A statistical analysis of the impact of urbanization on the consumption structure of rural residents in Shandong Province

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Abstract: We select the per capita living consumption expenditure of rural residents in Shandong Province from 2001 to 2019 and the eight items of consumption expenditure data to study the relationship between urbanization development and consumption expenditure of rural residents in Shandong Province and the change trend of consumption structure of rural residents in the process of urbanization development. Taking the urbanization rate as the independent variable and the proportion of the eight major consumer expenditure in the total consumption expenditure as the dependent variable, the regression analysis models are established respectively. The results show that the regression coefficients between the proportion of food, the proportion of health care, the proportion of transportation and communication and the urbanization rate are higher, and the fitting degree is better. It shows that in the process of urbanization, the three types of consumer expenditure are greatly affected by the development of urbanization.

Keywords: Shandong Province, urbanization, consumption structure of rural residents, regression analysis

1. Introduction

In recent years, various departments of Shandong Province vigorously implement the urbanization strategy and actively carry out the action of harmonious urban and rural construction. Now the urbanization development of Shandong Province has achieved obvious results.It can be seen that the scale of cities and towns in Shandong Province is constantly expanding, the comprehensive economic strength is constantly being improved, and the urban and rural infrastructure and the living conditions of residents are also constantly improving.However, there are still some problems in the urbanization construction of Shandong Province, such as low quality, slow speed, especially the weak strength and driving ability of some central cities, which makes the development of urban agglomeration backward. In addition, there are problems such as insufficient investment in infrastructure and public service facilities, and low efficiency of land use.Although the consumption level and ability of large and medium-sized cities have basically reached modernization, the income and consumption ability of rural areas with large population is still relatively low, so the income gap between urban and rural areas in Shandong Province is still relatively large.Income is the main factor affecting residents' consumption. In the process of urbanization, cities provide a large number of employment opportunities, promote the transfer of rural labor force, and thus increase the income of rural residents.Rural urbanization can increase the income of rural residents, affect the consumption structure of residents, and then affect the consumption behavior of residents.

The development of urbanization in Shandong Province can be reflected by the urbanization rate. The eight items of consumption expenditure data of rural residents can be obtained from the Shandong statistical yearbook. Therefore, we can study how the urbanization development affects the consumption structure of rural residents through statistical analysis.We conducted an empirical analysis of the relationship between urbanization and rural residents' consumption structure, obtained the results of the impact of urbanization development on rural residents' consumption structure, and put forward corresponding suggestions based on the results of statistical analysis to provide a basis for the government's scientific decision-making.

2. Numerical analysis

The urbanization rate is selected as an indicator to represent the development of urbanization, denoted as X. Obviously, the higher the urbanization rate, the higher the level of urbanization development in Shandong Province.The per capita consumption expenditure of rural residents is selected to represent the consumption situation of rural residents, denoted as Y.In order to better study how the consumption structure of rural residents

changes in the process of urbanization, we select the proportion of eight categories of consumption expenditure in the total consumption expenditure, namely, the proportion of food, clothing, housing, household equipment and services, transportation and communication, culture, education, entertainment and services, medical care and other goods and services, they are denoted as Y1, Y2, Y3, Y4, Y5, Y6, Y7 and Y8, respectively.

We select the data from 2001 to 2019, which is a total of nearly 19 years, including urbanization rate, per capita living consumption expenditure of rural residents and eight categories of consumption expenditure.

