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Empirical Analysis of Influencing Factors of Residents' Consumption Level Based on Econometric Model

Yanjiao Huang[1], Zejiong Zhou[2,a,*]

[1]School of Finance, Anhui University of Finance and Economics, Bengbu, Anhui, China

[2]School of Economics, Anhui University of Finance and Economics, Bengbu, Anhui, China

[a]aczzj123456@163.com

Abstract

Based on the data of China's residents' consumption level from 2001 to 2020, from the perspective of economic factors, this paper selects two reasonable indicators as explanatory variables, constructs an econometric model with the help of Eviews software, and makes an empirical analysis on the factors affecting China's residents' consumption level. The results show that the per capita disposable income of real residents and the level of urbanization have a significant positive impact on Residents' consumption level. Finally, it puts forward relevant policy suggestions on how to promote the consumption level of Chinese residents.

Keywords

Econometrics; Residents' consumption level; Multiple regression model; Resident income.

1. Introduction

Since the reform and opening up, China's economic strength has been significantly improved, and the environment of the whole market has also been significantly improved, showing a good development momentum of more and more optimized structure, faster and faster speed, stronger afterforce and higher efficiency. China's economic development has gradually joined the new track of structural upgrading, accelerated leapfrog development and improved power conversion efficiency. With the economic growth, the development of the consumption level of urban and rural residents has also been greatly promoted. The rapid economic growth will greatly promote the consumption level of Chinese residents. This paper empirically analyzes the influencing factors of Chinese residents' consumption level by using econometric analysis model, and puts forward countermeasures and suggestions in order to promote the upgrading of Chinese residents' consumption.

2. Research Design

2.1. Variable selection

(1) Consumption level of residents. Residents' consumption level refers to the extent to which residents meet people's needs for survival, development and enjoyment in the process of consumption of material products and services. Residents' consumption level helps the country grasp the national macroeconomic lifeline, maintain social stability and unity, and grasp the foundation of sustainable development through micro analysis. In this paper, the calculation method of residents' consumption level is calculated according to the caliber of GDP, that is, the total consumption including labor consumption. The calculation formula is:

Household consumption level (yuan / person) = total household consumption in GDP in the reporting period / annual average population in the reporting period.

(2) Per capita disposable income of real residents. Income elasticity theory shows that increasing consumer income will increase the consumption expenditure of survival, development and enjoyment. The growth rate of survival consumption is very small and limited, but the growth rate of consumption expenditure for development and enjoyment is large. Therefore, it can improve and optimize the consumption structure of rural residents and improve the consumption level of residents. The amount of people's income determines people's consumption level. The more people's income, the corresponding consumption expenditure will increase. At the same time, the decisive factor affecting residents' consumption is disposable income. The level of disposable income and consumption in cities are relatively high. According to the data, the proportion of urban population in the total population has increased year by year, accounting for more than half, which can better represent the overall consumption level of residents. Therefore, the disposable income of residents (X1) is selected as the explanatory variable. Since the per capita disposable income of residents cannot be obtained directly, the per capita disposable income of residents in this paper is calculated as follows:

Per capita disposable income of residents = (per capita disposable income of urban residents) × proportion of urban residents in the total population + per capita net income of rural households × proportion of rural residents in the total population) / CPI × 100%.

(3) Urbanization ratio. With the rapid advancement of urbanization, the impact of urbanization on Residents' consumption level is becoming more and more significant. From the research results of domestic scholars, most scholars tend to believe that there is a spontaneous "U" evolution relationship between urbanization development and residents' consumption. At present, China is in the decline stage of "U" curve, so the increase of urbanization rate leads to the decline of residents' consumption level. When the urbanization rate exceeds 70%, the relationship between the two reaches the right half of the "U" curve. At this time, the rise of urbanization rate will contribute to the improvement of residents' consumption level. A large number of rural transferred population will transfer to cities and towns, but the specific relationship between urbanization ratio and residents' consumption level is still controversial. Since the data of urbanization ratio cannot be obtained directly, the calculation formula is: urbanization ratio = urban population / population at the end of the year. Through the analysis of the above main influencing factors, the following three main variables are summarized as the variables to build the model.

