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Impact of Rented Houses on Household welfare in Developing Countries: An Empirical Study

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ABSTRACT

Household welfare is a big concern to all countries particularly in developing countries. However, if the aim of studying is not only improving the well-being of households who are currently poor, but also preventing people from becoming poor in the future, a new forward-looking perspective must be adopted. This study is applied descriptive statistics and binary logit model to investigate the impact of living in privately rented house on household poverty status (proxy to welfare) the logistic regression model has as dependent variable the poverty status (poor and non-poor). This study is based on cross section data. The result of the econometric model indicates that households living in privately rented house is significantly 3.571 times more likely currently poor than owner households; the married couples was found to be 5.228 times more likely poor compared to single household heads; income of the household negatively and household size positively and an education attainment of the household significantly negatively affect the household poverty status.

Keywords: Poverty, Welfare, Household, Logistic Regression, Binary Logistic Regression, Rented Houses

1. INTRODUCTION

1.1. Background of the Study

This question of welfare must be rethought and aimed towards measuring the perceived quality of one's situation in life. This study uses this question as a foundation to access urban household welfare. It focuses on the rented households in order to determine the impact which is contributed to his welfare. Although housing is an integral part of a human settlement that fulfils a basic need and has a profound impact on the quality of life, health, welfare as well as productivity of man; a large proportion of urban residents in less developed countries do not have access to decent housing at an affordable cost. As a result of this, inadequate housing condition has become an intractable challenge that has continued to receive attention from governments, professionals, developers and individuals in most developing countries. Addis Ababa is a city with various aspects of urban problems, which include among others, severe housing shortage and poor housing, a highly skewed income disparity, deepening poverty, a concentration of low incomes, overcrowded conditions, high rates of unemployment, transport and infrastructure problems and other related urban problems. In Addis Ababa, there is an ever growing mismatch between the size of the population and its demand for basic services.

1.2. Statement of the problem

The most expensive item of household expenditure is rent and for many tenant-households, this takes up more than a third of their income. When people live in their own homes they may save on rent payments. Rent fee is critical for each household for many different reasons, but most important for low-income households because it takes a large portion of income this is the drawback to fulfill other basic needs. Spending too much on rent means less money for other necessities, including food, education, and medical care. The most intensively studied household poverty and welfare status in developing countries include: age of the household head, gender, marital status, employment sector, education level, household characteristics, household size, dependency ratio, and so forth.

1.3. Objectives of the study

The main objective of this study is to evaluate the impact of living in privately rented house, on household welfare; so as to contribute to the understanding on the impact of rented on household welfare: A case of woreda 8, Yeka sub-city, Addis Ababa.

The specific objectives include:

i. To evaluate the impact of rented on households' welfare status.
ii. To evaluate the effect of living in rented houses on households' food expenditure.
iii. To investigate the synergy between rented and poverty status of the households.
iv. Based on research findings, draw policy recommendations to address the rented household welfare problems.

1.4. Research hypothesis

H1: Living in privately rented houses increase the probability of being poor.

H2: Having own houses increases household per capital expenditure.

1.5. Significance of the research

This study helps to identify whether the living in rented houses has any negative impact on household welfare or not. Housing basically constitutes an important part of the wealth of any given urban households, the owners. When house rent fee values appreciate, it is translated to the wealth of the rent house provider directly or indirectly through various ways. It also increases the impact on the rented households. Therefore, the study is providing evidence to policy-makers so that appropriate interventions and correct choices would be made with regard to allocating limited resources to an area where a real difference is possible.

1.6. Scope of the study

The research is focused on Addis Ababa, Ethiopia. Particularly the study is conducted at Yeka sub-city. Under Yeka sub-city, woreda 8 are focused. Yeka sub-city is the second most large populated sub city next to Kolfe Keraniyo sub-city. This shows the prevalence of tenants living within the same compound which affirm the best representation of the areas of the research problem. Municipal city rental houses (kebele homes) were not discused in this research because of the contract type, payment duration, minimum rent fee and living environment condition.

2. LITERATURE REVIEW

The studies of the household welfare and poverty have been modeled using two alternative approaches. The first approach employs probit/logit models to examine the the probability of a households being poor or not. This approach has been widely used in the empirical literature by previous scholars (see McKenzie, 2006; Mok *et al.,*

2007; Akerele and Adewuyi, 2011; Edoumiekumo *et al.,* 2013).

This study adopts consumption as a measure of welfare. The literature review shall therefore be limited to studies that have followed the same approach to analyze the household welfare or poverty (see Geda *et al.,* 2005; Akerele and Adewuyi, 2011; Cheema and Sial, 2012; Sekhampu, 2013). They are commonly used the second approach Ordinary Least Squares (OLS) estimation procedure to regress household per capita consumption on a number of factors that contribute to one's welfare.

