Study on the Influence of Urban Rail Transit on the Value of Real Estate Based on Information System

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Abstract: Urban rail transit has strong transportation capability, but little environmental pollution. Besides, it also saves land resource. These advantages make the urban rail transit gradually becomes an effective measure to solve city traffic problems. In order to analyze the impact of the scope and extent of urban rail transit on the real estate, this paper first introduces the composition of real estate market information system, explains the process of how the urban rail transit influences the value of real estate by taking the 1st project of line 1 of Zhengzhou urban rail transit in Henan province for example, finds the semi logarithmic model which has the best regression effects with three hedonic price models and the collected data from the real estate market information system, and finally works out the added value of real estate generated by the above urban rail transit.

1. INTRODUCTION

China is in a period of rapid development of industrialization and urbanization. Rapid population expansion, population density increasing and rapid increasing number of cars cause the city traffic no longer smooth, and the city environment is worsening. Since there is a large population but relatively little land, low density housing expansion in developed countries doesn't work in the development of city in China. Therefore, how to resolve the contradiction between traffic and the environment has become an urgent problem in the development of city.

Urban rail transit has strong transportation capability, but little environmental pollution. Besides, it also saves land resource. All these advantages make the urban rail transit gradually become an effective measure to solve city traffic problems. More cities will build rail transportation to realize the optimized use of land. According to statistics, the number of rail transit line in China has risen up to 55 by the end of 2010. According to the forecast, China will build 87 lines by the end of 2015 and the total mileage will reach 2495 kilometers [1].

In fact, urban rail transit improves the city traffic conditions while it promotes the development of high density of real estate projects along the line and enhances its value at the same time. Facts prove that the research on the relationship between urban rail traffic and the value of real estate can be especially useful in promoting a healthy urban layout. Recently the influence of urban rail transit on the value of real estate attracted increasing attention in the field of transportation science. However, because of the imperfection of the real estate market information system in China now, it is

difficult to get the accurate and convinced data. The development of urban rail transit is so fast that there is a lack of reliable evidence to support the quantitative analysis of relating researches. To the above situation, this paper does a systematic study about the influence of urban rail transit on the value of real estate in both quantitative and qualitative way with theories of real estate economics and information economics, basing on the data from real estate market information system. It is hoped that this research can be taken as theory basis for the government to regulate and control the balance between the development of urban rail transit and the real estate projects.

2. THE COMPOSITION OF REAL ESTATE MARKET INFORMATION SYSTEM

The analysis about the influence of urban rail transit network on the value of real estate under the information background is based on the establishment of real estate market information system. As the information of real estate always change frequently, it will be helpful to establish a centralized and dynamic basic information management of multipurpose. This will also realize the real-time monitoring of the real estate market in order to supervise the marketing activities, regulate the trading behavior, and enable the government in market analysis and management. Basing on the computer and information technology, the real estate market information system meets the needs of real estate in terms of development, survey, trade and register. Besides, it can also gather, manage, count, compute, and publish the relating data.

Taking each city as a unit, the real estate market information system integrate the market information of development, transfer, registration of lease and ownership of housing with the help of certain platform of systems included in the real estate management, and also bring in other relating information about land and finance, then finally form the complete

and objective information system which reflects the operation of real estate market all over the country.