Table 1 Variables used

Variable representation	Variable name (unit)
Y	Consumption level of residents (yuan)
X1	Per capita disposable income of actual residents (yuan)
X2	Urbanization ratio (percentage)

2.2. Data sources

The relevant data of Chinese residents' consumption level and its influencing factors from 2001 to 2020 used in this paper are from the website of the National Bureau of statistics and China's three rural database. Detailed data are shown in Table 2 below.

Table 2. Original data

Year	Y	X1	X2	Year	Y	X1	X2
2001	908.0092	931.4344	37.6597	2011	2242.1239	2595.9660	51.8300

2002	985.0058	1045.3668	39.0898	2012	2427.8075	2888.7196	53.1003
2003	1038.2950	1141.2545	40.5302	2013	2620.3766	3146.1465	54.4900
2004	1112.5494	1241.9712	41.7600	2014	2838.3056	3415.5035	55.7503
2005	1225.8621	1376.0133	42.9900	2015	3065.1821	3699.2159	57.3298
2006	1341.6136	1534.8380	44.3430	2016	3314.9004	3963.1125	58.8399
2007	1510.1297	1738.9499	45.8892	2017	3602.9804	4276.9968	60.2403
2008	1627.1284	1904.8162	46.9895	2018	3878.4760	4573.1813	61.5002
2009	1782.0809	2115.1579	48.3417	2019	4106.3004	4857.7636	62.7099
2010	1972.5797	2335.2834	49.9497	2020	3996.7953	4980.5707	63.8903

2.3. Model establishment

The econometric method is used to establish the econometric model between the following dependent variables and independent variables:

$$Y = \beta_1 \log(X_1) + \beta_2 \log(X_2) + u$$

Where, Y is the consumption level of residents, X1 is the per capita disposable income of actual residents, and X2 is the urbanization ratio.

3. Empirical Analysis

3.1. Descriptive analysis

3.1.1. Trend chart analysis

Enter PLOT X1 X2 in Eviews9 command window to get the following figure:

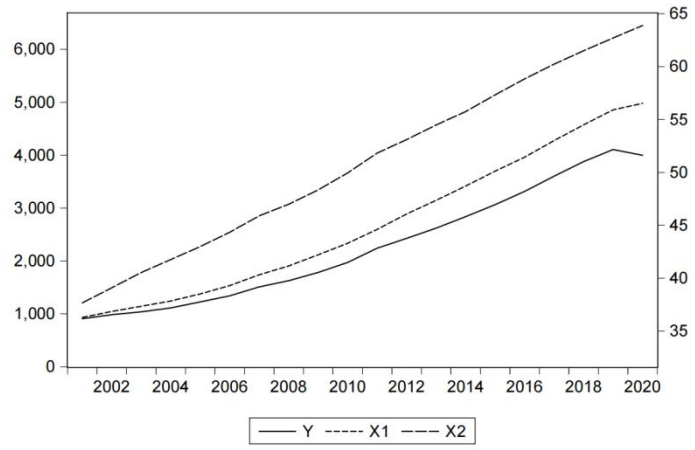

Figure 1. Trend analysis chart

As can be seen from the trend chart, the change direction of the explained variable residents' consumption level Y and the explanatory variable actual residents' per capita disposable income X1 is the same, and there is a certain correlation between them, but the change direction of the explanatory variable urbanization X2 is not obvious.

3.1.2. Scatter diagram analysis

Enter SCAT X1 Y in Eviews9 command window respectively; SCAT X2 Y obtains the following figure.

