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Factors Influencing Price Based on Hedonic Model

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Abstract: This article is based on the Hedonic model and selects 36 sets of price related characteristic data and 12 characteristic variables from Zhengzhou City in 2019. Linear models, logarithmic models, semi logarithmic models, and other functional forms are used for regression analysis and continuous optimization. The conclusion drawn in this article is that the distance from CBD and property fees have a significant impact on residential prices.

1. Introduction

With the advancement of urbanization and rural revitalization strategies, people's living standards have been improved. More and more Henan people are choosing to buy houses and settle in Zhengzhou, the capital of Henan Province. At the same time, with the relaxation of the second child policy, people's demand for real estate is also increasing year by year. The price of commercial housing has always been a concern and concern of all sectors of society in the housing market. The rapid growth of real estate demand has led to a significantly higher rate of increase in commodity housing prices than the growth rate of residents' income and consumption. The increasing difficulty of purchasing a house will indirectly affect socio-economic development and social stability. There are many factors that affect the price of commercial residential buildings. This article aims to analyze the influencing factors of second-hand housing prices in the central urban area of Zhengzhou through the characteristic price feature model, and identify the main factors that affect the real estate prices in Zhengzhou. Through empirical analysis, it has important practical significance for the stability of the price of commercial housing market in Zhengzhou, and provides help for Zhengzhou to formulate effective macro-control policies on real estate prices in the future.

2. A Review of Hedonic Model for Real Estate Price

The analysis of factors affecting the real estate price helps to find out the law of changes in the price of commercial housing in the housing market, explore the regulation policies to stabilize the price of the real estate market, and also provides a strong empirical analysis for restraining the rapid growth of the price of commercial housing [1]. Given the universal applicability of feature models in the study of housing price characteristics, it has certain guiding significance for the study of real estate market pricing [2]. Therefore, this article adopts methods for the above research. Many scholars at home and abroad use hedonic models to study the influencing factors of real estate prices. Jia Dezheng [3] and Guo Wengang [4] respectively studied the influencing factors of residential or plot prices in Tianjin, Shanghai, and Hangzhou based on the hedonic model; Feng Bo

et al. analyzed the influencing factors of parcel prices in Beijing based on the Hedonic model. This article also uses a feature model to analyze the influencing factors of residential land prices in the central urban area of Zhengzhou, Henan Province[5].

3. Construction and Test of Hedonic Model

3.1 Research Objects

This article selects Zhengzhou City as the research object, based on the administrative divisions of Zhengzhou City, and analyzes six central urban areas: Jinshui District, Zhongyuan District, Guancheng District, Erqi District, Huiji District, and Zhengdong New Area. Select six real estate projects from each urban area, totaling 36 sets of samples, and collect and analyze average selling prices and other relevant data.

3.2 Data Sources

The relevant data of this paper comes from the real estate related data of real estate websites of fangtianxia and anjuke, and the relevant distance and surrounding facilities come from Baidu map.

3.3 Selection and Quantification of Variables and Samples

Table 1: Selection and quantification of variables and samples

Features	Variable	Quantitative Index
Area Characteristic	Metro Station	Number of surrounding subways (including under construction subways)
	Bus Stop	Number Of Peripheral Bus Lines
	Distance From CBD	Distance From CBD
Architectural Features	The Measure Of Area	Construction Land Area
	Plot Ratio	Total Building Area Above Ground / Total Land Area
	Greening Rate	Greening Rate
	Property Fee	Monthly Property Fee
	Parking Space	Number Of Parking Spaces
Neighborhood Characteristics Features	Educational Support	Number Of Primary And Secondary Schools And Kindergartens Around
	Medical Support	Number Of Surrounding Hospitals
	Commercial Support	Number Of Surrounding Shopping Malls And Supermarkets
	Landscape Matching	Number Of Green Spaces In Surrounding Parks

Based on reading relevant literature and understanding the hedonic model, this article divides the index of real estate characteristic variables into three types of characteristic indices:

(1). Location characteristics: that is, considering the overall location of the city and real estate. At the same time, these geographical location data are used to measure the reachability of traffic. The indicators selected in this article mainly depend on the three variables of bus and subway routes around the real estate, and the distance to the CBD center.

(2).Drawing feature: This function is to search for data from the basic data of the drawing. This article mainly studies five variables: building area, plot ratio, greening rate, parking space, and property fees.

(3). Neighborhood characteristics: the landscape and cultural conditions surrounding the real estate, including related living and educational facilities. This article selects four data sources:

education, healthcare, business, and landscape as supporting indicators.

