

DETERMINANTS AFFECTING HOUSING PRICES IN HO CHI MINH CITY

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ABSTRACT:

In an effort to develop a mass appraisal model implemented in Ho Chi Minh City, this research employs additive models based on a comparative approach with a sample of 1,300 houses are selling in Ho Chi Minh City. As indicated by results factors that most significantly determine housing price in Ho Chi Minh City are: (1) Living area, (2) Location, (3) Number of rooms, (4) Number of floors, (5) Distance to the front road, (6) Width of the front road, (7) Car parking, (8) Terrace. The research applies Hedonic's valuation model to build a research model of 8 factors affecting house prices in the city.

Keywords: Real estate market, housing prices affected determinants, Hedonic Price Model.

1. Introduction

Currently, the valuation of real estate in Vietnam still has numerous mistakes. The prices of land and housing market with the official price frequently vary greatly, leading to inadequacies in land clearance, creating opportunities for corruption. Besides, in mortgage valuation at commercial banks, mortgage valuation is also important, which is the basis for loaning, investment, capital contribution decisions; contributing to limiting bad debt and credit risk.

2. Literature Review

A. T. Court, an analyst of the US automotive industry, has established the first model named Hedonic in 1939. Later, this method has extended to other industry. For example, Brosen et al. (1984) applied the HPM model to determine the factors affecting the price of rice.

From heterogeneous goods, Lancaster (1966) analyzed the basic elements that constitute goods and suggested that demand for goods was not based on the goods themselves but the characteristics of the goods.

The model of Rosen, Lancaster, and all other hedonic models all speculate that goods have countless attributes that combine to and represent value. When making consumer choices, the value is not only the internal characteristics of a house such as the number of rooms, size, year of construction, but also in the aspect of the location and neighborhood characteristics, easy to access to shopping, schools, hospitals, parks, distance to work and environmental quality (Batalhone et al.2002).

One of the soonest studies about Hedonic model was conducted by Zangerle (1927) and Handerson (1931) on Principles of Real Estate Appraising paper, these two authors focused on studying the impact of environmental factors and individual characteristics of each property type such as structure of houses, views, air pollution, noise, vegetation. In 1974, on the Journal of Political Economy, Rosen also applied this model to real estate valuation in "Hedonic Prices and Implicit Markets."

In a study named "The Measurement of

Environmental and Resource Values" published in 1999. Freeman and A.M.I have mentioned that the price of a good is not the same, it could be determined through attributes related to that goods. If the goods were real estate, the price increased if it has such factors such as near supermarkets, hospitals, schools, beautiful views, views of the sea, etc.

In 1990, in a paper named "Aircraft noise and residential property values adjacent to Manchester International Airport." Penning et al. also applied the Hedonic model to investigate the effect of aircraft noise on price fluctuations in the area around Manchester international airport.

According to Hughes and Sirmans (1993) with research named "Adjusting house prices for intra-neighborhood traffic differences," they believe that besides the internal determinants of the house such as area, number of rooms; the external factors like street conditions, security, distance from the city, the workplace also affect house prices.

In 1995, on a paper named "Real Estate Values and Historical Designation" by Asabere Paul and Huffman Forrest. They also used the Hedonic model to study factors affecting apartment prices, and they concluded the same that external factors could affect real estate prices.

In addition, Asabere and Huffman also found that the average price of apartments decreased from 2.2% per block of apartments calculated from Market Street and 3.8% from Broad Street. According to them, distance from the real estate to the main street, distance from city center should also be house price factors.

In the next five years, from 1996 to 2001, many authors applied Hedonic model to tested several other characteristics affecting real estate prices across many different countries, for example, studying the impact of the surrounding environment, geographical locations, landscapes, near rivers and streams (Bullard, 1996; Brown and Charles, 1998; Spahr and Sunderman, 1999; Mahan et al., 2000); distance to parks, golf courses, swimming pools (Anderson, 2001)

Sergio A.B. et al. (2002), applied the Hedonic model to assess the impact of the environment that is typically emitted by a Brazilian waste treatment plant. He built 20 variables and built four models to analyse the impact of the air on the price of apartment. The results show that air quality affects

the price of apartment, the lower price apartment was located near the waste treatment plant.