A perfect real estate market information system should consist of seven subsystems: (1) statistic analysis and information dissemination subsystem, which publishes the market information to the public, deals with index management, conducts the statistics basing on different operations and Geography Information System (GIS), analysis of kinds of index and application of data warehouse and data mining; (2) new built commercial housing online record subsystem, which realizes the management of new built commercial housing booking permit and online record of reserve, booking, and sales contracts; (3) housing stock online record subsystem, which realizes online record of the brokerage agency, sales and purchase contracts of housing stock, lease agreement, and reserves the joints for the capital supervision; (4) professional participants management subsystem, which realizes the management of enterprises and employees in real estate market; (5) project management subsystem, which realizes the management of construction of real estate projects; (6) registration management subsystem, which realizes the management of ownership of housing registration; (7) surveying and mapping results management subsystem, which realizes the real estate survey and relating operations management and also the results update management. Among all the subsystems, the new built commercial housing online record subsystem, housing stock online record subsystem, professional participants management subsystem, project management subsystem need to be based on the registration management subsystem and surveying and mapping results management subsystem, and the statistic analysis and information dissemination subsystem need to be built on the basis of the other six subsystems. According to the specific conditions in different cities, the title and composition of the system can be different, but the real estate market information system should conclude all the functions of operation management, statistic analysis and information republish.

3. INFLUENCEMODELS OF URBAN RAIL TRANSIT ON THE REAL ESTATE BASED ON INFORMATION SYSTEM

3.1. The Types of Influence Models

The quantitative models, which are established to analyze the influence of urban rail transport on the real estate values based on information system, include transportation cost model, hedonic price model and expend linear expenditure system.

Transportation cost model: The generalized cost of transportation includes fatigue, psychological stress, discomfort and so on, in addition to transportation costs and other opportunity costs such as time. Transportation cost model is based on the exchange of theory. With the increasing distance from the city center, the homebuyers will keep the balance between the decreasing real estate purchase cost and the rising transportation cost in order to acquire the lowest total cost of transportation. The mathematical model of the transportation cost is:

$$Y = P_z \times Z + P(X) \times G + K_{(X)} \qquad (1)$$

Y means family income; PZ means the unit price of other commodities; Z represents the number of other commodities; P(X) represents the real estate price where the city center X; G means unit family building areas; K(X) means the transportation cost to the city center X [2-3].

Hedonic price model: Hedonic price model, originally used to analyze the functional relationship between a product and its price differences abroad, and then has gradually been applied in the real estate field.

Hedonic price model, based on the assumption of goods heterogeneity, considers the reason that the prices of goods vary widely mainly is that the product itself contains lots of different characteristics, which forms the package of characteristics [4].

This paper mainly studies the influence of urban rail transit on the property values. As unit housing areas, building types, distance to the city center and the station also have the impacts on the price of real estate. We can use P to represent the real estate prices, and the function between P and real estate price can be expressed as:

$$P = f(X, d) \qquad (2)$$

d means the nearest distance from the real estate to the urban rail transit station,

X represents the collection of other factors on the value of real estate.

In fact, the natural attributes of the real estate and its values can be used to reveal the hedonic price model and a semi-logarithmic hedonic price model, log-linear hedonic price model and linear hedonic price model are often applied to analyze the impacts of urban rail transit on the real estate values.

Semi-logarithmic Hedonic Price Model

Semi-logarithmic hedonic price mode is also known growth model, referring to the logarithms of real estate prices. It can be expressed as:

$$\ln p_i = \alpha_0 + \sum_{k=1}^{m} \alpha_k x_{ki} + \eta d_i + \varepsilon_i \qquad (3)$$

Pi means the residential price of unit i, yuan/m^2; d_i means the distance (m) to the rail station nearest to the property; ε_i means random error term; X_{ki} means i-th residential properties in the k-th feature value; α_0, α_k, η are all estimated coefficients [5].

Log-linear hedonic price model

Log-linear hedonic model is to evaluate logarithm of each property of the real estate value separately based on the log models and establish a linear relationship between each price log and property log. Namely:

$$p_i = \alpha_0 + \sum_{k=1}^{m} \alpha_k x_{ki} + \eta d_i + \varepsilon_i \qquad (4)$$

From Equation 7 to Equation 9, p_i means the residential price of unit i, yuan/m^2; d_j means the distance (m) to the rail station nearest to the property; ε_i means random error term; X_{ki} means i-th residential properties in the k-th feature value; α_0, α_k, η are all estimated coefficients [6].