It is difficult to find empirical works regarding the rented household situation. Despite this fact, the researcher was tries to review some works which are closely related to the concept of privately rented household welfare impact. Some empirical works which are concerned with homeowner household's benefits compare to rent.

Increasing household size raised the probability of being poor in Kenya (Geda *et al.,* 2005) and South Africa (Sekhampu, 2013). There are findings dependency ratio in explaining the poverty incidence and household welfare. For example Edoumiekumo *et al.,* (2013) found that higher dependency ratio significantly and positively increase the probability of households plunging into poverty (one more person increases in the household the probability that the household is poor by 0.0036 percent). The inverse relationship between household size and per capita consumption, and by implication the positive relationship between household size and poverty, is a common finding in the empirical literature (Datt and Jolliffe (2005); Gounder, (2012). Evgjeni xhafaj and Ines nurja (2014) they found increasing of household size, there is a decreasing per capital expenditure of consumption.

Employment of the household enhances household welfare. Sekhampu (2013) found that employment of the household was negatively associated with the probability of being poor. Similarly, Mukherjee and Benson (2003) found that having at least one household member engaged in formal wage employment led to a significant increase in household welfare in Malawi. Thus, marriage reduces the risk of falling into poverty and unmarried individuals and single-parent families are more likely to be poor than their married counterparts (White and Rodgers, 2000).

Gender of the household head was found to influence household welfare and poverty in Kenya (Geda *et al.,* 2005) Female-headed households were more likely to be poor than male-headed households. In other finding household headed by females, reduce the probability of being poor (Evgjeni xhafaj and Ines nurja 2014), in Nigeria Male-headed households were more likely to be poor than female-headed households John C. Anyanwu (2014).

The other issue that has arisen from past studies is that the relationship between age and poverty may be non-linear, implying that poverty is relatively higher at a young age, decreases at middle age and then increases again at an old age Datt and Jolliffe, (2005) and John C. Anyanwu (2014).
Rastislav Sec and Petr Zemcik, (2007) they try to investigate the effect of changes in rents on consumption. Finally, their result shows that for renters a 1 percent increase in rents decreases consumption by 0.25 percent as compared with the homeowner and higher house prices imply greater consumption growth for homeowners but not for renters. The analysis suggests that higher rents imply a consumption reduction for renters.

According to Andrea L. Bentzinger and Christine C. Cook, (2009) on their MSc thesis entitled *"Low-income homeownership: Benefits, barriers, and predictors for families in rural areas"*. They try to investigate the benefit of homeownership compared to rented households. They found that homeowners were more likely to have a higher education than were their renting counterparts. This shows that education level had a positive relationship with tenure status, the other strong variable shows that 64.4 percent of owners were food secure, whereas only 42.8 percent of renters were categorized as food secure, meaning owners were more likely to be food secure than were their renter counterparts and the results of life satisfaction shows that 62.3 percent of homeowners compared to 51.4 percent of renters rated being satisfied or very satisfied with life. Housing ownership condition was found to be more important in predicting self-esteem and life satisfaction than income, occupation or education.

Fru Awah Wanka, (2014) and John C. Anyanwu (2014) supported the Andrea finding on his study the impact of educational attainment on household poverty. Finally, the result shows that when households head with primary or no educations are more likely to be poorer than those who head with tertiary education (a household with the

head having education is 32.79 percent, less likely to be poor than a household with the head having no education). The analysis suggests that there is a negative relationship between education and poverty, meaning the higher the level of education the lower the probability of being poor.

According to Gary V. Engelhardt, *et al.,* (2010) on their research called *"What Are the Social Benefits of Homeownership? Experimental Evidence for Low-Income Households"* they try to show the social activation of renters compared to the owners. Finally, the result shows that renters invest less than owners in social capital and local amenities because renters are more geographically mobile but not long-term effects. Moreover, there is no evidence that homeowners are more politically involved than renters.

Lawrence Yun and Nadia Evangelou, (2016) supported Gary V. Engelhardt, *et al.,* (2010) finding about the mobility of renters higher than owners frequently on their research called *"Social benefits of homeownership and stable housing"* finally the result shows that homeowners move less than renters, and hence are embedded into the same neighborhood and community for a longer period, 5 percent of owner-occupied residents moved, nearly 25 percent of renters changed residential location. That is, people with the same age, income, and marital status was significantly more likely to change residence in a given year if he or she was a renter rather than a homeowner.