Another empirical evidence of the study by L.M. Olayiwola, O.A. Adeleye, and A.O. Oduway, 2005, "Each correlation between the determinants of land prices in Lagos Metropolis, Nigeria." Scholars point out that land prices are influenced by factors such as distance, ability to bring income, transport infrastructure, surrounding environment, infrastructure, and state planning.

Model of Sibel Selim in 2008 studied the intrinsic elements of houses in Turkey, he built the valuation model as follows:

$$\ln P = bx + u$$

This model contains 46 variables. In this study, he used the semi-logarithm form for models. Variables include location characteristics (rural, urban); type of house (detached, basement, adjacent, apartment, other; the age of house; construction type (wood, brick, stone, mid-brick); numbers of room; house area. In addition, there are other variables, such as living room floor type, heating system, etc. The results of his Hedonic model regression show the house area, the number of rooms, type of house, drainage system, swimming pool, location characteristics and type of building are the most important variables affecting housing prices.

3. Methodology

This study conducted a survey of 1300 houses that are selling on the routes of 10 districts includes District 1, District 2, District 3, District 4, District 5, District 7, District 8, District 9, Binh Tan District, Phu Nhuan District.

Data in this study collected from selling information published on real estate website named alonhadat.com.vn.

House price per square feet, Size of living area (square feet), Distance to city (meter), Numbers of room, Numbers of floor, Façade or Alley, Width of the Plot, Width of Front Road, Terrace, Parking. Notably, data on distance from real estate to Bitexco Financial Tower due to the specific address should be measured through the website of popular locations search <https://maps.google.com/>. Since each observed property has a specific address, it can re-examined if necessary.

The Hedonic valuation method defined as a regression analysis technique used to determine

the value of goods-related attributes in the market during specific periods. Measurable properties such as size, speed, weight, etc. will affect the value of goods.

The semi-logarithm linear model consists of a dependent variable and eight independent variables:

$$\begin{aligned} \ln \text{PRICE} = & \beta_0 + \beta_1 * \text{SIZE} + \beta_2 * \text{LOCATION} \\ & + \beta_3 * \text{ROOM} + \beta_4 * \text{FLOOR} + \beta_5 * \text{FAÇADE} \\ & + \beta_6 * \text{FRONTROAD} + \beta_7 * \text{PARKING} \\ & + \beta_8 * \text{TERRACE} + \epsilon \end{aligned}$$

In which:

* $\ln \text{PRICE}$: dependent variable, natural logarithms of housing prices

* SIZE , LOCATION , ROOM , FLOOR , FAÇADE , FRONTROAD , PARKING , TERRACE : independent variables represent factors affecting residential housing prices

* β_0 : intercept

* $\beta_1, \beta_2, \beta_3, \beta_9$: regression coefficients show the impact level of similar factors applies to house prices.

* ϵ : random error

4. Data Analysis and Results

Descriptive Statistics result

the variance of the estimated coefficients is recalculated, without using the assumption of constant error variance. By estimating a strong standard error model, the model will give an accurate estimate of standard error in which the presence of the variance change phenomenon (heteroscedasticity) is accepted.

Therefore, we would apply the regression of Robust Standard errors to produce more reliable results. (Table 2).

Based on the results of table 2, we can withdraw the following conclusions: R-squared = 0.6157 means independent variables explain 61.57% variability of dependent variable $\ln \text{Price}$. F test: $\text{Prob} > F = 0.0000$ less than 5% proves that hypotheses H_0 (all regression coefficients are equal to 0) is rejected, the regression model is suitable for the data set.

