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Article

Affordability of residential house rent market value in Hawassa city

Cogent Economics & Finance

Provided in Cooperation with:

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Suggested Citation: Shitaye, Aschale Mekuria (2022) : Affordability of residential house rent market value in Hawassa city, Cogent Economics & Finance, ISSN 2332-2039, Taylor & Francis, Abingdon, Vol. 10, Iss. 1, pp. 1-11,
<https://doi.org/10.1080/23322039.2022.2048341>

This Version is available at:

<https://hdl.handle.net/10419/303605>

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To cite this article: Aschale Mekuria Shitaye (2022) Affordability of residential house rent market value in Hawassa city, Cogent Economics & Finance, 10:1, 2048341, DOI: [10.1080/23322039.2022.2048341](https://doi.org/10.1080/23322039.2022.2048341)

To link to this article: <https://doi.org/10.1080/23322039.2022.2048341>



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Published online: 05 Apr 2022.



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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Affordability of residential house rent market value in Hawassa city

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Received: 20 December 2021
 Accepted: 27 February 2022

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Reviewing editor:
 Francesco Tajani, university of bari, ITALY

Additional information is available at the end of the article

Abstract: The urban housing situation in Ethiopia is a wide gap between housing demand and actual supply in all urban centers of the country. Generally, the study aims to examine the affordability of residential house rent market value. Specifically, the study aims to assess the characteristics of rental housing, examined rent affordability; identify factors that determined rental affordability in Hawassa city, Sidama Regional State, Ethiopia. The study employed both primary and secondary data. Primary data were obtained from 219 rental households through questioners. For data analysis, the study employed both descriptive and inferential statistics. Logistics regression estimation technique was used to examine the affordability of residential house rent market value. About 68.04% of surveyed households were paid 30% or less of their monthly income to residential house rent, and 31.96% of a household were spent more than the thresholds' income level. The findings of the study revealed that household income, marital status, number of rooms, transport access and house typology are the determinants of residential

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Aschale Mekuria is a lecturer at Hawassa University, Ethiopia. His current research interests are industry development issue like manufacturing, construction development, industrial economics and labor economics.

PUBLIC INTEREST STATEMENT

Rental housing is an essential part of the housing market in all African cities. This paper examines the affordability of residential house market value in Hawassa city, Sidama region, Ethiopia. The finding of the study reveals that household income, marital status, house rooms, transport accessibility and house typology are determinants of residential house market value affordability in Hawassa city.

Table 1. Description of the model of variables, measurement and expected sign

Variable name	Description	Measurement	Expected sign
House rent affordability	Defined as rent-income ratio. It is a dummy variable	1 = affordable and 0 = not affordable	Response variable
Family size	It is a continuous variable and measured in numbers of household members	-	marital status
It is a dummy variable	1 = married and 0 = unmarried	+	Household income
It is monthly income of the household. It is continuous variable and measured in Ethiopian birr	-	+	Rooms
It is continuous variable and measured in numbers of house room	-	+	Transport
Its dummy variable	1 = if it is within 10 minutes walking distance to the road and 0 = otherwise	-	Kitchen/dining room
It is dummy variable	1 = yes and 0 = no	-	House typology
Its dummy variable	1 = private rent house and 0 condominium	+	

house rent market value affordability in Hawassa city, Sidama region, Ethiopia. The study suggests that government should be focused on constructing public houses, controlling the effects of illegal brokers and subsidizes private house builders through credit access, tax break down for imported construction materials and provision of land with low lease.

Subjects: Urban Studies; Urban Economics; Cities & the Developing World; Economics; Industry & Industrial Studies

Keywords: Residential house; rent value; affordability; logistic regression; Hawassa

1. Introduction

Housing is an essential need affecting the well-being of all citizens and it accounts for the largest share of the consumer price index (Bajari & Kahn, 2005). Lower-income households typically live in lower-quality housing, on which they spend a greater share of their disposable income (Tadashi & Jonathan, 2020).