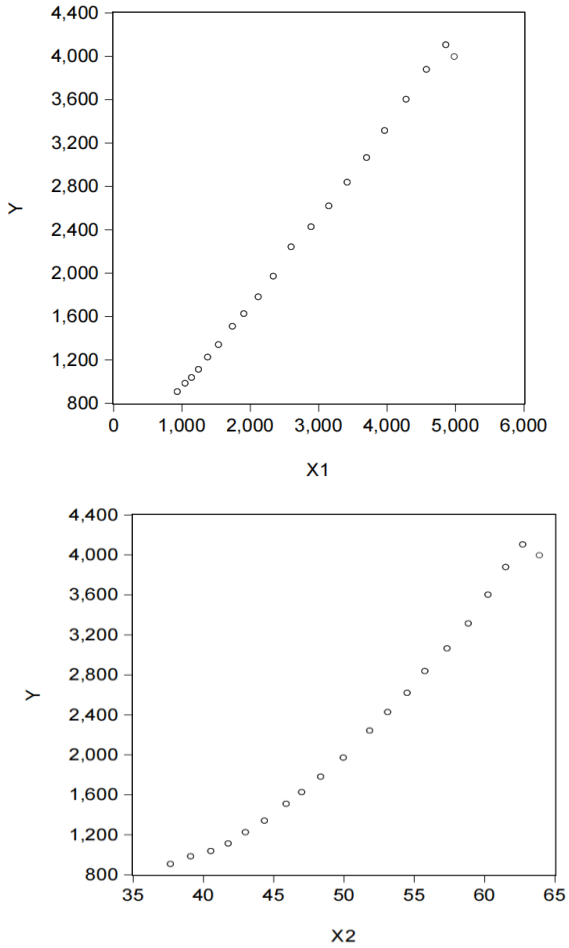

Figure 2. Scatter diagram

It can be seen from the correlation chart that there is a positive correlation between the explanatory variable real residents' per capita disposable income X1, urbanization ratio X2 and the explanatory variable residents' consumption level Y.

3.1.3. Correlation coefficient analysis

Enter COR Y X1 X2 in Eviews 9 command window, and the results are shown in the table below.

Table 3. Correlation coefficient

	Y	X1	X2
Y	1.000000	0.998196	0.980738
X1	0.998196	1.000000	0.988651
X2	0.980738	0.988651	1.000000

It can be seen from the above table that the correlation coefficients between the consumption level Y of the explained variable and the real per capita disposable income X1 and urbanization ratio X2 of the explained variable are 0.998196 and 0.980738 respectively, and their absolute values are greater than 0.8, which preliminarily shows that there is a highly linear correlation between the consumption level y of the explained variable and the real per capita disposable income X1 and urbanization ratio X2 of the explained variable.

3.2. Model estimation

According to the model setting and the collection of relevant data, respectively type LS log (Y) log (X1) log (X2) in the command bar of Eviews9 software as regression model 1, establish a double logarithm model and estimate the OLS regression parameters. The regression results are as follows:

LOG(Y) = 0.8426ln(X1) + 0.2742ln(X2)

3.3. Model inspection and correction

3.3.1. Economic significance test

The coefficient symbols of explanatory variables X1 and X2 are positive, indicating that the increase of the per capita disposable income of the actual residents of explanatory variable X1 and the increase of the urbanization level of explanatory variable X2 will increase the consumption level Y of the residents of the explained variable, and their coefficients are 0.8426 and 0.2742 respectively, which are less than 1, which is in line with the actual economic significance.

3.3.2. Statistical inspection

(1) Goodness of fit test. The determinable coefficient R^2 = 0.9979, indicating that the interpretation degree of the model to the consumption level of residents is as high as 99.79%, indicating that the model fits the sample well.

(2) T-test and P-test. At significance level α=0.05, the t-values of the explanatory variables real residents' per capita disposable income X1 and urbanization ratio X2 are 33.86638 and 5.552468 respectively, which pass the t-test, and the p-values are 0.0000. It passes the P-test, indicating that when other explanatory variables remain unchanged, they are at the significance level α= 0.05, the explanatory variables real residents' per capita disposable income X1 and urbanization ratio X2 have a significant impact on the explanatory variable residents' consumption level Y.

