REVIEW ARTICLE   OPEN ACCESS

Study of Effecting Factors on Housing Price by Hedonic Model A Case Study of the Ninth District of Mashhad City

Azadeh Ebrahimi, Sadegh Bafandeh Imandoust and Mohammad Lashkari
Economic Department, Payame Noor University, Tehran, Iran

Abstract
In this paper, an investigation of the housing price in ninth district of Mashhad was presented. We applied a descriptive and analytical method for calculations. That is called Hedonic Model. We used 10 variables that covered the physical factors and access position. The results of 516 cases by software Eviews in version 3.1 indicated that 7 of 10 variable coefficients had a significant error about 5%. Also, the 3 variables of ground area and the distance of shopping centers and number of bedroom are no statistically significant, so these are not used in the final estimate. The structural that used for estimate of housing prices by Hedonic model with a logarithmic function. The researches indicate that the area of infrastructure in housing units and the number of floors are important factors for increasing housing price in Mashhad, so that for increasing in each 1% for the area infrastructure and number of bedrooms changed the housing prices about 0.9 and 0.0083 respectively. The factors of decreasing in housing price included age of construction, number of floors, distance of training center, parks and etc.
Keywords: Hedonic price model, Housing, Housing price of Mashhad, Mashhad.

I. Introduction

Housing is the smallest element for living and human's necessity and economic phenomenon's. Increasing urbanization and population are one of the important problems for providing housing [7]. The other factors in this problem are included increasing population, immigration from village, demolition and renovation of old buildings, smaller residential units and things like that [6]. In additional, the technical progress and scientific in housing, changing social conditions and building stable housing are important factors too [3]. One of the important parts of the housing plan is estimate function of demand housing. One of the important methods about function of housing demand is " Hedonic price method". In this method checked the housing as a multi-dimensional commodity and the price in each housing unit considered as a function of different variables such as land, infrastructure, number of rooms and etc.

At first the Hedonic price function was used by Hass in 1992. He estimated the price of agricultural land in Minnesota of United State. Hedonic function for price housing was examined in Louis of United State by Ridker, Henning, Kane, Kain and Qaigley in 1970. The other persons used this method too [10-13].

II. Situation of Housing in Mashhad

Mashhad is the second most populous in Iran, so that the population of Mashhad was 2,992,478 in 1389. This city is the center of population and immigration centers. The significant point about Mashhad is the theory of poverty in third thousandth anniversary. The high price of housing is a large problem for low-income groups. Studies show ; after that; occupation the important problem for low-income groups is appropriate housing, so the housing price increased.

III. Theoretical Model

Housing is a multi-part goods and services and the broader concept of a physical shelter.
In addition to housing is a physical structure that is a shelter includes general services and requirements for family welfare, occupation schemes, training and health [8]. Housing is considered as a means to establish a link between family life and environment [5]. Therefore, theory of Hedonic model considers different properties in building units.
According to this model, the price of housing Hedonic depend on various consumer goods (X), welfare environmental characteristics (Q), vector of physical properties such as rooms, materials posing, infrastructure and etc. (S).
Vector of access and neighborhood properties (N) [12].
If N_j, S_j and Q_j vector of housing characteristics and $P(z)$ is a function Hedonic housing prices, so function of household utility as follows:

$$U = U (X, Q_j, S_j, N_j) \qquad (1)$$

X is composed of non-housing goods with unit price and utility to access households with limitation of budget as follows:

Y=X+P(z)   (2)

P(z) in Eq. (2) is value of properties residential unit and X is value of other commodities.
So housing price depend on using properties of residential units in household demand.
This function is called function of price Hedonic (Pz_i) [13]. That is as follows:

$Pz_i = P(z) = P(Q_j, S_j, N_j)$ (3)

Eq. (3) is the function of price Hedonic that related each of the characteristics in residential and bazar price.
In maximum case of Eq. (1) and limitation of budget in Eq. (2) in result: the primary condition to maximum of welfare as follows:

$$U= U(X, Q_j, S_j, N_j) + \lambda(y - Pz_i - X)$$ (4)

$$\frac{\partial I}{\partial Q_i} = \frac{\partial U}{\partial Q_i} - \lambda \frac{\partial Pz_i}{\partial Q_i} = 0$$ (5)

$$\frac{\partial I}{\partial X} = \frac{\partial U}{\partial X} - \lambda = 0$$ (6)