3. RESEARCH METHODOLOGY

3.1. Description of the study area

Woreda 8 is one of the 13 woredas of Yeka sub-city. The total population is 27,490 located in the centre of megenagna and kasanches villages, Based on woreda 8 administration data there are 5498 households and 5788 house units (Private, public or kebele, governmental rented, 7 block condominiums and other houses), within the total households, owned 2548 households, rented 2850 households. Total 4500 households, 2039 homeowners and 2461 rented households were targeted to this study.

3.2. Sources and Collection of data

To achieve the objective of the study, quantitative and qualitative data are gathering from both primary and secondary sources. The primary data was obtained from households and the woreda administration offices. This helps to get first-hand information from the residents and officials about household's situation. The secondary data collection constitutes an extensive survey of literature from different sources including books, journals, official documents, websites and reports from the town housing project office, sub city administration, and woreda administrations. To gather information from selected owned and rented households a formal survey was conducted on the sample population of 354 household heads by using structured questionnaires with closed-ended questions from each ketenas.

3.3. Sampling technique, Sampling frame and Sample size

In this study, two types of sampling techniques were used. Those are from random sampling and stratified random sampling methods. Woreda 8 administration household list as a sampling frame to study. The head of rented and owner households was selected from each stratum by using stratified random sampling and by applying the principle of the proportional sample selection method. Head of households was stratified according to their "*ketena*" (sub Woreda unit) in order to conduct the survey in the Woreda. Accordingly, there are nine (9) "*ketena*" and the total head of the households is 4500 homeowners 2039 and rented 2461.

To calculate sample size the following formula is used (Kothari, 2004, pp 175):-

$$n = \frac{Z^2.p.q.N}{e^2(N-1) + Z^2.p.q}$$

Where, n = sample size required = 354, N = number of population = 4500, p = 0.5, q = 0.5, e = 0.05, Z = confidence

level = 1.96 for 95 percent confidence.

The head of households was selected from each stratum by using stratified random sampling and by applying the principle of the proportional sample selection method. The sample size in each stratum is proportional to the size of a stratum.
With proportionate stratification, the sample size of each stratum is proportionate to the population size of the stratum. Strata sample sizes are determined by the following equation:

nh = (Nh / N) * n Where nh is the sample size for stratum h, Nh is the population size for stratum h, N is total population size, and n is total sample size (Kothari, 2004).

Table 3.1: Proportional sample allocation method

		Number of Households		Sample Size	
Woreda	Ketenes	Owner	Rented	Owner	Rented
	Ketene 1	252	221	20	17
	Ketene 2	172	154	14	12
	Ketene 3	255	181	20	14
	Ketene 4	220	313	17	25
08	Ketene 5	234	258	18	21
	Ketene 6	210	304	17	24
	Ketene 7	227	253	18	20
	Ketene 8	261	439	21	35
	Ketene 9	208	338	17	16
Total	9	2039	2461	162	192

Source: Computed from unpublished document of woreda 8 administration

3.4. Methods of data analysis

The studies of the household welfare and poverty have been modeled using two alternative approaches. The first approach employs probit/logit models to examine the probability of households being poor. The second alternative approach models the impact on welfare as measured by consumption or income using Ordinary Least Square (OLS). The empirical results from these approaches tend to yield similar results because factors that increase welfare measured by income or consumption should lower the probability of falling into poverty (Kabubuo-Mariara, 2002). In this study the first approach was choose.

The logistic distribution is also more preferable than the others in the analysis of dichotomous outcome variable, in that it is extremely flexible and easily uses a model from the mathematical point of view and results in a meaningful interpretation (Gujarati:2004 pp 617).

The logit model is a maximum likelihood estimator that allows for estimating the probability that an event occurs or not by predicting a binary dependent outcome from a set of observable independent or predictor variables.

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} \dots\dots\dots\dots + \beta_n X_{ni} + \varepsilon i \dots\dots\dots\dots\dots\dots (1)$$

Let us consider a linear regression of the form;

Y_i = the outcome variable predicted from the equation

X_i = a vector of explanatory variables representing household

β's = a vector of regression coefficients to be estimated

ε_i = the error term

Logistic regression assumes meaningful coding of the variables. Logistic coefficients will be difficult to interpret if not coded meaningfully. The convention for binomial logistic regression is to code the dependent class of interest as 1 and the other class as 0.

3.5. Maximum Likelihood Estimation

Although logistic regression model looks like simple linear regression model, the underlying distribution is binomial and α and β parameters cannot be estimated in the same way as for simple linear regression. The coefficients are usually estimated by the Maximum Likelihood Model (Park, Hyeoun-Ae, 2013). The likelihood is a probability to get observed values of the dependent variable given the observed values of independent variables. The likelihood varies from 0 to 1 like any other probabilities.