Research on the effect of urban rail transit on the value-added real estate along the line is to study the change of the real estate price while each increase or decrease unit change, such as 1m of the distance from the subway station to the property with other conditions unchanged. Namely:

$$\eta = \frac{\partial \ln p}{\partial d} = (\frac{1}{p})(\frac{\partial p}{\partial d}) = \frac{\frac{\partial p}{p}}{\partial d}$$

$$= \frac{\text{relative change of } p}{\text{absolute change of } d} \qquad (5)$$

$$= \frac{\text{percentage change of p}}{\text{unit change of d}}$$

Expend linear expenditure system model: Expend linear expenditure system model expands the consumers' demand to build a new model based on hedonic price theory. How to enable consumers to achieve the maximization of utility in the consumer goods demand is a function of the linear expenditure system model to derive a prerequisite. Based on this principle, R. Stone, a British econometrician puts forward a comprehensive linear expenditure system model focusing on more consumer demand. Namely:

$$p_i q_i = p_i r_i + b_i \left(V - \sum_{i=1}^{n} p_i r_i \right) \qquad (6)$$

In the formula, qi means actual consumer demand for the i-th commodity; ri represents consumer demand for the i-th basic commodities; bi means the marginal share of the budget needs; V means the total budget of consumer demand; pi means the i-th consumer goods price [7].

3.2. Selection of the Models Based on Accessibility Theory

Transportation cost model analyzes the influence of urban rail transit on the property values mainly based on the location theory, the transportation cost theory and the land rent theory. Because of its simple function relationship, convenient parameter estimation, easy obtain of sample data and scientific calculation method, it has been more widely used in practice. If enough amounts of sample data can be collected, and the data information is complete, the result caused by other factors can be ignored in the process of analyzing. However, when the sample size is small, data analysis used by the function model would cause a serious error, the estimates will be failed and lead to an error result. Moreover, because of only the influenceof transportation costs considered in the process of study, the model needs to be improved.

Established on the commodity characteristics of the real estate, hedonic price model has comprehensively considered the factors impacting on the real estate values based on the throry of utility function, demand function and market equilibrium. Based on a complete theroy, the model is more persuaded compared to the transportation cost model, considering that the real estate price is composed of a series of characteristics has. However the model requires highly on data, needs a lot of comprehensive information of the real estate transaction, and it's hard to collect the data of the consum-

ers' income level, age, level of education, consumer preferences, etc. When using this model to analyze, the influences of other factors have to be eliminated.

Expend linear expenditure system model distinguishes basic demands of different families and the marginal propensity to consume, based on variables of income, age, number of people. The theoretical basis of this model is perfect and its analysis of economic phenomena is more comprehensive. However, the variable data on family structureit is usually difficult to obtain, the data obtained by the market investigation is often lack of authenticity and representative, and the parameter estimation method is often complex. Therefore, the model is still in the theoretical research and rarely used in practice.

Based on the analysis of the advantages and disadvantages of each model, the model data requirements and the scope of the research problem utilized, we find that using hedonic price model to analyze the influence of urban rail transit on the real estate value can be more complete and accordable with the theory of real estate value return. However, by analyzing semi-log model, log-linear model and the coefficient of linear model of hedonic price model, we find that how far the real estate away the rail transit is, its value will never be 0 in the research of the impacts of the rail transit on the real estate value. Therefore, it will be reasonable to use hedonic price model to choose the dependent variable and independent variables under the regional accessibility theory. Then, we can use three kinds of simplified form models to carry out on the collected data, find out the best regression effect and analyze the value-added effect of urban rail transit on surrounding real estate prices [8].

4. THE PROCESS ANALYSIS OF URBAN RAIL TRANSIT'S INFLUENCE ON THE REAL ESTATE BASED ON INFORMATION SYSTEM

The paper takes the first phase of Zhengzhou urban rail transit line 1 as an example and has detailed introduction of the value-added process of urban rail transit on the real estate.