Dividing the Eq. (4) and (5) and omitting λ:

$$\frac{\frac{\partial U}{\partial Q_i}}{\frac{\partial U}{\partial x}} = \frac{\partial Pz_i}{\partial Q_j}$$ (7)

In Eq. (7): $\partial U / \partial Q_j$, $\partial U / \partial X$, $\partial Pz_i / \partial Q_j$ shows additional desirability, final desirability and final value property respectively.
For estimating Hedonic price function can use the logarithmic function. That is the best fitting as follows:

$$Lnp_i = b_0 + \Sigma (b_i \ln z_i) + e_i$$ (8)

After fitting, the derivative of the function is obtained implicit price for each of properties:

$$p_{zi} = b_i z_i = \frac{\partial P_i}{\partial z_i}$$ (9)

IV.   Materials and Methods

The purpose of this paper an investigation of the housing price in ninth district of Mashhad. This research is a survey descriptive and analytical. The population of housing that is in the ninth district of Mashhad and that is a selection sample of simple random about 516 random sample. In this study for more accurate estimate no consider the residential and villas number and just are estimated statistics on residential apartment units.

V.   Results and Discussion

For achieving effect factors on the price of housing are used price Hedonic functions. In commodities that prices depend on goods properties, so hedonic function used for estimating price. In the present study we used the vectors of physical housing characteristics. For estimating Hedonic price function we applied a form of logarithmic function. The results of the software business computer (Eviews, 3.1) for 516 sample indicated that variable coefficients 7 of 10 independent variables had a significant statistically error about 5%. And also, the other variables such as, ground area and the distance of shopping and training centers and number of bedroom are no statistically significant, so these are not applied in the final estimate.
The results of estimating the model parameters Hedonic housing price for ninth district of Mashhad final estimate as follows:
LogPRC = C(1)+C(2)*LALA+C(3)*LAUB+C(4)*LLIF+C(5)*LNRO+C(6)*LTB+C(7)*LDST+C(8)*DED+C(9)*DHO+C(10)DPA
At the top:
ALA: Area
AUB: Area Infrastructure
NRO: Number of Bedrooms
LIF: Old Building
TB: Floors
DCE: Distance from Downtown
DST: Distance from Main Street

DHO: Distance from the Center of Healthcare
DED: Distance Learning Center
DPA: Distance of Parks and Green Space
The top model is estimated using the following ols:
Log p_m = 7/34 +0/03log ALA + 0/9 log AUB − 0/008 log LIF + 0/05 log NRO − 0/008 log TB − 0/06 DST + 0/007 DED − 0/02 DPA − 0/01 DHO + 0/01 log LIF × log AUB × DST
Table 1 shows that final estimate sample for all variables credited with about 95%. Explanation coefficient R^2 indicates that 82% of total independent variable changes, explained by changing of housing units. The other parameters explained by some variables that are not included in the model

Table 1: Estimating Initial and Final Hedonic Price Function for Residential Units in ninth district of Mashhad (2012).

Variable name	The expected sign	The estimated coefficient on the initial		The estimated coefficients of the variables in the final	
		Coefficients	Possibility	Coefficients	Possibility
Intercept	Positive	7.3924	0	7.3413	0
ALA	Positive	0.0144	0.7729	0.0384	0.4529
AUB	Positive	0.9023	0	0.9068	0
NRO	Positive	0.0701	0.0995	0.0555	0.1967
LIF	Negative	-0.0065	0/1012	-0.0084	0.0226
TB	Negative	-0.0084	0.0011	-0.0083	0.0226
DST	Negative	0.0051	0.5383	-0.0694	0.0624
DHO	Negative	-0.017	0.0226	-0.0158	0.0386
NED	Negative	0.0071	0.3037	0.0077	0.2614
DPA	Negative	-0.0264	0.0368	-0.0226	0.0401
	516 516			516	
R^2			0.82		0.82
$\bar{R}_2$			0.81		0.81
F- Statistics			256.452		232.706
D-W			2.07		2.08

Table 1 shows the most important factors that effective the price of housing in Mashhad. As discussed by 10 variables, the 3 variables omitted because the T-statistic is less than 5% and the credit less than 95%. So we applied only 7 variables in final estimate of the logarithmic function as the best structural model for this research. Referring to table 1, the most important factors that effective on price of housing in ninth district of Mashhad included area of infrastructure, number of floors and bedrooms, distance of downtown, main street, park and age of construction respectively.