The probability estimation of the dependent variable as applied by Gujarati: (2004) can be represented by;

$$\text{Prob}(Y_i = 1) = F(\beta' X_i) \ldots\ldots\ldots\ldots\ldots (2)$$

$$\text{Prob}(Y_i = 0) = 1 - F(\beta' X_i) \ldots\ldots\ldots\ldots\ldots (3)$$

Where:

$$Y_i = \begin{cases} 1 \text{ if} - \text{HH poor} \\ 0 \text{ if} - \text{HH not poor} \end{cases} \ldots\ldots\ldots\ldots\ldots (4)$$

The probability model involves regression of the conditional expectation of Y on X as given by:

$$E(Y|X) = 1[F(\beta' X)] + 0[1 - F(\beta' X)] = F(\beta' X) \ldots\ldots\ldots\ldots (5)$$

The F-function represents that the logit model uses a logit cumulative distributive function. When an outcome variable is dichotomous or binary, the relationship between variables may be nonlinear and can be converted into linear ones through logarithmic transformation. Therefore, the logit regression equation from which the probability of the outcome variable (Y) is predicted is given by:

$$P(Y = 1|X) = \frac{e^{\beta' X}}{1 + e^{\beta' X}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

$$P(Y = 0|X) = 1 - \frac{e^{\beta' X}}{1 + e^{\beta' X}} = \frac{1}{1 + e^{\beta' X}} \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where:

P(Y) = the probability of Y occurring as defined in equation (4)

e = the base of natural logarithms

The logit regression in equation 6 and 7 are expressed in logarithm terms and overcomes the problem of nonlinearity. The result of the logit regression varies between 0 and 1: values closer to 0 indicates that the outcome variable (Y) is unlikely to have occurred and values closer to 1 indicate the probability of Y occurring is very high.

According to Gujarati: (2004)

$$\frac{\partial E[Y_i|X_i]}{\partial X_i} = F(\beta' X)[1 - F(\beta' X)]\beta \ldots\ldots\ldots\ldots\ldots (8)$$

It indicates how much percent the probability of (Y=1) changes when the X covariates change by one unit. SPSS software version 21 has an inbuilt system to compute the coefficients of the logit function and the marginal effects.

3.6. Selection of dependent and independent variables

The variables used in the binary logistic regression are summarized in the Table 3.

Table 3. 2: Description of variables for both models

Variables	Types	Variable description	Expect sign
Dependent variables			
Poverty status	Binary	Poverty = (1 if poor and 0 if not poor)	
Explanatory variables			
Age of the HHH**	Categorical	18-29 years old	+/-
		30-40 years old	
		41-50 years old	
		Above 51 years old	
Gender of HHH	Binary	HHH ; 1=Male, 0=Females	+/-
Marital status of HHH	Binary	HHH ; 0=if single, 1= if married	-
Household size	Continuous	Total number of members in HH	+
Education of HHH	Categorical	Primary school level (Grade 1-8)	-
		Secondary school level (Grade 9-12)	
		Tertiary level	
Household income	Categorical	< 3500 Birr	-
		3501-5500 Birr	
		5501-7500 Birr	
		7501-9500 birr	
		> 9501 Birr	
Employment sector of HHH	Categorical	Own business	+/-
		Government employee	
		Private organization employee	
		Unemployed	
Housing situation	Binary	0= if Owned 1 = if Rented	+/-

*HHH indicate household head

4. RESULTS AND DISCUSSION

4.1 Descriptive Analysis

Table 4.1: Summary statistics of variables

Variables names		Frequency	Percent
	Female HHH	122	35.36
Gender	Male HHH	223	64.64
Marital status	Single HHH	107	31.01

	Married HHH	238	68.99
	Owners HH	162	46.96
Housing situation	Rented HH	183	53.04

Source: Researcher's own calculations using survey data 2024.

Table 4.2: Summary statistics of the household head age

Age	Owned	Rented	Total
18-29 years old	35	67	29.57
30-40 years old	76	104	52.17
41-50 years old	24	10	9.86
Above 51 years old	27	2	8.41
Total	162	183	345

Source: Researcher's own calculations using survey data 2024.

The findings showed that 73.22 percent rented and 50 percent of owner respondents had about 1-3 persons in their household which implies that household member size of rented almost 23 percent less than house owner households but 42 percent owners had about 4-6 persons that is about 20 percent much more of rented. The average household size was 3.82 and 2.86 persons, respectively.

Table 4.3: Summary statistics of the household size

Household size	Frequency	Percent
1 household member	64	18.55
2-3 household members	151	43.77
4-5 household members	95	27.54
6-7 household members	21	6.09
More than 8 household members	14	4.06
Total	345	100

Source: Researcher's own calculations using survey data 2024.