In addition, all variables are statistically significant at the 5% significance level, except ROOM variable is not statistically significant, we remove it from the model.

Therefore, we have the remaining seven variables: SIZE , FRONTROAD , LOCATION , FAÇADE , PARKING , FLOOR , TERRACE .

Table 1. Descriptive Statistic

Variables	Obs.	Mean	Std. Dev.	Min	Max
PRICE	1300	19.21548	21.87279	0.7	220
SIZE	1300	114.2054	73.06384	15	411
FRONTROAD	1300	11.93954	8.494645	1	60
LOCATION	1300	6.410154	4.65402	0.2	23.2
FAÇADE	1300	0.7938462	0.5597942	0	4
PARKING	1300	0.55	0.4976852	0	1
FLOOR	1300	2.896923	1.678596	0	10
ROOM	1300	8.986154	5.489814	1	29
TERRACE	1300	0.3930769	0.4886216	0	1

Regression results

White (1980) proposed robust standard error with the following explanatory: still using the estimated coefficients from the OLS method, but

As a result, with the dependent variable $\ln \text{Price}$, after using the OLS regression method, this study gets the following result:

$$\ln \text{Price} = -2.253577 + 0.0006485 * \text{SIZE}$$

Table 2. Regression Results

. reg LnPrice SIZE FRONTROAD LOCATION FACADE PARKING FLOOR ROOM TERRACE, robust						
Linear regression						Number of obs = 1300
						F(8, 1291) = 334.24
						Prob > F 0.0000
						R-squared 0.6157
						Root MSE .58634
LnPrice	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
SIZE	.0006485	.0002213	2.93	0.003	.0002145	.0010826
FRONTROAD	.0182311	.0021666	8.41	0.000	.0139807	.0224815
LOCATION	-.0999632	.004035	-24.77	0.000	-.1078792	-.0920473
FACADE	.116412	.0307295	3.79	0.000	.0561267	.1766972
PARKING	.4063773	.0408383	9.95	0.000	.3262606	.486494
FLOOR	.0832157	.011233	7.41	0.000	.0611788	.1052526
ROOM	.0029991	.0030914	0.97	0.332	-.0030656	.0090638
TERRACE	.0653786	.0329809	1.98	0.048	.0006767	.1300806
_cons	-2.253577	.0742284	-30.36	0.000	-2.399198	-2.107955

+ 0.0182311*FRONTROAD
 - 0.0999632*LOCATION
 + 0.116412*FACADE
 + 0.4063773*PARKING + 0.0832157*FLOOR
 + 0.0653786*TERRACE

Among the 1 factor affecting the house prices, there are seven factors that impact positively and one element in the opposite impact.

With the results of estimating the OLS regression model (Table 8):

5. Conclusion and Recommendation

This study applied the Hedonic model with a data sample of 1300 houses being traded in the market to determine the factors affecting housing prices in Ho Chi Minh City. The results showed that there are 5 variables that affect the price of houses. The study analyses and assigns the most appropriate method, Hedonic Pricing Method, with the sample of 1300 houses from January to May of 2019 ■

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TÓM TẮT:

Thông qua việc sử dụng các mô hình phụ dựa trên cách tiếp cận so sánh để phân tích dữ liệu từ 1.300 ngôi nhà đang được giao dịch tại TP. Hồ Chí Minh, nghiên cứu này phát triển mô hình thẩm định giá nhà tại TP. Hồ Chí Minh. Kết quả nghiên cứu cho thấy những nhân tố sau đây có ảnh hưởng đáng kể đến giá nhà tại TP. Hồ Chí Minh, gồm: (1) diện tích sử dụng, (2) vị trí nhà, (3) số phòng, (4) số tầng, (5) khoảng cách đến đường lớn, (6) độ rộng đường lớn, (7) chỗ đậu xe, và (8) sân thượng.

Từ khóa: Thị trường bất động sản, các yếu tố ảnh hưởng đến giá nhà, mô hình định giá Hedonic.