The first phase of line 1, east to west, maybe cost 14.57 billion yuan and extends from the Zhengshang road near the west ring to the sports center which is in plan. Its total length is 26.34 kilometers, including 24.2 kilometers underground and 2.14 kilometers elevated.

4.1. Confirm the Research Range

Accessibility refers to the calculation of the transportation cost from the residential area to the city. Through the comparison of the public transport and rail transportation, the influence of urban rail transit on the surrounding area can be determined based on accessibility theory and then a function relationship model can be established to calculate the influence scope. Equal accessibility theory uses travel time to describe the accessibility and convenient degree of urban transportation, that is to say, whether using the common transportation or travelling by urban rail transit, the travel time will be fixed from the edge line of the scope to the center of the city, the accessibility of the edge to the center of the city is the same.

Considering the railway station and Erqi Square station are the city centers of Zhengzhou city, we only calculate the other 18 railway stations impact range. Through the accessibility theory, we can calculate that the influence scope of the near town six sites such as the sports center and redbud mountain is less than 1 km. The influence scope of the four sites is 1.5 km like QinLing road and Tongbai road, which is far from the town center. The five sites like Kaixuan road and west ring is about 2 km. It is noted that besides the Boxue road and sports center, three stations influence sphere even extends more than 2.5 km.

As the most residential buildings in Zhengzhou are located in the areas except city centers, the sample residential bulidings in the paper are choosed within the influence scope of the stations from West ring road to East Nongye road. In order to avoid the detrimentaleffects caused by the time difference, the paper selects 52 new sample buildings on sale within the influence scope of each station from January 2010 to December 2010 [9].

4.2. The Acquisition and Quantification of the Variable Data

In theory, the deal price can mostly reflect the actual transaction market information. The website like ZFZL, soufun, Zhengzhou PinFang, house 666 and daher house is professional and detailed classified in the real estate information. These web sites will update the real estate sales, publish the real estate policies and renew the latest information every day and they can timely and accurately provide housing transaction price and the information of the real estate supporting facilities. In this paper, the housing transaction price which can get from the real estate information website has been taken as the dependent variable in the study.

In this paper, the independent variables are selected according to the situation of the rail transit construction, the characteristics of the real estate market, the difficulty of the data collection and the degree of the correlation between each other. In the investigation of the real estate prices, we find that the owners mainly focus on the traffic conditions, supporting infrastructure conditions and the environment surroundings. Therefore, in this paper, these problems which are concerned commonly by the owners have been analyzed in detail. Finally, eight independent variables have been selected and assigned scores [10]:

Traffic conditions:

- The condition of subway (X1), represented by the actual distance (m). Usually, the subway traffic conditions and the convenience degree of connect with the outside of a certain building can be judged by the shortest route distance from this building to one station of Zhengzhou subway line 1, which maybe has been completed or will be constructed before 2013.

- The conditions of public transport (X2), represented by the number of public transport passing through the bus station (number). Zhengzhou city has the bus routes in all directions and the bus rapid transit, completed in 2009, has made the traffic of Zhengzhou city be generally better. Because the public transportation has been the main means of the transportation for the most people before the completion of the subway in Zhengzhou, it is an im-

portant influence on the price whether there is a convenient public transportation near the residential areas.

Supporting facilities:

- The distance to downtown (X3), represented by the actual distance (m). According to the layout and structural zoning of the Zhengzhou city, Erqi business district is the main shopping district in Zhengzhou City. The development of the new district in Zhengzhou is still in the primary stage and its center is still in planning. Nither the population scale nor the degree of commercial prosperity of new district is more than that of Erqi square. So this paper takes Erqi square area, near the Zhengzhou railway station, as the commercial center of Zhengzhou City, and the variable X3 can be measured by the nearest route distance between the residential building and Erqi square.

