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Article

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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Determinants of residential house rental price in Debre Berhan Town, North Shewa Zone, Amhara Region, Ethiopia

Abebaw Hailu Fikire^{1*}

Abstract: This study aims to investigate the determinants of residential house rental price in Debre Berhan town, North Shewa Zone, Amhara Region, Ethiopia. For this purpose, the study used both primary and secondary data. The data were obtained from 385 sample respondents. Questionnaires were used to collect the necessary data. Descriptive and inferential statistics were employed to analyze the data. Ordinary least square estimation technique was used to examine the determinants of residential house rental price. It found that floor material, age of the house, land size, access to water, near to amenities and the numbers of the bedroom are the determinants of residential house rental price in Debre Berhan Town, North Shewa Zone. The study suggests that zonal and regional governments need to establish residential house rent control programs to stabilize the unaffordable rental price of houses in Debre Berhan Town.

Subjects: Urban Economics; Macroeconomics; Microeconomics; Environmental Economics

Keywords: Rental house price; Debre Berhan; North Shewa zone

1. Introduction

Shelter is one of the basic needs of humankind, and it is important for the physical survival of human beings (Habitat, 2011). The adequacy and quality of housing are an indication of productivity, well-being and satisfaction. If the quality of housing is adequate and accessible to all, the government and people will spend less on the provision of health care facilities, recreation, crime prevention and pollution, and productivity and prosperity will increase. For retirees and the poor, housing is a form of security. Today, housing ownership is seen as an investment by many (Woo et al., 2016).

ABOUT THE AUTHOR

Abebaw Hailu is a lecturer at Debre Berhan university, Ethiopia. His current research interests are development issues like urban and rural development, microeconomics and macroeconomics. He has published one paper dealing with the determinants of urban housing choice in Debre Berhan Town, North Shewa Zone, Amhara Region, Ethiopia.



Abebaw Hailu Fikire

PUBLIC INTEREST STATEMENT

Rise in the residential house rental price indicates that there is a wide gap between housing demand and the current market supply for residential house in study area. This paper examines determinants of residential house rental price in Debre Berhan Town, North Shewa Zone. The study results confirmed that floor material, age of the house, land size, access to water, near to amenities and the numbers of the bedroom are the determinants of residential house rental price in Debre Berhan Town, North Shewa Zone.

A major challenge of the pattern of urbanization, particularly in third world countries, pertains to meeting the housing needs of the cities' crowded population and reminds that high rates of urbanization exert tremendous pressure on urban housing and land markets. This is partly reflected in the housing shortages that characterize developing countries (Arimah, 1997).

The higher housing price reveals how many people are willing to pay for the amenities, water and nice places. When we describe a house it usually describes the quality or the characteristics of its structure, environment and locality attribute. The structural attributes can be the number of the bedrooms, toilets and bathrooms; the area of the house; the age of the house and the floor material; areas for car parking are the structural features of the house. The preferred location of the house is by the side of the bus stop, airport, school, hospital and city centers. Environmental attributes can be the quality of air and quality and availability of water (Samapatti & Tay, 2002). Sila (2015) stated that location of house, wall material, and number of bedrooms and toilets had positive and significant effects on the price of the house.

Most cities in Ethiopia, like many other fast-growing cities in developing countries, face a severe shortage of affordable formal housing. The urban housing situation in Ethiopia is a wide gap between housing demand and actual supply in all urban centers of the country. The major factors behind the current housing problems are high cost of standard construction materials, urbanization trend, construction permit guidelines, areas allowed for renewal by master plans and tenure for the low level of housing condition in Ethiopia. This results in a chronic shortage of housing due to accumulated demand over time, as indicated by the significance of overcrowding and increased number of homeless people (Robi, 2011). In Ethiopia, most of the studies were focused on factors affecting the real estate market, housing provision and challenges of urban residents and assessment of the housing provision challenge for urban residents. To mention some, Aquabamicheal (2009) studied factors affecting the real estate market in Addis Ababa city. Wordofa & Akmel (2014) studied the assessment of housing provision challenges for urban residents in Bekoji Town. Residential house rental prices are increasing at an alarming rate in Debre Birhan town as a result of uncontrolled fast urbanization, expansion of industry and high population growth. However, this study intends to examine the determinants of residential house rental prices in Debre Birhan town.