3.3.3. Econometric test

(1) Multicollinearity test

①Simple correlation coefficient test

Table 4. Simple correlation coefficient test results

	Y	X1	X2
Y	1.000000	0.998196	0.980738
X1	0.998196	1.000000	0.988651
X2	0.980738	0.988651	1.000000

From the correlation coefficient between explanatory variables output by Eviews, it can be seen that the correlation coefficient between X1 and X2 is greater than 0.8, and there is serious multicollinearity between explanatory variables.

②Variance expansion (expansion) factor method

Table 5. Results of variance expansion (expansion) factor analysis

Variable	Coefficient Variance	Uncentered VIF
LOG(X1)	0.000619	1331.515
LOG(X2)	0.002440	1331.515

According to Eviews, there is no VIF_1, VIF_1. The variance expansion factor method cannot explain whether there is multicollinearity between explanatory variables.

Through simple correlation coefficient test and variance expansion (expansion) factor method, it can be concluded that there is no serious multicollinearity between model variables.

③Stepwise regression test. Since the p-value criterion is linear, it is impossible to use the stepwise regression method to explain whether there are multiple variables in the regression model, and whether the stepwise regression method can be used to explain whether there is a stepwise regression criterion between p-value and 0.05. The estimated results are as follows.

Table 6. Results of stepwise regression test

Variable	Coefficient	Std.Error	T-Statistic	Prob
LOG(x1)	0.842594	0.024880	33.86638	0.000000
Log(x2)	0.274249	0.0493992	5.552468	0.000000

The linear regression equation obtained by stepwise regression test is completely consistent with the equation estimated by OLS, indicating that there is no multicollinearity in the model.

(2) Heteroscedasticity test

①Graphical test method. The residual graphic analysis is as follows

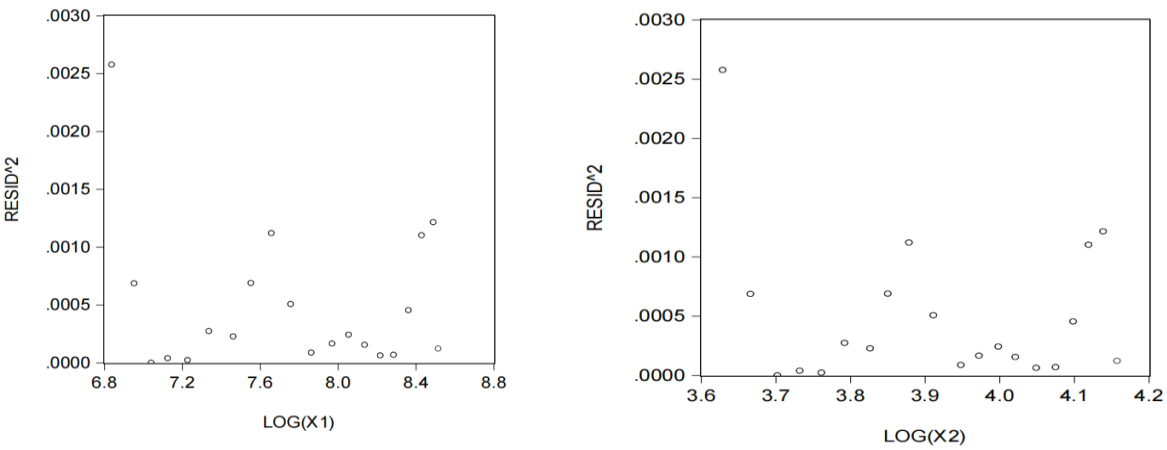

Figure 3. Residual graph

According to the scatter diagram of residual square e_i^2 on explanatory variables $logX_1$ and $logX_2$, the change of residual Square e_i^2 on explanatory variable X_2 shows an uneven distribution trend. Therefore, the model is likely to have no heteroscedasticity.