Majority of respondents (54.49 percent) used common and 45.51 percent used a private toilet, respectively. Majority of rented households 73.77 percent were used the common toilet that means sharing with owners and other rented neighbors but 67.28 percent owners had a private toilet which sharing with no ones.

Table 4.4: Summary statistics of the household head employment sector

Employment sector	Frequency	Percent
Own business	56	16.23
Government employee	142	41.16
Private organization employee	95	27.54
Unemployed	52	15.07
Total	345	100

Source: Researcher's own calculations using survey data 2024.

It was also observed that 68.11 percent respondents earned a living income from a different source as means of salary, 17.68 percent were from own business profit and 28.4 percent from rent fee. The findings showed that majority of the rented respondents (83.61 percent) earn a living income from salary. Government employment is the main source of households‟ income and this implies that working in government office had a big chance of living in a privately rented house. The findings showed that 3 percent of rented household head respondents were unemployed but surprisingly 28.4 percent owners' household heads are unemployed. This implies that own living

house is guaranteed during retirement and unemployment periods.

Table 4.5: Summary statistics of the household monthly income

Monthly income	Rented (percent)	Owners (percent)	Total (percent)
< 3500 Birr	16.94	10.5	13.91
3501-5000 Birr	35.52	22.84	29.57
5001-7500 Birr	23.5	21.6	22.61
7501-9500 Birr	11.47	20.37	15.65
> 9501 Birr	12.56	24.69	18.26

Source: Researcher's own calculations using survey data 2024.

The findings in Table 4.5 showed that 13.91 percent of total respondents were earning on average less than 3500 Ethiopian birr per month, 16.94 percent rented household and 10.5 percent owner households. 24.69 percent of owners were earn more than 9501 birr per month (12.56 percent rented were earn more than 9501 birr). This implies that house owners had high income than rented households.

Table 4.6: Summary statistics of the household head education level

Education level	Frequency	Percent
Primary school level	32	9.28
Secondary school level	66	19.13
College Diploma level	99	28.7
Bachelor Degree level	136	39.42
Masters level	12	3.48
Total	345	100

Source: Researcher's own calculations using survey data 2024.

This number implies that bachelor degree holding was not guaranteed for having own living house. Almost 40 percent of house owners in research areas do not finish high school. The averages per capital expenditure for rented household members are 1433 birr (minimum 584 and maximum 3800 birr) as compared to rented household member's averages per capital expenditure 1671 birr (minimum 100 and maximum 3453 birr).

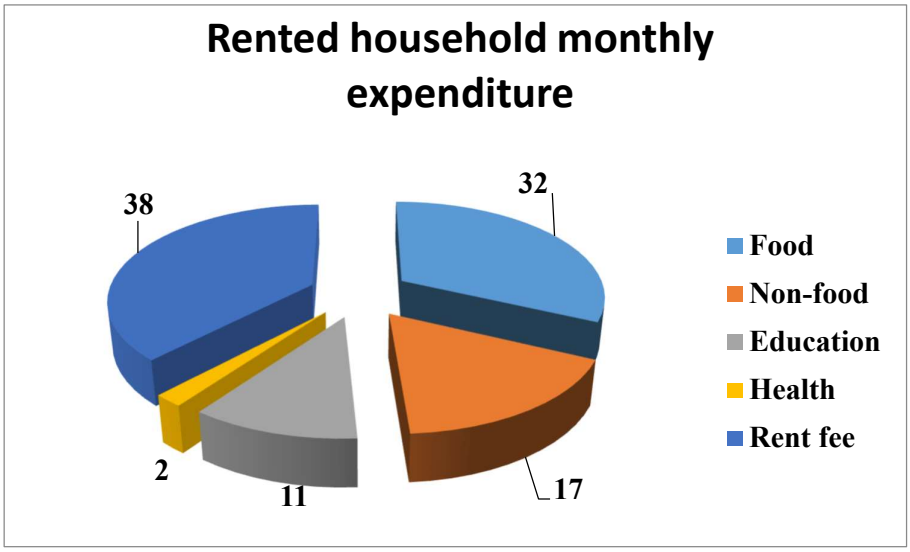
Table 4.7: Summary statistics of the monthly expenditures

Expenditures	Rented (percent)	Owners (percent)	Total (percent)
Food	32	43	30.23
Non-food	17	37	21.37
Education	11	17	11
Health	2	3	2.14
Rent fee	38	0	35.05

Source: Researcher's own calculations using survey data 2024.