Housing prices in China experienced a rapid increase, which made the housing affordability issue become critical to Chinese. Low and middle income groups, who expected to buy their own houses from the market, suffered greatly from the affordability issue as well as indecent living conditions (Zou, 2014). Similarly, a rapid house rent prices increment in Papua New Guinea challenge middle income households not to afford house rent prices and will affect their welfare, because they might find it difficult to afford other necessities such as nutritious food and clothing (Ezebilo, 2017). There is a housing problems in Tanzania looked at from either the stock point of view or the quality point of view. From the housing stock point of view, empirical evidence suggests that Tanzania has been on serious shortages since independence when the housing issue came into policy focus (Mosha, 2012).

Like other housing markets within the Sub-Saharan African (SSA) region, residential rental housing market in Ghana is characterized by high demand over available supply; high rental values coupled with generally low incomes; and government policy focus on homeownership with less attention to the rental housing market. Ghana's market follows a free-market model with the active participation of the private sector as the main suppliers of new developments (Arku, 2009a, 2009b; Tiple & Korboe, 1998).

Renting offers a more affordable way for many people to gain access to accommodation. The provision of adequate housing is a very integral part of the needs of every society and has great value for individuals, families, communities and society at large (Opoku & Abdul-Muhmin, 2010).

Rental housing is an integral part of a well-functioning housing market. In spite of this, governments in Africa have done little to support the improvement of rental housing which already exists or the expansion of affordable rental housing (Louise Schultz, 2011).

Rental housing is an essential part of the housing market in all African cities. For large-scale property developers and investors, one way to earn money from the properties they own is to rent them out to short-term or long-term tenants (Khan, 2018).

In particular, rental valuation is important as renting is becoming an increasingly popular form of tenure due to the rising, and often inaccessible, cost of buying residential property (Belachew, 2013).

Like many other fast-growing cities in developing countries, there is a severe shortage of affordable formal housing in Ethiopia. The urban housing situation in Ethiopia is a wide gap between housing demand and actual supply in all urban centers of the country; even those existing have low quality and space (Abreham, 2018).

Lack of sufficient and affordable housing is one of the major problems in Addis Ababa as well as in other cities and towns across the country (Selam & Abebe, 2018).

Similarly like other urban cities in Ethiopia, Hawassa also face residential housing problems. Due to the effects of population growth result from migration, insufficient residential house supply, existence of many house and land brokers and other factors both the rent price and purchasing house price are unaffordable in the city (Bereket & Nigatu, 2015).

So far, there are different studies conducted on housing problems; the majority were mainly focused on affordability of constructing house while some of them were on determinants of house rent from owners perspective. This includes the studies made by Selam and Abebe (2018), Firoz khan (2011), Belachew (2013), Sebsbe et al. (2017), Masresha and Mesfin (2020), Abebaw (2021), Abaynew (2019) and Bereket and Nigatu (2015) to mention a few. They mention population growth, urbanization, inadequate house supply, expensive house rent and low household income as major causes to render peoples to own their house. Furthermore, a few studies conducted on affordability of house rent use shelter poverty approach as measurement of affordability. However, this measurement method is not good enough to show level of affordability due to existence of high inflation and devaluation of Ethiopian local currency currently. Therefore, given this major knowledge and research gap, this study intended to examine the affordability of residential house market value in Hawassa city, Sidama Region, Ethiopia. The rest of the paper is structured as follows: section 2 deals with literature review. Section 3 and 4 provides the overall methodology and analysis of results and discussions, respectively. Section 5 offers conclusion and recommendations.

2. Literature review

“Rental housing” is defined as property owned by someone other than the resident or by a legal entity for which the resident pays a periodic rent to the owner. In “pure” rental housing schemes, there is no obligation for the owner to sell or for the resident to buy the occupied unit. It is simply a formal or informal agreement between a tenant and a landlord to rent a dwelling for a certain period of time at a predetermined price (Peppercorn & Taffin, 2013).