The specific variables and their quantitative indicators are shown in Table 1:

3.4 Analysis of Model Construction

(1) Model setting

Based on the research characteristics of the hedonic model and hedonic model of housing prices, this paper estimates and tests three functional forms: linear model, logarithmic model, and semi logarithmic model. The linear model is shown in equation (1):

$$y = \beta_0 + \sum \beta_i q_i + \mu \tag{1}$$

The logarithmic model is shown in equation (2) and semi logarithmic model is shown in equation (3):

$$\ln y = y_0 + \sum y_i \ln q_i + \alpha \tag{2}$$

$$\ln y = y_0 + \sum y_i q_i + \alpha \tag{3}$$

This article uses Python technology to input specific data from 36 real estate samples selected from second-hand websites into Excel. Afterwards, SPSS software was used to perform regression analysis on the three functional models, and the results after data substitution were observed and tested. Through comparison, this study found that the logarithmic model has the best fit. Therefore, the logarithmic model will be chosen for empirical analysis in the end of this article.

Table 2 shows the results obtained using linear, logarithmic, and semi logarithmic feature models, respectively. It can be seen from the comparison in Table 2 that the degree of fitting of the logarithmic model is better (Goodness of fit: the adjusted decision coefficient R2 is higher), and the adjusted decision coefficient R2 is 0.647. Therefore, this article chooses a logarithmic model for analysis.

According to the model summary in Table 3, when using a logarithmic model for analysis, the complex correlation coefficient r of the model is 0.877, the judgment coefficient R2 is 0.768, and the decision coefficient R2 after degree of freedom adjustment is 0.647. The research results indicate that the percentage of regression models used to explain the differences in dependent variables has reached around 65%. This model has good fitting performance, and the dependent variable has a linear relationship with the independent variable, which is relatively strong.

According to the results of the analysis of variance in Table 4, the significance of the analysis of variance reached 0.000 in the regression mode, indicating the importance of using the logarithmic mode variance formula to calculate the overall linear relationship of the analysis.

According to the data results shown in Table 5, this effect is more pronounced when the p-value is less than 0.05. The proximity to the central urban area, property fees, and other factors have a significant impact on residential land prices. However, due to a single source of data and a small sample size, the research results are inevitably biased.

Table 2: Summary of Estimation Results of Three Models

Model	R	Determination CoefficientR^2	Adjusted Resolvable Coefficient R^2	Standard Estimation Error
Linear Model	0.859[a]	0.738	0.601	4594.072
Logarithmic Model	0.877[a]	0.768	0.647	0.182
Semi Logarithmic Model	0.872[a]	0.760	0.635	4391.753

Table 3: Model

Model	R	Determination Coefficient R^2	Adjusted Resolvable Coefficient R^2	Standard Estimation Error
1	0.877[a]	0.768	0.647	0.182

Table 4: Analysis of Variance Results of the Model

Model		Sum of Squares	Freedom	Mean Square Value	F Value	Significance
1	Regression	2.529	12	0.211	6.354	0.000[b]
	Residual	0.763	23	0.033		
	Total	3.292	35			

Table 5: Correlation Coefficient

Model		Nonstandardized coefficient		standardized coefficient	T Value	Significance
		B Value	Standard error value	Beta Value		
	(Constant)	10.655	0.566		18.835	0.000
	Metro	-0.245	0.122	-0.299	-2.013	0.056
	Transit	-0.070	0.080	-0.145	-0.870	0.393
	Distance From Cbd (Km)	-0.398	0.083	-0.607	-4.808	0.000
	Area (m2)	-0.088	0.065	-0.285	-1.349	0.191
	Plot Ratio	0.120	0.167	0.118	0.716	0.481
	Greening Rate	0.243	0.173	0.200	1.409	0.172
	Property Fee (Yuan / m2 / Month)	0.483	0.145	0.411	3.339	0.003
	Parking Space	0.119	0.078	0.314	1.515	0.143
	Educational Support	0.110	0.116	0.131	0.947	0.354
	Medical Support	-0.039	0.077	-0.069	-0.502	0.620
	Commercial Support	-0.058	0.082	-0.095	-0.706	0.487
	Landscape Matching	0.132	0.092	0.219	1.437	0.164

4. Conclusion

The article takes 36 second-hand houses in 6 administrative regions of Zhengzhou City, Henan Province as an example, and conducts empirical analysis on the main factors affecting second-hand house prices through data processing. On this basis, taking the central urban area of Zhengzhou as an example, 12 influencing factors were selected and corresponding Hedonic models were established. Empirical analysis was conducted on them, and corresponding conclusions were obtained.

Through empirical analysis of real estate data from six administrative regions in Zhengzhou City, it was found that the factors affecting residential land prices are the distance from the central urban area in the location attribute and the property cost in the building attribute, which have the greatest impact on land prices; Secondly, the distance from the subway entrance to the subway entrance, from the location characteristics to the number of parking spaces, and from the architectural characteristics to the community characteristics. The four types of landscape matching factors have a significant impact on the land price of residential land, but have little impact on the plot ratio of commercial and building types in the block type.

When analyzing the influencing factors of urban housing prices in China in the future, more sample indicators and broader sample data should be considered. Combined with China's current land based real estate policy, it can more accurately reflect the changes in urban housing prices in

China.

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