Heteroscedasticity analysis is as follows

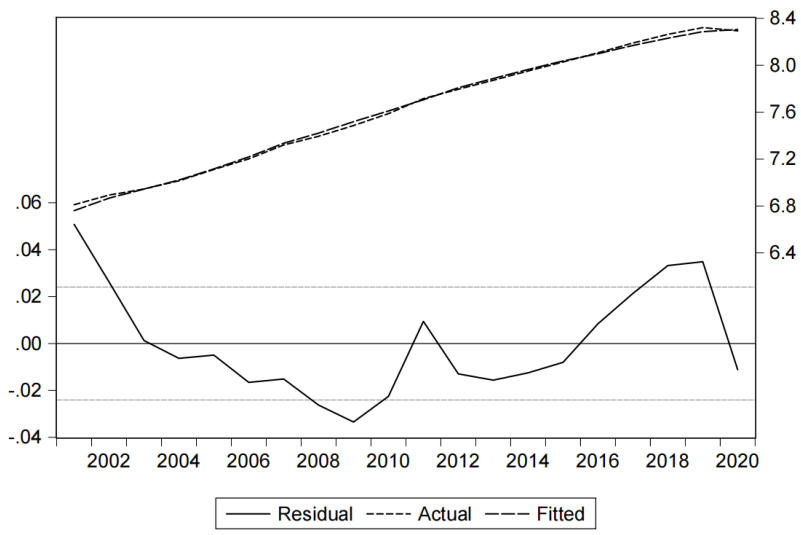

Figure 4. Residual diagram of regression model

The residual diagram of the regression model of the influencing factors of Chinese residents' consumption level shows that the residual distribution of the regression equation has no obvious expansion trend, which indicates that the model is likely to have no heteroscedasticity. This method can only be used as a reference to check whether there is variance in the model.

② Goldfeld-Quandt test. Through Goldfeld-Quandt test, the samples are divided into 1-8 and 13-20 parts as sample 1 and sample 2 respectively. Regression model 1 and regression model

2 are established by using sample 1 and sample 2 respectively. The test results are shown in the table below.

Table 7. Results of Goldfeld-Quandt test (1)

Variable	Coefficient	Std.Error	t-Statistic	Prob
Log(X1)	0.620841	0.065598	9.464340	0.001331
Log(X2)	0.700129	0.126015	5.555914	0.001452

Table8. Results of Goldfield- Quandt test (2)

Variable	Coefficient	Std.Error	t-Statistic	Prob
Log(X1)	1.060038	0.132189	8.019113	0.000253
Log(X2)	-0.166913	0.269139	-0.620173	0.557924

The F statistic is calculated from the obtained data， F=RSS2/RSS1=0.9328，$F_{0.05}$(6,6)=4.28，F=0.9328<$F_{0.05}$ = 4.28， therefore, there is no heteroscedasticity.

Through graphical test and Goldfeld-Quandt test, it is concluded that there is no Heteroscedasticity in the model.

(3) Autocorrelation test

①DW test method. Conduct DW inspection. Since n = 20 and k = 2, the significance level is taken α= 0.05, the table shows that D_L = 1.100, D_U = 1.537, 0 < DW = 0.788378 < D_L. Therefore, there is a first-order positive correlation.

②Partial correlation coefficient test. The partial correlation coefficient test is carried out. The default lag period is 12, and the correlation coefficient and partial correlation coefficient of each period of the residual are obtained, as shown in the figure below.

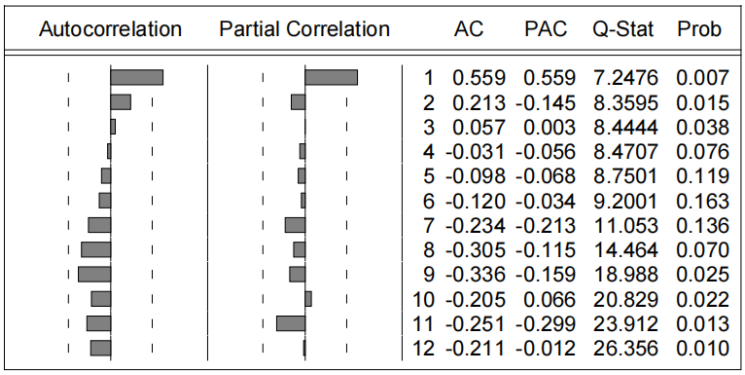

Figure 5. Partial correlation coefficient analysis diagram

It can be seen from the figure that the histogram of partial autocorrelation coefficient PAC in phase I exceeds the dotted line, indicating that the regression model has first-order autocorrelation.