2. Research methodology

2.1. Study area profile

Debre Birhan or Birhan, formerly spelled Debra-Birhan or Bernam, is a city and woreda in central Ethiopia. Located in the North Shewa Zone in the Amhara Region, about 130 km northeast of Addis Ababa, on the paved highway to Dessie, the town has a latitude and longitude of 9°41'N 39°32'E and an elevation of 2,840 m. It was an early capital of Ethiopia and afterward, with Ankober and Angolalla, it was one of the capitals of the kingdom of Shewa. Today, it is the administrative center of the North Shewa Zone of the Amhara Region (Chisholm, 1911). It has nine kebeles with a total population of 103,450 of whom 46,553 are men and 56,897 are women. The five largest ethnic groups reported in the town were the Amhara (90.12%), the Oromo (3.94%), the Tigrayan (1.81%), the Gurage (1.6%) and the Argobba (1.2%); all other ethnic groups made up 1.33% of the population. Amharic was spoken as a first language by 93.81%, Oromiffa was spoken by 3.04% and 1.5% spoke Tigrinya; the remaining 1.65% spoke all other primary languages reported (CSA, 2014).

2.2. Research approaches

The study used both quantitative and qualitative research approaches in analyzing the quantitative data presented with the help of tables, percentages, frequencies, figures and charts. However,

the qualitative data are also analyzed by using the narrative mechanism, which uses tabulated figures converted into statements.

2.3. Sources and methods of data collection

This study used both primary and secondary data. Primary data were collected through structured questionnaires. The questionnaires were designed as a closed-ended type. The questionnaires were pre-tested to check its clarity and understandability by local people (respondents) and to get quality data. The questionnaire was prepared in the English language and then translated into the local language (Amharic language) to make it easy for communication. Furthermore, 404 questionnaires were prepared and distributed to urban households who are living in Debre Berhan Town; 385 questionnaires were properly completed and returned on time in 2019/2020 fiscal year. However, secondary data were gathered from documented and published sources including books, journals, central statistics reports and reports from North Shewa Urban Municipality Development Bureaus.

2.4. Sampling technique and sample size determination

The study used purposive, proportional and random sampling designs in the survey. A simple random sampling technique was used to select four kebeles from a total of (nine) kebeles. Proportional sampling technique was used to take the sample size from each kebele. In this study, we applied a simplified formula provided by Yamane (1967) to determine the required sample size at 95% confidence level and 5% the margin of error. The Yamane formula is expressed as:

$$n = \frac{N}{1 + N(e^2)} = \frac{10443}{1 + 10443[0.0025]} = 385 \quad (1)$$

Where n = sample size; N = the total number of households who live in four kebeles and ε = error tolerance or margin of error. The list of sampled kebeles, the number of households and the sample respondent distribution from each kebele is depicted as follows in Table 1.

2.5. The methodology of data analysis

Data collected from different sources have been edited, interpreted and analyzed using descriptive and inferential statistical methodologies. Descriptive methods included tabulation, percentage and average. Inferential statistics are used to determine the relationship among a variable and to make a prediction by using ANOVA, t-test and correlation coefficients. Multiple regressions were used to examine the determinants of residential house prices. After the completion of the data collection, the data were coded and entered into programs of Stata version 13.0 software.

2.6. Model specification

The aim of this study is to explore the determinants of rental house price in Debre Berhan town. Supposedly, the number of bedrooms; access to toilets, wall materials and amenities; accessible to water; age of the house and land size are uncorrelated with the error term. The determinants of rental house price are specified as follows:

$$\ln(\text{RHP}) = \alpha_0 + \alpha_1 (\text{number of bedrooms}) + \alpha_2 (\text{access to toilet}) + \alpha_3 (\text{floor material}) + \alpha_4 (\text{amenities}) + \alpha_5 (\text{age of house}) + \alpha_6 (\text{access to water}) + \alpha_7 (\text{land size}) + \varepsilon$$

Where $\ln(\text{RHP})$ is the natural logarithm of residential house rental price, α_0 is the intercept, α_1 , α_5 and α_7 are continuous parameters, α_3 , α_2 , α_4 and α_6 are dummy parameters and also α_3 is categorical variable and ε is the error term.

2.7. Diagnostic tests

2.7.1. Multicollinearity test

Before running the model, variables were assessed using the multicollinearity test to detect the problem of multicollinearity among the independent (explanatory) variables. The most common estimation technique for multicollinearity is the Variance Inflation Factor (VIF) for continuous variables and contingency coefficients for categorical variables, which were included in the empirical models. If the VIF is greater than 10 and contingency coefficient is above 0.8, then it indicates there is a series multicollinearity problem (Gujarati, 2004).

