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Real estate price model based on multiple linear regression and analysis of influencing factors of regional economic vitality development

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Abstract: *Using this statistical analysis method, which regards one variable as a dependent variable and one or more other variables as independent variables, the quantitative relations of linear or nonlinear mathematical models between multiple variables are established and analyzed by using sample data. Economic vitality is the regional support to its social economy. By analyzing the influencing factors of economic vitality, the evaluation index system of regional economic vitality is constructed. SPSS software is used to analyze the selected data, so as to judge the change of gross national product, which is of great significance for improving the efficiency of government policy implementation, stimulating urban economic vitality and realizing regional sustainable development. Taking Guangzhou as an example, through multiple regression analysis, this paper establishes a model of influencing factors from the perspectives of human capital level, government intervention, consumption, industrial structure and opening up, and puts forward an action plan to improve regional economic vitality. This paper studies the relationship between the average sales price of commercial housing and the sales area of commercial housing, real estate housing investment, year-end resident population, regional gross domestic product and the number of real estate development enterprises. a multiple linear regression model for predicting commercial housing prices is established, and the model is tested and tested for multicollinearity, serial correlation and heteroscedasticity, and the optimal model is obtained. In addition, based on the grey correlation degree, this paper analyzes the impact of population trend and enterprise vitality on the economic vitality of Guangzhou, and studies the long-term and short-term impact of economic policy transformation on the provincial economy.*

Keywords: *Vitality, Multiple regression, Factors affecting, Real estate prices*

1. Introduction

Economic vitality is an explanatory variable of economic vitality. The factors that affect economic vitality include human capital level, government intervention, consumption level, opening level, industrial structure and road area as explanatory variables [1].

GDP can reflect the economic strength and market size of a country (or region).Therefore, understanding the changing trend of GDP and its relationship with various indicators can make the understanding of GDP more thorough and clear. This paper uses SPSS software to analyze the data characteristics and the relationship between GDP and value-added of various industries for 10 years.

2. Model building

2.1 Data preprocessing

According to the scatter graph, it can be judged that there is a linear relationship between explanatory variables and explanatory variables [2]. Based on this, we can build the following model:

$$\ln gdp = \beta_0 + \beta_1 \ln human + \beta_2 gov + \beta_3 comsumption + \beta_4 opening + \beta_5 industry + \beta_6 \ln road + \varepsilon \quad (1)$$

Make a descriptive analysis of GDP and the added value of each industry within 20 years, analyze and refine the data information, and discover the characteristics and rules hidden under the data. In this paper, the maximum value, median, quartile and other statistics are selected to reflect the characteristics of each data [3]. From table 1 can learn (see table 1), gross domestic product (GDP) in the great changes

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have taken place in 2000-2019, during the minimum value of 100280.1 to 990865.1, close to the original 10 times, and growth in a wide range of industries are also very significant, from the table above can clear understanding, industrial, wholesale and retail, transportation and accommodation catering industry data growth is relatively small, less than the minimum 10 times. The construction, finance and real estate industries respectively increased to ten times the minimum value.

Table 1: Statistic quantity

	GDP	Industrial added value	Added value of construction industry	Value added of wholesale and retail trade	The added value of traffic	Accommodation and catering industry	Added value of financial industry	Added value of real estate industry
Effective value	20	20	20	20	20	20	20	20
Missing	0	0	0	0	0	0	0	0
Mean value	441466.8	160155.655	29541.205	40691.275	20543.715	8248.670	30489.105	26626.895
Minimum	380318	151607	24970.400	32456.250	17653.000	7334.500	23784.950	21043.550
Maximum	100280.1	40258.5	5534.0	8159.8	6161.9	2146.3	4842.2	4140.9
25%	990865.1	317108.7	70904.3	95845.7	42802.1	18040.0	77077.0	69631.0
50%	380318.500	151607.85	24970.400	32456.250	17653.000	7334.500	23784.950	21043.550
75%	677534.425	234526.025	47171.400	66582.300	30023.225	12036.750	53938.200	41451.950

2.2 Data preprocessing

Least square estimation:

Set the linear regression model as:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_p x_p + \varepsilon \tag{2}$$

The ordinary least square method is usually used to solve the regression coefficient, whose principle is to minimize the sum of squares of the deviation at each observation point, namely:

$$\begin{aligned} &Q\left(\hat{\beta}_0, \hat{\beta}_1, \hat{\beta}_2, \ldots, \hat{\beta}_p\right) = \sum_{i=1}^{n}\left(y_i - \hat{\beta}_0 - \hat{\beta}_1 x_{i1} - \hat{\beta}_2 x_{i2} - \ldots - \hat{\beta}_p x_{ip}\right)^2 = \\ &\min \sum_{i=1}^{n}\left(y_i - \beta_0 - \beta_1 x_{i1} - \beta_2 x_{i2} - \ldots - \beta_p x_{ip}\right)^2 \end{aligned} \tag{3}$$

The significance F test is carried out on the multiple linear regression model to determine whether all independent variables have a significant impact on the dependent variables on the whole[4].F test statistics are constructed to test the significance of the population.

The significance t-test is carried out on each independent variable of the multiple linear regression model to determine whether each independent variable itself has a significant impact on the dependent variable. T-test statistics were constructed to test the significance of each independent variable.

The standard error of calculation is 1281.7810, which is relatively large.DW test statistic is 2.235, close to 2, so it can be considered that there is no autocorrelation and its residual is independent.