The high effect physical factors on price of building are area of infrastructure. So that increasing about 1% in area of infrastructure in building changed the price of Hedonic in ninth district of Mashhad about 0.9%. Therefore, should be considered to infrastructure factors in building. Also, the negative factors are negative effect on the total price of residential units. The negative coefficient variable of age indicates that decreased the price of building unit for a unit change in the age of building unit about 0.0083% and decreased the price of building unit for a unit of variable in distance of residential unit from downtown unit change about 0.0694%. The study

shows that physical factors are more effect on housing price, so considering to physical factors is significant in planning of building.

VI. Conclusion

This paper presents a study of effecting factors on housing prices by Hedonic model for ninth district of Mashhad. Housing price in Hedonic model depend on 5 groups such as, physical properties, available and general characteristics, environmental parameters and roles. Experimental results showed that the area of infrastructure and number of floors are the most important factors for housing price in Mashhad. So that it can be seen that for 1% alteration in area of ground and infrastructure the housing price changed 0.9% and 5% respectively. Also, the factors such as, age construction, increasing distance of downtown, main street and training centers are negative effected in housing price. Using Hedonic price model improved the factors of affecting in housing price.

The other factors that involved like policies and practices of national and local government and economic structure in housing price too. It should be noted that increasing and decreasing of housing price depend on inflation in society because in our country land and housing are as a source of wealth. Our results in this research included only physical factors and position factors.

References

[1] Pourahmad. Ahmed , Ali. Shamaei, ''The Physical Development of the City of Yazd in the Old Town'', A Social Sciences, Tehran University, Ss31-3, 1380.

[2] Management and Planning Organization of Khorasan, Statistical Year book of Khorasan, 1385.

[3] Javadi, Artaxerxes, ''Evaluation of Policies in the Eield of Urban Land in Iran'', Iranian Architectural Research Center, Ss182-165, 1378.

[4] Hafez Nia, Introduction to the Human Sciences Research, Publications, Tehran, 1380.

[5] Habib, F, ''An Overview of the Housing'', Journal of Housing Foundation of Islamic Revolution, No. 106, Tehran, 1383.

[6] Khoshakhlagh, Rahman and Others, ''Estimate the Demand for Housing Using Hedonic Khomeini'', Journal of Economic Research, No. 55, Tehran University, pp. 117-99, 1378.

[7] Zra' race, Ibrahim Mansour Anvari, ''Estimate the Data Using a Combination Hedonic Housing Prices in Ahwaz'', Iran's Economic Journal, No. 28, Tehran, Ss168-139, 1385.

[8] Mokhber, Abbas, ''Social Dimensions of Housing for Planning and Budget Organization'', Tehran, 1363.

[9] Statistical Center of Iran, ''General Population and Housing Census of the City of Mashhad'', 1385.

[10] Arimah, Ben, ''Hedonic Price and Demand for Housing Attributes in Third World City: The case of Ibadan, Nigeria, Urban Steeliest'', Vol.3.1.N.2,PP639-657, 1992.

[11] Rosen, Sherwin, ''Hedonic Prices and Implicit Markets Product Differentiation in Pure Competition'', Journal of Political Economy, 82 PP 34-55, 1974.

[12] Freeman, Battalhon et al, ''Hedonic Prices, Property Values and Measuring Environmental Benefits'', Scandinavian Journal of Economics, vo194 pp.154-170, 2005.

[13] Kim, S.g, ''A Model of Rental Housing Choices in the Korean Market'', Urban Studies, Vo1.29, No.8 PP 1264-1274, 1992.