2.7.2. Heteroskedasticity test

Homoscedasticity is one of the basic assumptions of ordinary least square (OLS) methods of estimation. Since it represents the conditional variance of the explained variable that is known as disturbance term, is conditional upon the given value of the explanatory variable and does not change as the value of the explanatory variable changes, it remains the same. However, if the conditional variance of the explained variable continuously increases or decreases as the value of the explanatory variable changes, the problem of heteroskedasticity is encountered; if this is the case, homoscedasticity as one of the requirements for estimations of the population parameters will not be consistent. It is caused due to non-constant coefficients, omitted variables, non-linearity and data aggregation problems. In order to detect/identify the presence of heteroskedasticity, there are different mechanisms such as graphical method and formal test (Breusch-Pagan test, Koenker's test, White's test and Engle's ARCH test) (Gujarati, 2004).

2.8. Description of the model of variable, its measurement and expected sign

3. Results and discussion

3.1. Descriptive statistics

This research interprets and analyzes the findings gathered from primary and secondary sources. The results of the study focused on the determinants of residential house rental prices (Table 2). The findings have been presented and analyzed under the following themes:

Table 3 displays that 357 (92.73%) houses have access to toilet, whereas 28 (7.27%) of households do not have access to toilets in their compound. As regards near to amenities, 224 (58.18%) houses are near to amenities for instance, near to school, bus station, hospital and marketplace and 161 (41.82%) houses are not near to amenities. In relation to floor material, 61 (15.84%) houses are made up of earthen, 262 (68.05%) houses are finished by concrete, 49 (12.73%) ceramics and 13 (3.38%) houses are made up of wood.

Table 1. Name of sampled kebeles, number of the household and sample distribution in Debre Birhan Town

Name of sampled kebeles	Numbers of household each kebeles	Sample size
01	2106	77
05	2798	103
07	2786	103
08	2756	102

Table 2. Measurement and description of variable

Variable name	Description and measurement of variables	Expected sign
Residential house rental price	Defined as natural logarithm of residential house rental price. It is a continuous variable measured in Ethiopian Birr.	Dependent variable
Number of bedrooms	It is a continuous variable measured in numbers.	+
Access to toilet	It is a dummy variable 1 = Yes and 0 = No	+
Floor material	It is a categorical variable earthen = 1, concrete = 2, ceramics = 3 and wooden = 4	+
Near to amenities	It is a dummy variable 1 = near to amenities and 0, otherwise.	+
Age of house	Defined as the number of years from the date of construction to the day of the survey date in the full year. This is measured in years	-
Access to water	It is a dummy variable 1 = Yes and 0 = No	+
Land size	It is a continuous variable measured in square meter.	+

Table 3. Percentage distribution rental house attributes

Variables	Freq	Percent
Toilet access		
No	28	7.27
Yes	357	92.73
Floor material		
Earthen	61	15.84
Concrete	262	68.05
Ceramics	49	12.73
Wooden	13	3.38
Access to water		
No	4	1.04
Yes	381	98.96
Near to amenities		
No	161	41.82
Yes	224	58.18

Table 4 shows that the mean and the standard deviation rental house price are 2840.961 Birr (ETB) and 2205.965, respectively. The data indicate that there is an extreme difference between minimum rental price 300 and maximum rental price 8500 Birr (ETB). The mean number of bedrooms was 1.712 and standard deviation was 0.92. The minimum number of bedrooms is 1 and maximum number of bedrooms is 5. The mean age of the house is 14.556 with standard deviation of 8.546, the minimum and maximum age of the house is 2 and 40, respectively. The

Table 4. Summary statistics on determinants of rental house price

Variable	Obs	Mean	Std. Dev.	Min	Max
Rental price	385	2840.961	2205.965	300	8500
Age of house	385	14.556	8.546	2	40
Number of bedrooms	385	1.712	.92	1	5
Land size	385	169.901	179.8	14	500

Table 5. Heteroscedasticity and multicollinearity tests

Heteroscedasticity Test	chi2(1) = 2.97 Prob > chi ² = 0.0849	No heteroscedasticity problem
Multicollinearity Test	Mean VIF = 1.61	No multicollinearity

mean and standard deviation of rental house price is 169.901 and 179.80 square meters, respectively. The minimum is 14 and maximum is 500 square meters.