Table 2: Anovab

Model	Sum of squares	Df	Mean square	F
I regression	1.579E12	7	2.25E11	137253.386
Residual error	19715551.054	12	16429262.588	
Total	1.579E12	19		

As can be seen from the above table (see Table 2 for details), the observed value of F statistic is 137253.386, and the P value is 0.000, less than 0.05, which is significant. Thus, it can be known that there is a linear relationship between GNP and the added value of various industries.

3. Results analysis

3.1 Description of specimens

The coefficient of human capital level is 0.451, indicating that the level of human capital has a positive impact on economic vitality. This indicator is the number of college students per 10,000 people, which indicates the current level of education in Guangzhou and the future level of the labor force.

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Economic and social development is related to the cultivation of talents. Economic competition is the competition for talents. Thus, the level of human resources has a significant impact on economic vitality. The coefficient of industrial structure is 0.219, indicating that the industrial structure has a positive impact on economic vitality. The index of industrial structure is the proportion of GDP of the tertiary industry in GDP. The contemporary society is more and more inclined to a service-oriented society. Development is conducive to the prosperity of the city economy, so the development of the tertiary industry is conducive to improving the vitality of the city economy.

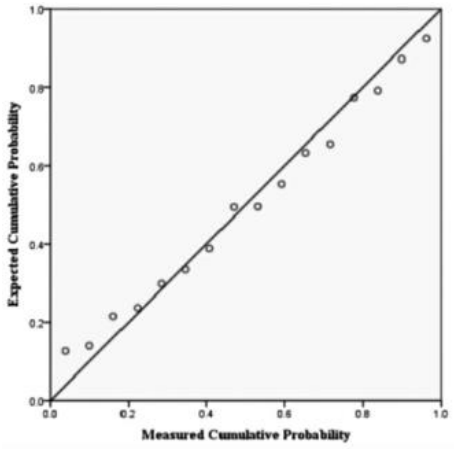

Figure 1: Economic vitality

Multiple linear regression was conducted for GDP and various data. It can be seen that the data did not have autocorrelation and the residuals were independent. According to the scatter plot and multivariate data analysis, there is a linear relationship between GDP and the added value of each industry, and there is no singular value in the data.

3.2 The results of the analysis

In the short term, the quantity of talent and the government's fiscal policies will have a significant impact on the province's economic vitality [5]. A large number of graduates will stimulate employment demand in the short term and inject new vitality into the company. This has a positive short-term impact on promoting personnel reform within the company. In addition, the increase of government fiscal expenditure is also conducive to the economic development of enterprises [6]. On the basis of respecting the market operation mechanism, the government must effectively bring into play the important role of foreign trade and financial policies in promoting regional economic development

In the long run, economies of scale, innovation and trade will boost economic development, and the number of graduates may reduce Guangdong's economic vitality. In the long run, from the quantitative point of view, a simple number of superposition does not necessarily mean an increase in the number of jobs, but may lead to a waste of personnel and a depressed employment environment. In terms of economies of scale, we will continue to promote the growth of regional industrial scale and give play to the important role of economies of scale in promoting industrial agglomeration, reducing production costs of enterprises, developing new products and enhancing market competitiveness. In terms of innovation ability, we will strengthen the construction of provincial innovation ability and improve the input-output efficiency of innovation activities. Finally, the long-term development of import and export trade is an important indicator of the sustainable development of provincial and municipal economy, so the trade policy will have an important impact on the long-term economy.

As a direct consumer of real estate products, after customer segmentation, it is necessary to find the appropriate target consumer groups of the project, analyze their fundamental needs according to the collected data and information, design the corresponding product functions and set a reasonable price on this basis. Therefore, in this series of workflow, we should standardize and classify, and get a complete management system without missing every potential customer. Through information registration, after the completion of a project, we can still find new target customers in the known information, design new projects, maintain a virtuous customer cycle, and seek higher profits for the enterprise.

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4. Conclusion

The multiple linear regression model used in this paper collects several data that affect commercial housing prices, namely, commercial housing sales area, real estate housing investment, year-end resident population, regional gross domestic product, and the number of real estate development enterprises. The multiple linear regression equation for the prediction of commercial housing prices in Gansu Province is estimated, and there are some influencing factors, such as policy factors, which are not easy to quantify. There is still a certain error between the predicted value of the model and the real value. However, this model is the optimal model after multiple collinearity, sequence correlation, heteroscedasticity test and correction. This model has passed the test well, and the domestic real estate market is increasing year by year.

References

[1] Wang he. Analysis of influencing factors of economic development based on multiple linear regression [J]. Business News, 2020 (36): 146147.
[2] Li Ning. Logistics demand Forecast and empirical Analysis based on Multivariate Linear regression Model [J]. Time economy and Trade, 2020 (29): 24-26.
[3] Zhou Yang, Shi Xinxuan, Lu Qinghua, Xiao Xiwen. Analysis of influencing factors of Beijing residents' information consumption level based on multiple linear regression [J]. Modernization of shopping malls, 2020 (21): 48-50.
[4] Wang Min, Wu Yubo, Min Fan. Multi-classification active learning algorithm based on multiple clustering algorithms and multiple linear regression [J]. Computer applications, 2020 and 40 (12): 3437-3444.
[5] Song GE. Study the influencing factors of stock price based on multiple linear regression model [J]. National Circulation economy, 2020 (29): 129131.
[6] Liu Yan. Mathematical model of multivariate linear regression [J]. Journal of Shenyang Institute of Engineering (Natural Science Edition), 2005 (Z1): 128129.