Based on Eviews of Econometric Analysis of Per Capita Disposable Income and Consumption Expenditure of Rural Residents in Shandong

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Abstract: The paper collected the data of per capita disposable income and consumption expenditure of rural residents in Shandong from 2000 to 2019. Combined with Eviews, the per capita disposable income and consumption expenditure of rural residents in Shandong were analyzed and simulated. The ordinary least squares estimators was used to establish the simple linear regression model. And the validity of the model would be tested. The fitting results show that the income consumption model can explain the relationship between them well. We find that as the per capita disposable income of rural residents increases, the per capita consumption expenditure also increases. More than 99% of the change in disposable income can be explained by changes in consumer spending. This paper proposes that the consumption level can be improved by increasing the disposable income of rural residents, so as to promote the improvement and optimization of the consumption structure of rural residents and promote the healthy and sustainable development of rural economy in Shandong. At the same time, it can also provide reference for the policy making and implementation of relevant departments.

1. Introduction

Since the reform and opening up, China's economy has achieved long-term stable growth. People's life has also changed a lot. The level of economic development in rural areas of our country is constantly improving, and the income has also achieved a substantial increase. At the same time, people's consumption has shifted from basic consumption to consumption based on enjoyment and development. The structure of consumption has become more optimized. Due to the large rural population base in China, the lack of consumption demand of rural residents has become the main factor affecting the lack of consumption of Chinese residents, thus restricting the development of national economy.

At present, the characteristics of consumption of rural residents in China include the following points. Firstly, the growth of rural consumption is slower than that of social consumption which makes rural residents' willingness to consume not high and reduces the share of consumption. Secondly, the consumption growth of rural residents was slower than that of urban residents. The gap between urban and rural consumption has widened. And the gap is still widening. Thirdly, the consumption growth in rural areas is slower than income growth. The increase of saving tendency

and decrease of consumption tendency are mainly due to the decrease of the overall consumption intention of rural residents.

Therefore, this paper focuses on the relationship between rural residents' disposable income and consumption expenditure to study their consumption level and draw relevant conclusions.

2. Data Collection and Modeling

2.1 Sources of Data

According to the Statistical Yearbook of Shandong province, the author collected the relevant data of per capita disposable income and per capita consumption expenditure of rural residents in Shandong Province from 2000 to 2019. According to the data in Table 1, it can be found that the disposable income and consumption expenditure of rural residents increased by 5.67 times and 6.06 times respectively in these 20 years. The per capita disposable income and consumption expenditure show a straight rising trend, indicating that the income and consumption level of rural residents in Shandong have been greatly improved.

Table 1 Per Capita Disposable Income and Per Capita Consumption Expenditure of Rural Residents in Shandong Province during 2000 to 2019 (Unit: Yuan)

year	per capita disposable income	per capita consumption expenditure	year	per capita disposable income	per capita consumption expenditure
2000	2663	1743	2010	7034	4472
2001	2810	1865	2011	8395	5489
2002	2955	1945	2012	9506	6304
2003	3159	2066	2013	10687	6877
2004	3519	2301	2014	11882	7962
2005	3946	2619	2015	12930	8748
2006	4387	2992	2016	13954	9519
2007	5009	3426	2017	15118	10342
2008	5671	3835	2018	16297	11270
2009	6154	4132	2019	17775	12309

2.2 Regression Analysis

The analysis tool used in this paper is Eviews software. This software is one of the most commonly used tools in data analysis. It is also an indispensable tool for relevant scholars in econometric analysis. It plays an irreplaceable role in the research of various economic phenomena and economic data. It is popular with people for its powerful function, flexible operation and easy to use. It is because of the emergence of econometrics software packages such as Eviews that econometrics has made great progress and developed into a more practical and rigorous economic discipline. However, there are inevitably some defects and deficiencies in the use of Eviews software. This requires us to update and complete it in the future research, so as to make a better contribution to economic research.

The following is a scatter chart of per capita disposable income and per capita consumption expenditure by using Eviews software. Through the scatter diagram, we can observe that there is a strong positive correlation between the two, which indicates that it has a certain practical significance and rationality to establish the model through the relationship between the two.
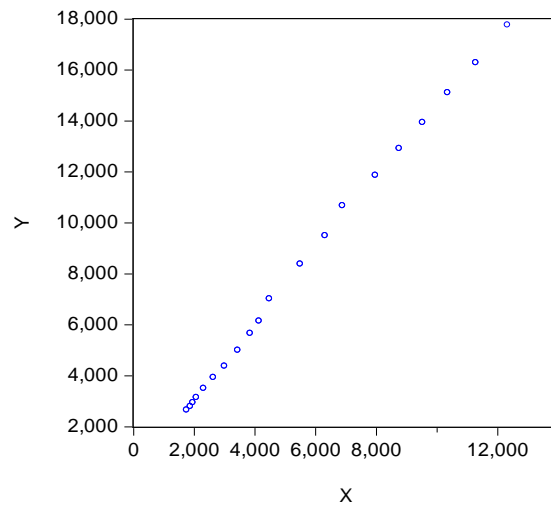
Fig.1 Scatter Chart of Per Capita Disposable Income and Per Capita Consumption Expenditure of Rural Residents

Make a preliminary judgment according to the scatter diagram, and set the general form of the model as follows:

$$y = \beta_0 + \beta_1 x + u$$

Where, u is called the random error term or random disturbance term, which contains the sum of all factors influencing the explained variable y except the explanatory variable x.