Below 250 m distance to University of Sri Jayewardenepura and above 25 ft² floor area per person are the most determining variables in rental values of bed as rented unit. Freely available water, freely available electricity, attached bath room and neighborhoods characteristics as less congestion/privacy were second order factors in determining rental value in Sri Lanka (Nishani, 2015).

Eugene and Maureen (2019) conducted a research on economic analysis of the housing rental market in formal and informal built areas of Port Moresby, Papua New Guinea. The finding state that the most important predictors of house rent in formal areas were the availability of recreation areas, access to infrastructure and the use of the same bathroom and toilet by different families.

Eugene (2017) conducted on evaluation of house rent prices and their affordability in Port Moresby, Papua New Guinea. It is found that house rent price is strongly linked to the number of bedrooms and the location of a house. Houses located in areas where basic trunk infrastructure and services are lacking attract the lowest rent price, whereas houses located in and around the CBD had a higher rent price.

Ivy and Ernest (2013) conducted on factors determining residential rental prices in Ghana. The result stated that locational characteristics, apartment characteristics such as the number of bedrooms, the availability of amenities (water and electricity supply), Sharing of apartment facilities and availability of facilities (toilet and bathroom) are statistically significant in determining rental charges.

Abaynew (2019) stated that household's income, the structure of the housing unit (single vs. multiform), household structure (single/divorced vs. married) and city/town size are significantly affecting rental affordability in eastern Ethiopia cities.

Number of rooms, the total area occupied by the house, dummy variable for transport or taxi availability, hospital or clinic availability and categorical variable for housing typology (i.e. categorical variable for housing typology being private and condominium house) are statistically significant and positively affect rental house price in Hawassa city (Sebsbe et al., 2017).

Access to water, age of house, near to amenities, floor material of the house, number of bedrooms, access to toilet and land are the determinants of rental house price in Debre Berhan Town, North Shewa Zone (Abebaw, 2021).

Yuan (2017) conducted on identifying critical factors influencing the rents of public rental housing delivery in Nanjing. The result stated that stakeholders assign greater value to construction costs, household income, floor area and structure, transportation, market rents in the same district and public facilities were statistically determine the rents of public rental housing .

The number of bedrooms, access to a balcony, the security of the compound, access to a lift, access to a road, and access to a parking area, area of the apartment, type of external wall finish, and the location of the site had the most significant impact on the rental value in Addis Ababa (Masresha & Mesfin, 2020).

Oluseyi et al. (2017) conducted on determinants of market value of residential properties in Ibadan metropolis, Nigeria. The finding revealed that the major determinant factors that influence the rental value of residential building in the study area are number of toilets, existence of burglar alarm and condition of the buildings while type of building and number of toilets are major determinant factors influencing capital value.

Bereket and Nigatu (2015) also found that 61.7% of their sample household in Hawassa city were shelter poor (their housing expense goes beyond 30% of their monthly income) whereas, the remaining 38.3% were non-shelter poor. Among the major problems that lead households to shelter poverty were low household income, large family size, high rental/mortgage cost, tenants choose of condominium houses for residential purpose, increase in the general price of both housing and non-housing items, down payment problems and bank loans related problems are some the problem.

Dependency ratio of the household, floor area of the house, dummy variable for migration status of household head and categorical variable for housing typology are statistically significant to explain the change in the housing affordability in Hawassa city (Sebsbe et al., 2017).

3. Research methodology

3.1. Study area profile

Hawassa is a city in Ethiopia, on the shores of Lake Awassa in the Great Rift Valley. It is 273 km south of Addis Ababa via Bishoftu, 130 km east of sodo, and 75 km north of dilla. The town serves as the capital of Sidama region. It lies on the Trans-African Highway 4 Cairo-Cape Town and has

a latitude and longitude of 7° 3' N 38° 28' E and an elevation of 1,708 meters above sea level. Hawassa city has eight sub cities with a total population of 315,267 and three of them (i.e. Addis Ketema, Menahreya and Tabor Sub cities) have private rental houses, kebele houses and condominium houses in combination (sebsebe et al., 2017).