- The educational facilities (X4). Education environment has a positive impact on real estate. Usually good educational environments nearby the property will enhance the value of the property to some extent. According to the survey about the education condition near the real estate, the factors considered by the buyers include the educational system of middle and primary school with the entrance for the nearest school, the good cultural environment around the real estate, the convenient leisure and entertainment facilities, and so on. Therefore, this paper determines the score of each property according to the actual situation. The property near the university scores 5, the property near the middle school scores 3 and the property near the kindergarten scores 1.

- The medical condition (X5). In order to reflect the hospital facilities as an important factor, the hospital facilities, located within 800 meters of the property, better score 5, good score 3, and other score 1.

- The shopping conditions (X6). In order to reflect the convenience of shopping conditions impacting on the property, the property which is near the supermarket within 300 meters around the property scores 5, near the supermarket within 300 ~ 900 meters around the property scores 3, and other scores 1.

- Whether the residence community has the parking space or not (X7). With the improvement of the residential living standards in Zhengzhou city, more and more people have private cars, and a parking space brings convenience to people's life. The residence community which has parking places scores 1, or scores 0.

Environmental factors: Environmental factors (X8). With the improvement of living standards, people pay more attention to the good natural environment and the convenient exercise place when purchasing a house. If the property is very close to the park, the living environment should have many advantages. So making whether there is a park near the property or not as a factor to be measured, the property which is near the park within 500 meters around the property score 5, within 500 ~ 1000 meters around the property score 3,and other score 1 [8].

4.3. The Establishment of the Regression Model

This paper makes prices and logarithm of prices as the dependent variable respectively. The eight independent

Table 1.   The table of overall parameters for the hedonic price linear model.

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	Df1	df2	Sig.F Change
.851a	.724	.639	1015.306	.724	8.533	12	39	.000

a.Predictors: (Constant), the condition of subway, the conditions of public transport, the distance to downtown (m),the educational facilities, the medical condition, the shopping conditions,whether the residence community has the parking space or not,environmental factors.

Table 2.   The table for regression variance analysis of hedonic price linear model.

ANOVAb					
Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1.056E8	12	8798089.980	8.535	.000a
Residual	4.020E7	39	1030845.763		
Total	1.458E8	51			

b. Dependent Variable: the price of the property (yuan / per square meter)

Table 3.   The table of overall parameters for the hedonic price's semi-log model.

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig.F Change
.853a	.728	.645	.14504	.728	8.707	12	39	.000

a. Predictors: (Constant), the condition of subway, the conditions of public transport,the distance to downtown (m),the educational facilities, the medical condition, the shopping conditions, whether the residence community has the parking space or not, environmental factors.

variables selected by this paper are substituted in the three models of the hedonic price model, and regression analysis is carried out using the SPSS16.0 statistical software.

The analysis and results of the hedonic price linear model: The tables of the overall parameters and the regression analysis under the hedonic price linear model, as show in the Table **1** and Table **2**.

Results of the linear model shows: the adjusted R = 0.639, the significance of the overall impact that all of the independent variables impact on the dependent variables is 63.9%, F=8.535, and the probability of the significance is 0. From the sense of the linear model, the distance to the station site increases by per 1m and the value about the property's per square meter will be decreased by yuan correspondingly. The building's prices far enough away the station site might become negative because of the influence of the subway, which is obviously unreasonable. Therefore, the model should not be selected in the practical significance.

The results of the hedonic price's semi-log model analyzed: The tables of the overall parameters and regression analysis under the hedonic price's semi-log model, as show in the Table **3** and Table **4**.

Results of the log-linear model shows: R = 0.543, the significance of the overall impact that all of the independent variables impact on the dependent variables is 54.3%, F=7.724, and the probability of the significance is 0.The effect of model is not obvious compared with the log-linear model and the semi-log model.