The average monthly non-food expenditure of the rented households is Birr 849.5. As compared to the mean monthly income, Birr 5122.732, the households spend 17 percent of the average monthly income. The average monthly non-food expenditure of the owner households is Birr 1779.6 As compared to the mean monthly income, Birr 6470.8, the households spend 37 percent of the average monthly income. This implies that rent-free households had a chance to spend more for recreation, clothes and holiday expenses.

Figure 4. 1: Rented household monthly expenditure



Source: Researcher's own calculations using survey data 2024.

Rented households were poorer than owners because extra monthly rent fee (38 percent of net monthly income) was the burden of only rented households. 50.6 percent of house owners even under the poverty line. This implies that owning living house guaranteed for long-run asset as a property, for living permanent places, self-esteem and living freedom, the source of income and social respect but not the only reason to out of poverty based on per capital expenditure poverty measurement method.

Table 4.8: Summary statistics of gender and marital status with poverty status

Households	Rented (percent)	Owners (percent)	Total (percent)
Single household head	31.8	52.38	27.8
Married household head	76.9	51.51	72.19
Female-headed household	66.1	52.38	64.28
Male-headed household	58.87	51.51	55.15

Source: Researcher's own calculations using survey data 2024.

Total observation poverty status 64.28 percent female-headed and 51.15 percent male-headed households are poor (female-headed households 7 percent poor than male-headed households). A Similar finding from the gender of the household head was found to influence household welfare and poverty in Kenya (Geda *et al.,* 2005) female-headed households were more likely to be poor than male-headed households. In other finding inversely household headed by females, reduce the probability of being poor (Evgjeni xhafaj and Ines nurja 2014).

Table 4.9: Summary statistics of education and poverty status

Education level	Rented household poor	Owner household poor	Total poor
Primary school level	100	85.7	87.5
Secondary school level	66.6	55.5	59
College Diploma level	64.8	37.7	53.5
Bachelor Degree level	55	44.6	51.4
Masters level	50	0	25

Source: Researcher's own calculations using survey data 2024.

Summary of education and poverty status Table show us the incidence of being a poor decline when educational attainment increase let see rent household statistics when the household head primary education level 100 percent under the poverty line as compared to 85.7 percent house owners, total respondents 87.5 percent at primary level heads are poor. When the household increase educational background to secondary level the poverty incidence level decline to 66.6 percent (33.4 percent change) for rented, 55.5 percent (30.2 percent change) and 59 percent for total observation (18.5 percent change) being poor.

Table 4.10: Summary statistics of age and poverty status

Age	Frequency	Poor
18-29 years old	102	50.98
30-40 years old	180	56.66
41-50 years old	34	50
Above 51 years old	29	82.75
Total	345	100

Source: Researcher's own calculations using survey data 2024.

Based on Table 4.10 summary statistics after the age of 41 at each age group poverty incidence increase, majority 81.7 percent economic active age group from 18-40 years old respondents were poor. At the age of above 51 at retirement age 82.75 percent of respondents were poor. This statistic implies that at age of between above 41-50 years old the incidence of being poor better than at the age above 51 years old. Based on per capital expenditure poverty measurements between the ages of 18-29 years category most respondents are single and few household members then less poverty status than age group 30-40 years old. This all indicates that age undetermined effect on being poor.

Table 4.11: Summary statistics of household size and poverty status

Household size	Frequency	Total poor (percent)
1 household member	8	12.5
2-3 household members	83	54.96
4-5 household members	70	73.68
6-7 household members	20	95.23
More than 8 household members	14	100

Source: Researcher's own calculations using survey data 2024.

Based on summary statistics of employment sector and poverty status within 41.16 percent civil servant respondents in the study areas 61.26 percent were under poverty line, unemployed households difficult to earn relatively enough income to satisfy the household basic needs 9.75 percent (33 observations) 75.75 percents are poor this implies house owners without formal work they were earning income from rented rooms and 5.5 percent (9 only house owner respondents) 63.15 percent were poor, relatively own business generator households had much better poverty status 35.7 and 28.15 percent, respectively.

1.1 4.2 Binary Logistic Regression with All Independent Variables

In this thesis, the IBM SPSS version 21 software was used to conduct logistic regression. Let us see what happened when we used all 8 explanatory variables as predictors in our model. Before estimating the models, it was necessary to check for multicollinearity. The reason for this is that, if multicollinearity turns out to be significant, the simultaneous presence of the two variables will attenuate or reinforce the individual effects of these variables. The problem of multicollinearity was checked by variance inflation factor VIF (variance-inflating factor) based on test for each variable was 1.49 (see Appendix Table 2) which is less than 10 then there is no multicollinearity problem (Gujarati, page 366).

Based on the "Case Processing Summary" output it is visible that 345 cases used out of 345 (100 percent cases included).