3.2. Econometric analysis

The study applies a method of analysis of OLS estimation in econometric analysis. For the purpose of effective estimation of the model, several normality tests and heteroskedasticity and multicollinearity tests for house price regression are presented (Table 5).

Table 6 shows that all the coefficients of the matrix are below 0.8, which implies there is no multicollinearity problem among the categorical variables. Hence, it is consistent with this hypothesis.

3.3. Determinants of rental house price in Debre Berhan Town

Table 7 reveals that numbers of bedrooms, access to toilet, floor material, access to water, age of house, near to amenities and land size are significant at 5%. On average, the value of the price of housing was higher for nearer to amenities than far from amenities by 25.7%, holding all other variables constant. On average, the value of the price of housing was higher for access to toilet than no access to toilet by 36.4%, holding all other variables constant. With one square meter increase in land size, rental price increase by 0.2%, ceteris paribus. As the number of bedrooms increased by one room, the price of the housing increased by 32%, while other things remain constant. On average, the value of the variable price of housing was higher for access to water than no access to water by 36.8%, ceteris paribus. As the floor material of the house became complex, the price of the housing was increased by 23%, while holding all other variables constant. A 1-year increase in age of house leads to a 0.9% decrease in the price of housing, ceteris paribus. This result is positively consistent with recent studies conducted in Kenya, which indicated that location and number of bedrooms were significant variables in explaining hedonic pricing (Sila, 2015).

4. Conclusion and recommendation

The issue of residential house rental prices is a major concern for developing countries, particularly in Ethiopia. Widespread arguments continue regarding what it contributes to and how to tackle it so as to see a better tomorrow. The main objective of the study is to examine the determinants of residential house rental price in Debre Berhan Town, North Shewa Zone, Amhara Region, Ethiopia. Purposive sampling was used to select Debre Berhan Town, and proportional and random sampling procedures were used to select 385 sample respondents. The study found that access to water, age of house, near to amenities, floor material of the house, number of bedrooms, access to toilet and land are the

Table 6. Correlation matrix of coefficients of regression model

Variable	Number of bedrooms	Access to toilet	Floor material	Access to water	Age of house	Near to amenities	Land size	_cons
Number of bedrooms	1.0000							
Access to toilet	-0.0528	1.0000						
Floor material	-0.0539	-0.2496	1.0000					
Access to water	0.0318	-0.0491	0.0277	1.0000				
Age of house	0.1742	-0.0866	0.1138	0.0480	1.0000			
Near to amenities	0.0347	-0.1956	0.0744	-0.0379	0.0309	1.0000		
Land size	-0.5629	-0.0529	-0.1865	-0.0859	0.1607	-0.1866	1.0000	
_cons	-0.2029	-0.2187	-0.0954	-0.8961	-0.1858	-0.0137	0.1313	1

Table 7. OLS Regression result for determinants of residential house rental price in Debre Berhan Town

Linear regression					R-squared = 0.715
					F-test = 163.368
					Prob > F = 0.000
Dependent variable	Coef.	St. Err.	t-value	Sig	
Number of bedrooms	0.32	0.033	9.59	***	
Access to toilet	0.364	0.093	3.92	***	
Floor material	0.23	0.039	5.83	***	
Access to water	0.368	0.077	4.77	***	
Age of house	-0.009	0.003	-3.03	***	
Near to amenities	0.257	0.049	5.21	***	
Land size	0.002	0	9.97	***	
Constant	5.817	0.109	53.17	***	

Note: *, ** and*** are levels of significance at 10, 5 and 1%, respectively

determinants of rental house price in Debre Berhan Town, North Shewa Zone. This study suggested that town administration and zonal and regional governments should formulate urban residential house rental price control programs to stabilize unaffordable rental prices in Debre Berhan Town.

Notes

- (1) Districts or woreda (in Amharic) are the third-level administrative divisions of Ethiopia. They are typically collected together into zones, which form a region (Yilmaz & Venugopal, 2008).
- (2) Kebele (Amharic word) means the lowest administrative unit in Ethiopia (Robi, 2011).
- (3) R² for the model was 0.715; this means 71.5% of the variance of the response variable price of a house is explained by regression model and the rest is due to an error. It may be necessary to note again that robust errors are reported because they reduce the effect of outliers in significance tests. p-value for the F-statistic <0.05 means that at least one of the independent variables is a significant predictor of the dependent variable (residential house price).

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