Through regression analysis of data from 2000 to 2019, the regression model of per capita disposable income and per capita consumption expenditure of rural residents is established as follows:

$$y = 222.00102 + 1.44635x$$

$$t = (2.59809)(109.1984)$$

$$R^2 = 0.99849$$

$$F = 11924.28$$

$$D.W. = 0.69999$$

Dependent Variable: Y
Method: Least Squares
Date: 12/14/21   Time: 21:59
Sample: 2000 2019
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	222.0010	85.44759	2.598096	0.0182
X	1.446351	0.013245	109.1984	0.0000

R-squared	0.998493	Mean dependent var	8192.550
Adjusted R-squared	0.998409	S.D. dependent var	4980.860
S.E. of regression	198.6724	Akaike info criterion	13.51583
Sum squared resid	710472.8	Schwarz criterion	13.61540
Log likelihood	-133.1583	Hannan-Quinn criter.	13.53527
F-statistic	11924.28	Durbin-Watson stat	0.699993
Prob(F-statistic)	0.000000		

Fig.2 One-Dimensional Linear Regression Equation

3. Model Test

3.1 Economic Significance Test

The results of regression model show that the per capita disposable income and per capita consumption expenditure of rural residents in Shandong province are positively correlated. And slope $\beta_1 = 1.44635$ is the consumption expenditure of marginal rural residents. This shows that when the explanatory variable increases by 1 yuan, the per capita disposable income of rural residents in Shandong province as the explained variable increases by 1.44635 yuan on average. With the increase of per capita consumption expenditure, the per capita disposable income of rural residents also presents a trend of gradual rise. So what we got is consistent with reality. This fully proves the rationality and practicability of the model, which can effectively measure the income level and change degree of rural residents in Shandong Province.

3.2 Statistical Significance Test

3.2.1 F Test

Significance of the equation F test is used to measure the regression effect of the whole equation to test whether there is a certain linear relationship between y and x. According to the established model, the F value of the regression model is:

$F = 11924.28$

At the significance level of 5%, the F statistic is greater than the critical value. The results show that the F test of the regression equation can pass. The equation we established is remarkable and has good explanatory power. It can effectively measure the linear relationship between y and x.

3.2.2 t Test

The parameter significance test is measured by the t test. For coefficient β_1 in the unitary linear regression model, the t statistic of sample data is 109.1984. At a significance level of 5%, the value obtained by looking up the T-distribution table is about 2. Since the t value of the regression model is much greater than 2, the t test of the model coefficient can be passed. This also indicates that the per capita disposable income selected in this paper as an explanatory variable can fully explain the level of consumer expenditure. And the established regression model is effective.

3.2.3 Goodness of Fit Test

Goodness of fit test is used to check whether the observed value is consistent with the estimated value of the constructed model, and also to test the accuracy of the sample regression model. It is mainly embodied by R^2. According to the above model, R^2 is obtained 0.99849. This shows that 99.849% of the change of rural residents' disposable income in Shandong province can be explained by the change of consumption expenditure. Therefore, the model fits well.

4. Analysis and Suggestions

Consumption is an important factor driving economic growth and plays a more important leading role in the national economic cycle. Through the above empirical analysis, we have a preliminary understanding of the relationship between the disposable income and consumption expenditure of

rural residents in Shandong Province from 2000 to 2019. The income of rural residents has always been the main driving force of consumption and has the most critical influence on consumption. Therefore, the relevant departments can promote the consumption expenditure level of rural residents by increasing their income.

Firstly, the government should adjust the structure of agricultural industry, increase the employment rate of farmers, and make the wage income increase steadily. We will strengthen infrastructure construction in rural areas and modernize agriculture. We will encourage farmers to actively change their production and businesses, vigorously develop agriculture with local characteristics, and expand the agricultural industrial chain. We will encourage the development of rural areas in light of local conditions, increase the added value of rural industries and raise farmers' incomes.

Secondly, the government accelerated economic development in rural areas and increased farmers' wage income. Relevant departments integrate existing industries, expand scale, increase investment, and develop a number of leading enterprises to drive small rural industries. So we can improve the technological content and added value of products and combined with local characteristics to cultivate brand-name products. We will make full use of the abundant labor resources in rural areas to develop agricultural industrial parks. The government supported the development of a number of specialized cooperative organizations and intermediary service organizations for farmers. In order to improve the organizational degree of farmers entering the market, we should strive to perfect the interest connection mechanism and management mechanism.

Thirdly, the government should increase the intensity of relevant policies to benefit the people and ensure that the income level of rural residents increases steadily. We will increase the proportion of remuneration in primary distribution and further improve the income distribution system. The income distribution gap should be narrowed to stimulate the consumption demand of rural residents. We will ensure farmers' production, livelihood and income. We will make proper use of funds to support agriculture, benefit farmers and help the poor to better use these funds. Relevant departments increase funds to support agricultural industrialization and give appropriate preferential policies to key leading enterprises in all aspects.

Fourthly, we will continue to improve the rural service system and make rural residents more competitive in employment. Carry out practical skills training for the employment needs of different rural residents, so that most farmers can master a professional skill. We should strengthen the popularization of science and technology, carry out various practical technical training, improve farmers' production skills.

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