Finally, observing the sense of the log-linear model, co-efficient reflect the relationship between subway station and building from the percentage's change between the distance and the building's price. This analysis is more reasonable in theory. In reality, some of the housing's variables cannot be quantified directly and mostly use the dummy variables. For example, we can value 0 or 1 using assignment method, for factors like whether there is the parking space or not, which cannot explain the linear relation between the changes of the property's percentage in intuitive phenomena. Therefore, this method should not be used.

4.4. The Test For the Significance of Linear Regression

We establish a hedonic price's semi-log model, which is about the first phase project of Line One of Zhengzhou rail transit affecting the value of real estate. The interpretation of linear regression as shows in Table **5** and Table **7**.

We can see from the above results that the significant probability of the above several independent variables are all less than 0.05,which shows that there is significant difference between these variables coefficient and 0.This indicates

Table 4. **The table for regression variance analysis of the hedonic price's semi-log model.**

ANOVAb					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2.198	12	.183	8.707	.000a
Residual	.820	39	.021		
Total	3.018	51			

b. Dependent Variable: the price of the property (yuan / per square meter)

Table 5. **The table of overall parameters for the hedonic price's log linear model.**

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig.F Change
.790a	.623	.543	1143.344	.623	7.724	9	42	.000

a.Predictors: (Constant), the condition of subway, the conditions of public transport,the distance to downtown (m),the educational facilities, the medical condition, the shopping conditions, whether the residence community has the parking space or not, environmental factors.

Table 6. **The table for regression variance analysis of the hedonic price's log linear model.**

ANOVAb					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	9.088E7	9	1.010E7	7.724	.000a
Residual	5.490E7	42	1307235.568		
Total	1.458E8	51			

b. Dependent Variable: the price of the property (yuan / per square meter)

Table 7. **The table for regression coefficients and the test of significance.**

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	8.835	.250		35.365	.000
The condition of subway X1(m)	-.002	.000	-.247	-2.217	.033
The conditions of public transport X2	-.051	.017	-.299	-3.020	.004
The distance to downtown X3(m)	-4.121E-5	.000	-.441	-3.556	.001
The educational facilities X4	.023	.018	.136	1.246	.220
The medical condition X5	-.050	.022	-.316	-2.304	.027
The shopping conditions X6	.031	.022	.176	1.385	.174
Whether the residence community has the parking space or not X7	.166	.051	.324	3.275	.002
Environmental factors X8	.049	.017	.306	2.893	t

a. Dependent Variable: the log of the building's price

that these factors have significant effect on the real estate and should be the explanatory variables appearing in the equation [11, 12].

5. THE EFFECT ANALYSIS OF URBAN RAIL TRANSIT'S INFLUENCE ON THE VALUE OF REAL ESTATE

Through the standard regression, we calculate the regression model of the impact on the real estate value by the first phase project of Line One of Zhengzhou rail transit, which is as follows:

$$LnP = 8.835 - 0.002X_1 - 0.051X_2 - 4.121E - 5X_3 + 0.023X_4$$
$$- 0.050X_5 + 0.031X_6 + 0.166X_7 + 0.049X_8$$

The model's coefficient of determination of obtained results can prove the degree of explanation of the model to the true situations. In the regression equation above, the coefficient of determination is R=0.853,which shows that the model equation can explain the information reflected by the original data within the scope of 85.3%, and the data selected achieves to a certain explanation level. It proves that the impact of the influence equation calculated about Zhengzhou rail transit to the real estate value on the average variable of the residential prices has played a certain explained role [13-18].

We can draw from the model that the factors which influence the Zhengzhou housing prices: Subway, bus condition, distance to the downtown , medical conditions has a negative coefficient, showing that the real estate prices is inversely proportional to the factors. But the education facilities, shopping conditions, presence of parking space, and environment factors of the community are positive, which proves that good education facilities, shopping convenience, entertainment, leisure places and a parking lot play a positive role on the real estate prices [19-21].