3.2. Sampling technique and sample size

The sampling frame for the collection of data is rental units in Hawassa city. The study employed multi stage, proportional and random sampling technique in the survey. A simple random sampling technique was used to choose three sub cities (Tabor, Menahrya and Haikdar sub cities) from eight sub cities and four kebeles from three sub cities. Proportional sampling technique was used to take the sample size of 219 from all four kebeles. Both quantitative and qualitative data were collected from primary and secondary data sources. Primary data were gathered from 219 household's lives in rented house using well-structured questioners. Secondary data were gathered from different documented and published sources including books, journals and official documents (government housing report, policies and strategies)

3.3. Methods of data analysis

Data collected from respondents have been entered, coded edited, interpreted and analyzed using descriptive and inferential statistical methodologies. Descriptive methods are used to change the raw data in to meaningful information that would be easy to understand and interpret the study. The methods include frequency, percentages, mean, and standard deviations, maximum and minimum. Moreover, the study used tables, pie-chart as a method of data presentation.

Furthermore, one-way ANOVA, correlation test, and t-test analyses tools were employed to show the association and variation of the different variables. The study employed Binary logit model to examine the affordability of residential house rent market value. For this estimation, STATA software version 15 is used.

3.3.1. Model specification

The objective of this study is to examine affordability of residential house rental market price in Hawassa city. To create a threshold line for residential house rent affordability, the study used housing cost approach (rent to income ratio). This approach states that housing affordability as the ratio between what households pay for their housing and what they earn and affordable rental housing should cost only a certain percentage (usually about 25–30%) of a household's monthly income (Chris Fiscelli, 2005; Ndubueze, 2009). A household spends less than or equals to 30% of their income is categorized as affordable and households that spend more than 30% of household monthly income were categorized as not affordable. Binary logistic regression is used when the dependent variable is dichotomous and the independent variables are either continuous or categorical (Gujarati et al., 2004). A binary logistic regression analysis helps us to estimate whether a rental unit was within a threshold level of a household income or not. The affordability of residential house market value is specified as follow:

$$P_i = E(Y = 1|X_i) = \beta_0 + \beta_1 X_i \quad (1)$$

Where P_i = the probability of an occurrence of an event, $Y = 1$ means the household afford residential house rent and X_i = explanatory variables explaining affordability.

$$P_i = E(Y = 1|X_i) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_i)}} \quad (2)$$

For easy of exposition equation 1 rewrite as:

$$P_i = \frac{1}{1 + e^{-Z_i}} = \frac{e^{Z_i}}{1 + e^{Z_i}} \quad (3)$$

Where, $Z_i = \beta_0 + \beta_1 X_i = X' \beta$ Where X is vector of (family size, household income, number of rooms, marital status, transport access, kitchen /dining room availability and house typology) explanatory variables and β is vector of model parameters

Parameters in such nonlinear model are not necessarily a measure of change of probability for a unit change in covariates (X's). But vector β shows the effect of covariate X's on the average value of Z conditional on X[E(Z/X)]. However, parameters are interpreted only in terms of odd ratio. Odd ratio implies the ratio of probability of residential house rent market value affordability to the probability of not affording the market value of residential house rent. The odd ratio of binary response model defined as

$$\text{oddratio} = \frac{\text{pr}(y = 1/x)}{[1 - \text{pr}(y = 1/x)]} = \frac{\frac{e^{X'\beta}}{1 + e^{X'\beta}}}{1 - \frac{e^{X'\beta}}{1 + e^{X'\beta}}} = e^{X'\beta} \quad (4)$$

Taking the natural log of the odd ratio give an interesting result of logit and defined as follows:

$$L = \ln\left(\frac{P_i}{1 - P_i}\right) = Z_i \quad (5)$$

Where P_i = the probability of affording residential house rent market value, while $1 - P_i$ = the probability of not affording residential house rent market value.