③BG (LM) inspection. BG test was carried out and the lag period was 2. The following results were obtained.

Table 9. BG inspection results

Variable	Coefficient	Std.Error	t-statistic	Prob.
LOG(X1)	-0.005888	0.022174	-0.265541	0.794011
LOG(X2)	0.011433	0.044000	0.259838	0.798326
RESID(-1)	0.719081	0.275904	2.606274	0.019153
RESID(-2)	-0.315486	0.294574	-1.070991	0.300125

According to the output results, T R^2 =6.335439> $\chi^2_{0.05}$ (2)==5.99147， P=0.0421<0.05. It indicates that the model has autocorrelation.

(4) Modified generalized difference method for autocorrelation. The generalized differential regression is made by Cochran Oakert iterative method, and the following estimation results are obtained by inputting: LS log (Y) log (X1) log (X2) AR (1).

The estimation process converges after 8 iterations. The DW of the adjusted model is 1.717443, n = 18, k = 1, and the significance level is taken α= 0.05, DL = 1.100, Du = 1.537, D_U < DW = 1.830433 < 4- D_U = 2.463, indicating that the model has no autocorrelation.

Therefore, the revised model is: LOG(Y) = 0.7942ln(X1) + 0.3710ln(X2).

The estimation results of the model show that the consumption level y of residents mainly depends on the per capita disposable income X1 and urbanization level x2 of actual residents. With other factors unchanged, when the per capita disposable income of real residents increases by 1 percentage point, the consumption level of residents increases by 0.7942 percentage points. When other factors remain unchanged, the consumption level of residents can increase by 0.3711 percentage points for every 1 percentage point increase in the level of urbanization, which is in line with the general law of economics.

4. Conclusions and Suggestion

4.1. Conclusions

From the above analysis, we can see that the per capita disposable income of actual residents and the level of urbanization are one of the important factors affecting the consumption level of residents, and play a vital role in the impact on the consumption level of Chinese residents. Third, the per capita consumption level is also affected by the residents' consumption level and the actual consumption level, and the per capita consumption level is also affected by the residents' consumption concept and CPI. Therefore, in order to improve the consumption level of Chinese residents, it is necessary to increase the per capita disposable income of real residents and promote the process of urbanization in China. Therefore, the following suggestions are put forward.

4.2. Suggestions

(1) Improve the income of rural residents and stabilize income expectations. Due to the unbalanced development of Chinese residents' income and serious income polarization, increasing rural per capita disposable income is an important measure. In order to improve the income of rural residents and stabilize the expectation of farmers' income, we must improve the current unstable situation of farmers' land income and increase farmers' agricultural income, so as to promote the improvement of residents' consumption level. The government should increase technical investment and increase crop output, so as to gradually realize large-scale agricultural management. Relevant policies should also be introduced to gradually raise crop prices and increase farmers' agricultural income. In addition, controlling the price rise of agricultural means of production and giving farmers more land subsidies, chemical fertilizer and pesticide subsidies can also improve farmers' enthusiasm from the production link, improve the level of agricultural production, and promote the overall improvement of Chinese residents' consumption level by promoting the income growth of relatively vulnerable groups.