The coefficient of subway in the model is -0.002. According to the meaning of η in the semi-log model, 0.002 means each building square meters price will be increased by 0.002% when the real estate close to the nearest subway station each meter ,while the other factors in the model equation will not change. We can discover that the average price of the 52 real estates is 7192.6 Yuan through the summary of 52 real estate prices selected in this paper. Therefore, the average price of the real estate multiplied by the average added value equals to the added value of per square meter of the house price appreciation causing by the subway effect. The effect of Zhengzhou urban rail transit on the house price appreciation is: 7192.60 0.002%=0.14 Yuan/m2.

The sphere of subway's influence on the added value of the along residential presents a certain regularity. The area is commonly between 800m-1000m in urban, and the scope expands to 2000m-3000m in the suburbs. The research on the range of influence about Zhengzhou rail transit line 1 in this paper conforms basically to this regulation [22, 23].

This paper assumes that the impact of the first-stage project of Zhengzhou rail transit line 1 on the surrounding residential property prices in 2000m is 0, and the biggest growth point lies in the place where 100 meters away from subway station. According to this, we can find the biggest added

value of the real estate is in 100m, the value-added is smaller as far as the subway station, and the value-added is 0 in 2000m. Therefore, we can calculate the average value-added point within this scope is in 1050m away from rail transit station by using the linear relationship. The distance to the subway station closes each 1m, the value of the real estate being increased by 0.14 Yuan per square meter. The added value amount from 2000m to 100m is 0.14 (2000-100)=266 Yuan/m2. It means the average value-added of the first-stage project of Zhengzhou rail transit on the along 2000m's range property is: ΔP =0.14 (2000-100)/2=133 Yuan/m2.

According to this method, we can calculate the percentage of the value-added of the building's average per square meters by the influence of the first-stage project of Zhengzhou rail transit line 1: β=0.002% (2000-100)/2=1.9%.

In the samples of 52 buildings collected in this paper, the average building-up area of each houses is 365835.90m2 , from which we can calculated the value added amount of the first-stage project of Zhengzhou rail transit line 1 on each houses collected: = =133 365835.90=4865174.7 Yuan.

So the total value added amount of the sample buildings collected is: ΔV = ΔP X S =247789084 Yuan.

CONCLUSION

This paper quantitatively analyses the econometric model of urban rail transit impact on the real estate value by hedonic price model. In the construction of Zhengzhou Rail Transit Line 1 first phase project, we have collected and integrated the relevant research data of residential market along the rail, and have constructed the hedonic price model of the real estate market. The conclusions are as follows:

This paper does a systematic study about the influence of urban rail transit on the value of real estate in both quantitative and qualitative way with theories of real estate economics and information economics, basing on the data form real estate market information system and of modern technology of computer and information, and also set up the hedonic price models about the influence of urban rail transit on the value of real estate.

This paper puts forward methods of data obtaining, information processing, data decision, data acquisition of the real estate market information system and matters of data process after the explanation of the relation between the value of real estate and market information.

Basing on the EEMIS (REMIS?), the analysis of market information in the example of Zhengzhou Rail Transit Line 1 illustrates that Urban rail transit plays an important role in increasing real estate value. Within the influence range of Zhengzhou Rail Transit Line 1, the appreciation of real estate can be calculated approximately by 0.002% per 1 meter close to subway stations from the edge of influence range. The average property appreciation is 4865000 Yuan, the total appreciation of all sample properties is about 247789000 Yuan.

This paper has certain success in impacts of urban rail transit on the real estate value, but there are still many problems to be further studied. For example: Zhengzhou plans to construct 6 rail lines by 2020. Zhengzhou Rail Transit Line 1

began in June 2009, and was expected to open in the end of 2013. This paper only considers the influence on buildings under construction. However, the problems whether the full operation of the urban tail transit will drive the house price around the whole city, and whether each traffic network will bring the mutual effect, need to be further studied [13].

CONFLICT OF INTEREST

The authors confirm that this article content has no conflict of interest.

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