Table 4.12: Case Processing Summary

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	345	100.0
	Missing Cases	0	.0
	Total	345	100.0
Unselected Cases		0	.0
Total		345	100.0

The case processing summary simply tells us about how many cases are included in our analysis. The dependent variable encoding reminds us how our outcome variable is encoded '0' for 'non-poor' (per capital expenditure above poverty line) and '1' for 'poor' (per capital expenditure less than poverty line) (see Appendix Table 3 dependent variable encoding). The category that is assigned the value zero is called the reference category. When interpreting results, all comparison is made with references to this category (see Appendix B: Table 1 all variable categorical Table).

Table 4.13: Classification Table (block model)

Classification Table[a,b]

Observed			Predicted		
			poverty status		Percentage Correct
			non-poor	Poor	
Step 0	poverty status	non-poor	0	150	.0
		poor	0	195	100.0
Overall Percentage					56.5

a. Constant is included in the model.
b. The cut value is .500

According to Table 4.13 the model with just the constant is a statistically significant predictor of the outcome. However, it is only accurate 56.5 percent of the time! The reason we can be so confident that our baseline model has some predictive power (better than just guessing).

The omnibus tests of model coefficients Table give the result of the Likelihood Ratio (LR) test which indicates whether the inclusion of this block of variables contributes significantly to model fit. A p-value (sig) of less than 0.05 for block means that the block 1 model is a significant improvement to the block 0 model.

Here the chi-square is highly significant (*chi-square=194.685, df=16, p<.001*) so our new model is significantly better. The *Sig.* values are $p < .001$, which indicates the accuracy of the model improves when we add our explanatory variables.

Table 4.14: Omnibus Tests of Model Coefficients

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	194.685	16	.000
	Block	194.685	16	.000
	Model	194.685	16	.000

4.3. Model summary

Model summary has values shown in Table 4.15 indicate how good the model fits the data.

Table 4.15: Model Summary

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	277.700[a]	.431	.578

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

In this summary it is visible that -2 Log likelihood (goodness of fit test) is 277.700. By itself, this number is not very informative this statistic measures how poorly the model predicts the decisions (Karl L.Wuensch, 2014). The p-value for our overall model is less than 0.05, which means that null hypothesis is rejected and there is evidence that at least one of the explanatory variables contributes to the prediction of the outcome.

Cox & Snell R square and Nagelkerke R square are both methods of calculating the explained variation. The Cox & Snell *R2* can be interpreted like *R2* in a multiple regression, but cannot reach a maximum value of 1. The Nagelkerke *R2* can reach a maximum of 1(Karl L.Wuensch, 2014). For our model, the explained variation ranges from 0.431 to 0.578 depending on whether we reference Cox & Snell R square or Nagelkerke R square, respectively. Nagelkerke R square is the modification of Cox & Snell R square and is more preferable to use. From the Table 4.15, we can conclude that between 43.1 percent and 57.8 percent of the variation in poverty can be explained by the model. In our case it is 0.57.8, indicating a moderately strong relationship of 57.8 percent between the predictors and the prediction.

Table 4.17: Classification Table

Classification Table[a,b]

Observed			Predicted		
			Poverty status		Percentage Correct
			non-poor	poor	
Step1	poverty status	non-poor	117	33	78.0
		Poor	38	157	80.5
	Overall Percentage				79.4

a. Constant is included in the model.

The classification Table tells us how good the fitted model is for prediction purposes. Based on Table 4.16 SPSS output result 345 households included in the analysis, 79.4 percent of them (or 117+157=274) are classified correctly on the basis of their household characteristics. This Table is the equivalent to that in Block 0 (Appendix B: Table B4**)** but is now based on the model that includes our explanatory variables. As you can see our model is now correctly classifying the outcome for 79.4 percent of the cases compared to 56.5 percent in the null model.

Table 4.17: Hosmer and Lemeshow Test

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	7.327	8	.502

The null hypothesis of this test is that the model fits the data well. As can be seen from the Table 4.17 the Chi-square test statistic is insignificant p-value 0.502 (as the p-value exceeds 5 percent). Thus we can conclude that the model fits the data well.

The next Table 4.19 provides the regression coefficient (B), the Wald statistic (to test the statistical significance) and the all-important Odds Ratio (Exp (B)) for each variable category. If the odds ratio Exp (B) is less than one

(i.e., the estimated regression coefficient is negative), then this means that the odds (or the likelihood) of being poor is higher for the reference category. On the other hand, if Exp (B) is greater than one, then the odds are higher for a particular category as compared to the reference category.