(2) Increase fiscal expenditure and improve the social security system. Residents' consumption level is closely related to residents' living standards to a large extent, while medical and health issues and education are the two main livelihood issues faced by residents. In terms of medical and health care, the goal should be to reduce the medical burden of residents. At present, China's medical level still has great limitations, so we should increase the scale of medical expenditure and actively improve the medical and health conditions of vulnerable groups. We

will strengthen the construction of medical and health infrastructure and the introduction of talents in underdeveloped and rural areas, narrow the medical and health gap between regions, so that more residents can get better medical assistance, and will not lower the consumption level of the whole family due to illness. In addition, we should create favorable market conditions, introduce market mechanism, increase medical and health investment, and solve the related problems of insufficient public funds. In terms of education, we should increase financial investment in education at all levels, especially in the stage of compulsory education, and generally improve the human capital level of urban and rural residents. On the premise of ensuring the basic education expenditure of each region, we should focus on supporting the education development of relatively underdeveloped areas and rural areas, and improve the salary level and school running conditions of teachers in these areas, so as to attract high-level and high-quality teachers and promote the appreciation of human capital in underdeveloped areas and rural areas.

(3) Optimize the spatial layout of urbanization and promote the coordinated development between cities. Take regional central cities and urban agglomerations as the main spatial form of urbanization development, improve the regional comprehensive carrying capacity of economic development advantages, further promote the construction of modern central integrated cities, metropolitan areas and urban agglomerations with high degree of integration and obvious synergy, and drive the common development of relevant regions and central cities, Relying on the linkage of metropolitan areas and the development process of urban agglomeration, form a high-quality power system for urbanization development and promote the process of urbanization.

(4) For the purpose of fair sharing, rationally allocate urban and rural production factors and public resources. Rationally allocate public resources, promote the delivery of high-quality public resources to remote rural areas or poor areas, make social undertakings cover more rural areas, promote the balanced allocation of basic public services in urban and rural areas, promote the integrated development of urban and rural areas, and improve the basic public service system integrating urban and rural areas; We will accelerate the upgrading of rural infrastructure and realize the integration of urban and rural infrastructure planning, construction and management. At the same time, we should unblock the flow channels of urban and rural production factors and guide urban factors into the countryside, so as to achieve the purpose of promoting development. By clarifying the ownership of various rural assets and enriching their power, we can effectively revitalize the elements of rural resources by using the market mechanism and promote the development of urbanization.

References

[1] Yang Ligao, Xie Rui, He Zhengchu, et al. Research on the impact of rising labor costs on the upgrading of manufacturing structure -- An empirical analysis based on the data of China's manufacturing industry segments [J]. China soft science, 2014 (12): 136-147.

[2] Chu Deyin, Yan Wei. Tax policy and residents' consumption demand -- new thinking from the perspective of structural effect [J]. Economic theory and economic management, 2012 (3): 53-63.

[3] Gao Xuedi, Wu Qianmin. Research on the influencing factors of residents' consumption level in China [J]. Inner Mongolia coal economy, 2020 (20): 95-96.

[4] Zhao Xueyao. Analysis on influencing factors of China's real estate price based on linear regression [J]. Journal of Anhui Jianzhu University, 2018, 26 (6): 120-126.

[5] Feng Yao. Analysis on the main factors affecting residents' consumption level -- Taking Hunan Province as an example [J]. Statistics and management, 2017 (3): 57-58.

[6] Shen Genxiang. Financial Econometrics: achievements and challenges [J]. Productivity research, 2001 (6): 52-54 + 189.

[7] Wang Bo. Book therapy in China [J]. Chinese Journal of library, 1998 (02): 79-86.

[8] Wang Xiaoyan, Yang Yang, Zhou Xiaobo. Study on influencing factors of coal inventory in Chinese ports [J]. China coal, 2014, 40 (5): 15-18.
[9] Lu Cailan, Hong Yinxing, Zhao Hua. The impact of farmers' income structure on consumption expenditure -- Based on the data analysis of Jiangsu Province from 1993 to 2009 [J]. Economic system reform, 2012 (2): 66-67.
[10] Zhang Shuguang, Zhao Nong. Marketization and its measurement -- Also on the research on the marketization process of China's economic system [J]. Economic research, 2000 (10): 73-77.