But in many applications, the primary goal is to explain the effects of explanatory variable on response probability Pr (Y =1), not of the log of odd ratio.so, the change in probabilities result from a change in explanatory variables can be computed by marginal effects. This is important to explain or predict the effect of household income, family size, number of rooms, marital status, transport access, kitchen /dining room availability and house typology on affordability of residential house rent market value. Marginal effect is defined as:

$$\frac{\partial E(y/x)}{\partial x} = \frac{\partial \text{Pr}(y/x)}{\partial x_j} \quad (6)$$

4. Result and discussion

4.1. Descriptive statistics

Table 1 and Table 2 indicates that overall about 68.04% of surveyed households were paid 30% or less of their monthly income to rent and 31.96% of a household were spent more than the thresholds' income level allocated to rent of rent to income category assessment methods. From this result, one can conclude that the dominant households spent within the threshold level of income acceptable by international standards, however, the quality of the residential units is in a poor condition and households are forced to compromise a rental prices with the adequacy of the housing units. With regards to marital status, the majority (138) was married and 81 were unmarried. In relation to accessibility of transport, 42.47% of the total respondents rent houses are near to main road, while 57.53% of them are far from the main road. Kitchen and dining distribution indicates that 43.84% of the respondent rent house has kitchen and dining rooms, whereas 56.16% of respondents rent house

Table 1. Description of the model of variables, measurement and expected sign

Variable name	Description and measurement	Expected sign
House rent affordability	Defined as rent-income ratio. It is a dummy variable 1 = affordable and 0 = not affordable.	Response variable
Family size	It is a continuous variable and measured in numbers of household members	–
marital status	It is a dummy variable 1 = married and 0 = unmarried	+
Household income	It is monthly income of the household. It is continuous variable and measured in Ethiopian birr	+
Rooms	It is continuous variable and measured in numbers of house room	–
Transport	Its dummy variable 1 = if it is within 10 minutes walking distance to the road and 0 = otherwise	–
Kitchen/dining room	It is dummy variable 1 = yes and 0 = no	–
House typology	Its dummy variable 1 = private rent house and 0 condominium	+

Table 2. Percentage distribution of affordability of residential house rent market value attributes

Variable		Frequency	Percent
Residential house rent market value	Affordable	149	68.04
	Not affordable	70	31.96
Marital status	Married	138	63.01
	Unmarried	81	36.99
Transport	Available	93	42.47
	Not available	126	57.53
Kitchen/dining	Yes	96	43.84
	No	123	56.16
House typology	Condominium	96	43.84
	Private	123	56.16

hasn't a kitchen or dining rooms. The percentage distribution of house typology shows that from the total 219 respondents 96 households live in condominium, whereas 123 of them lives in private rent house.

Table 3 indicates that the average family size of the surveyed households were 3.37 with a minimum one and maximum of seven household members. With regards to household income, the average income of surveyed household is 7231.46 birr; a minimum of 1800 and maximum of 25000 Ethiopian birr monthly household income. Finally the average numbers of rooms that a household lives were two with a minimum of one room and maximum of three rooms.

Table 3. Summary statistics on affordability of residential house rent market value

Variable	Obs	Mean	Std. Dev.	Min	Max
Family size	219	3.369863	1.759693	1	7
Hhs income	219	7231.461	3908.74	1800	25000
Rooms	219	2.059361	0.7609395	1	3

Table 4. Binary logit coefficients and marginal effect of residential house rent market value

Logistics regression		Number of obs = 219	
		LR chi²(7) = 55.38	
		Prob > chi² = 0.0000	
Log likelihood = −109.53573		Pseudo R² = 0.2018	
Affordability of residential house rent			
	Coefficients	Standard error	Mfx(dy/dx)
Family size	.0127791	.1353917	.0024504
Marital status	1.250409***	.4892584	.2539929
Household income	.0002674***	.0000712	.0000513
Rooms	−1.313355***	.271159	−.2518397
Transport	−1.247307***	.4219545	−.2465211
Kitchen/dining	−.1644037	.3519529	−.0316733
House typology	1.050249***	.4383986	.1939622

Note: *** indicates that at 1% level of significant.