Table 4.19: Variables in the Equation

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	house(1)	1.273	0.35	13.242	1	0.000*	3.571	1.799	7.087
	gender(1)	0.026	0.334	0.006	1	0.939	1.026	0.533	1.975
	mst(1)	1.654	0.474	12.176	1	0.000*	5.228	2.065	13.238
	edulev	-0.625	0.339	3.405	1	0.065***	0.535	0.275	1.04
	empsec			4.918	3	0.178			
	empsec(1)	-1.102	0.632	3.044	1	0.081	0.332	0.096	1.146
	empsec(2)	-0.223	0.614	0.132	1	0.716	0.8	0.24	2.664
	empsec(3)	-0.331	0.611	0.293	1	0.588	0.718	0.217	2.381
	age			0.619	3	0.892			
	age(1)	0.374	0.991	0.143	1	0.706	1.454	0.209	10.131
	age(2)	0.059	0.925	0.004	1	0.949	1.061	0.173	6.495
	age(3)	0.095	0.945	0.01	1	0.92	1.1	0.173	7.004
	size			42.187	2	0.000*			
	size(1)	-6.563	1.263	26.984	1	0.000*	0.001	0	0.017
	size(2)	-4.117	1.219	11.414	1	0.001*	0.016	0.001	0.178
	income			41.516	4	0.000*			
	income(1)	-1.168	0.532	4.825	1	0.028**	0.311	0.11	0.882
	income(2)	-2.065	0.605	11.653	1	0.001*	0.127	0.039	0.415
	income(3)	-3.318	0.678	23.973	1	0.000*	0.036	0.01	0.137
	income(4)	-4.182	0.712	34.515	1	0.000*	0.015	0.004	0.062
	Constant	7.219	1.493	23.382	1	0.000*	1364.78		
a. Variable(s) entered on step 1: house, gender, mst, edulev, empsec, age, size, income.									

Source: Researcher's own calculations using survey data 2024.
*** Significant at 10%; ** Significant at 5%; * Significant at 1%

The variable house situation is significant at the 1 percent level of significance (p-value 0.000). The odds ratio for the house (1) is 3.571 since the coding house (1) refers to the household who are living in the rented house. The reference category house (0) refers to the household who are living in owned house and Exp (B) is greater than one the implication is that the household who are living in the rented house is 3.571 times more likely being poor as compared to the household who are living in an owned house, keeping all other covariates constant. Similar finding with housing ownership condition was found to be more important in predicting self-esteem and life satisfaction than income, occupation or education Andrea L. Bentzinger and Christine C. Cook, (2009).

The variable marital status of the household head (mst) is significant at the 1 percent level of significance (p-value 0.000). The odds ratio for mst (1) is 5.228 since the coding mst (1) refers to the household head who are married. The reference category mst (0) refers to the household who are single (never married) and Exp (B) is greater than

one the implication is that the household who are married are 5.228 times more likely being poor as compared to the household who are single (never married), keeping all other covariates constant. This implies that household per capital expenditure (poverty line) decrease with the household head become married, i.e. married couples had a chance to build family adding children's then monthly expenditure divided for a large number of household members per capital expenditure also decrease (falling to under poverty line). 65.96 percent married and 71.96 percent single household head were earned just the amount of mean income (between 5500-7500 birr per month), and in family size perspective 77.3 percent married household head had between 3-5 household members but single household head 79.44 percent had only between 1-2 household members.

5. CONCLUDING REMARKS

The paper concludes that living in privately rented house relates with an incidence of poverty and negatively impact on per capita expenditure (living rented house 3.571 times more likely being poor than owners). However, the relationship between living in privately rented house and poverty (or welfare) implying that poverty is relatively higher at rented households than house owners household. The paper concludes that age brings no gains in household welfare and poverty. However, the relationship between age and poverty (or welfare) is not significant. Housing is the leading factor in achieving education, medical care and food. In Addis Ababa lack of adequate housing, extreme rapid population growth, rural-urban migration from all over the country, inefficient house construction capacity, unemployment, income inequality, shortage of land, sever corruption and poor maintenance of the housing stock of most residents, as a result there is a huge gap between housing demand and supply in the city (there is house deficit). Availability of affordable houses for the low-income urban population is the main point to which the government and every stakeholder have to give attention.

The results and analyses above suggest that policy interventions are necessary to reduce poverty in Yeka sub city woreda 08 and Addis Ababa in general. The condominium housing program is one of the pro-poor programs being implemented in Addis Ababa targeting the low and middle-income households. Evaluating the welfare effects that can be attributed to the housing program is important to see what the program is achieving besides solving the housing shortages. Based on the empirical findings, the following policy implications are drawn to minimize the welfare impact of the privately rented households.

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