4.2. Econometrics analysis

Table 4 reveals that marital status of households is significant and positively affects the outcome variable affordability of residential house rent market value. The marginal effect shows that if households are married, then the probability of affording residential house rent market value increased by 25.4% with relative to not affordable, holding all other factors constant. This implies that the married the households are the more income which enables them to afford residential house rent. This result is inconsistent with the recent study conducted in eastern Ethiopia, which indicated that household marital status was negatively and significantly affect affordability of house rent (Abaynew, 2019).

Household income and affordability of residential house rent are positively correlated, indicating that the probability of affording residential house rent market value increase by 0.005% as household income increased by one unit compared with households not afford house rent, all variables held constant. This is due to the fact that when the household income increases the ability to pay for housing is increased. The result is consistent with the findings of recent studies conducted in Ethiopia, which stated that the likely of house rent affordability varies significantly with the change in household income (Abaynew, 2019; Sebsbe et al., 2017).

Number of rooms and residential house rent affordability are negatively and significantly related at 1% level of significance. The marginal effect shows that as the numbers of house rooms increases the probability of affording residential house rent market value decreased by 25.2% in comparison with households not afford house rent, holding all other covariates constant. This implies that the

likelihood of rent affordability is decreases as numbers of rooms increased from a single size unit to many rooms and confirms the finding of Ernest (2013) conducted in Ghana; number of rooms is statistically significant in determining rental charges.

Availability of transport (taxi) also negatively and statistically correlated with affordability of residential house rent market value. The marginal effect indicate that the households who were easily access transport, the probability of affording residential house rent market value decrease by 24.6% relatively with households not affording house rent value, all other factors being equal. This result indicates that the likelihood of residential house rent affordability decreases as households live near to the road.

Furthermore, with regards to house typology, the likely of residential house rent affordability varies significantly with house typology. The marginal effect indicates that the likelihood of residential house rent market value increases by 19.4 percent relatively with households not affording residential house rent, other things remain constant. This implies that the probability of affording residential house rent market value increases as households live in private rent house in relation with households live in condominium. With this finding, it is possible to conclude the market rent value of condominium is higher in relation with market rent value of private rent house.

5. Conclusion and recommendations

Generally in developing countries and particularly in Ethiopia, the rental sector is a residual to alternatives of housing supply modalities and government at national or local levels are failed to allocate enough resources and failed to regulate it. Result from this, the issue of residential house rent affordability is a major concern of low income groups in the society. The objective of the study is examining the affordability of residential house market value in Hawassa city, Ethiopia. The result of logistics regression analysis revealed that household income, marital status, number of house rooms, transport access and house typology are significantly determine the affordability of residential house market value. From the total surveyed households 68.04% were affording residential house rent whereas 31.96% were not affording residential house rent using a 30% rent income ratio method as a threshold level of affordability measurement.

Due to high land lease price, high cost of house construction materials and low level of house finances the need of the majority income groups was restricted to rental options and they are struggling in the rental market. With this, they obliged to live in poor quality house and face hike house rent which is inflated by illegal brokers and forced to pay more than what they expect to pay and afford. Therefore, the study suggests that government should be focused on constructing public houses, controlling the effects of illegal brokers and subsidizes private house builders through credit access, tax break down for imported construction materials and provision of land with low lease.

Acknowledgements

I would like thank the editor and reviewers for the constructive comments and suggestions.

Funding

The authors received no direct funding for this research.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Citation information

Cite this article as: Affordability of residential house rent market value in Hawassa city, Aschale Mekuria Shitaye, *Cogent Economics & Finance* (2022), 10: 2048341.

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