2.1 The change trend between urbanization rate and consumption structure of rural residents

The urbanization rate of Shandong Province has gradually increased in the past 19 years, from 39.20% in 2001 to 61.51% in 2019.The urbanization rate of China is 60.60% in 2019, while the urbanization rate of Shandong Province is higher than the national average in 2019. It can be seen that the urbanization process of Shandong Province is still relatively fast.Firstly, we study the change trend of per capita consumption structure of rural residents in Shandong Province with the increase of urbanization rate.Taking the year as the abscissa and the urbanization rate and consumption structure of rural residents in Shandong Province from 2001 to 2019 as the ordinate, we draw a line group, as shown in Figure 1.
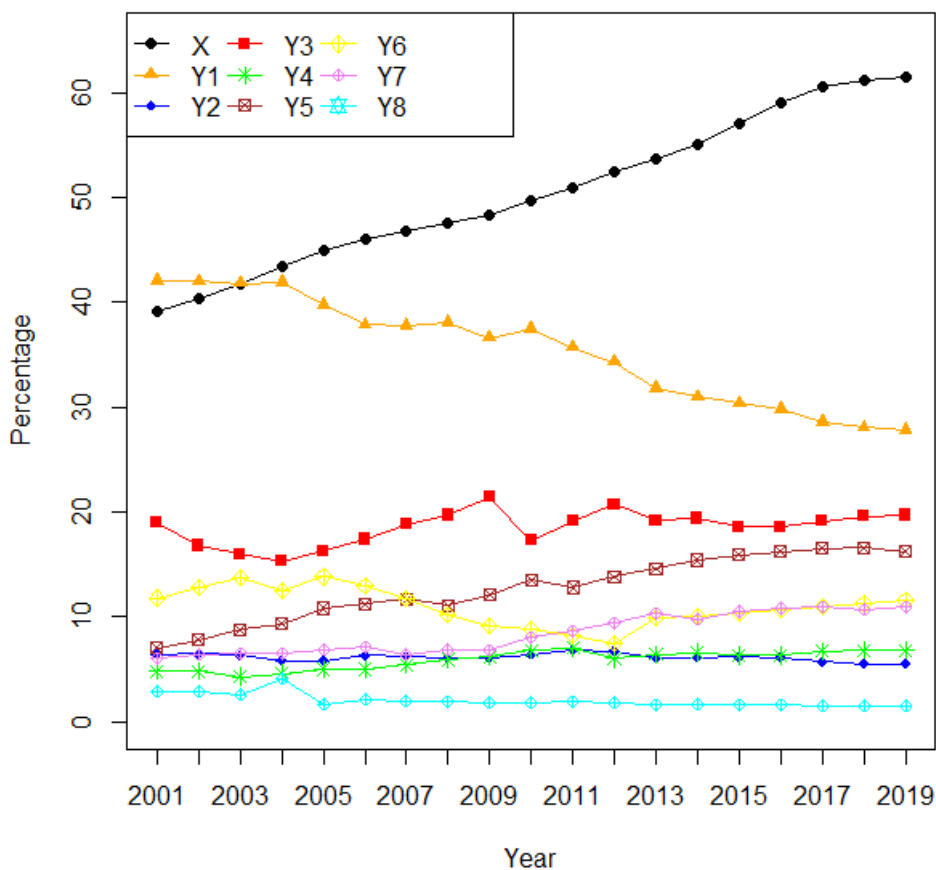
Figure 1 The change trend between urbanization rate and consumption structure of rural residents

From Figure 1, it can be seen that the urbanization rate of Shandong Province has been on a steady rise from 2001 to 2019. Consumption structure has different trends with the increase of urbanization rate, and the specific contents are as follows:

The proportion of food expenditure (Engel coefficient) and housing expenditure is relatively large. With the increase of urbanization rate, the proportion of food expenditure is gradually decreasing, from 42.1% to 27.8%; the

proportion of housing expenditure is generally increasing, fluctuating in the range of 15.3% ~ 21.4%, and gradually increasing in recent years.

The proportion of transportation and communication expenditure, culture, education and entertainment expenditure and health care expenditure in the total consumption expenditure is relatively small. However, the proportion of transportation and communication expenditure continued to increase, from 7.0% to 16.2%, up 9.2 %, with the largest increase.The proportion of culture, education and entertainment expenditure showed a contrast in 2012. Before 2012, the proportion of culture, education and entertainment expenditure decreased, and then gradually increased. The proportion of health care expenditure increased from 6.0% to 10.9%, up by 4.9 %, with a relatively rapid growth rate.

The proportion of clothing expenditure, household equipment expenditure and other goods and services expenditure in the total consumption expenditure is relatively low. The proportion of clothing expenditure is generally decreasing, fluctuating in the range of 5.5% ~ 6.8%. On the whole, the expenditure on household equipment, supplies and services is increasing, but the increase rate is relatively small, which is maintained in the range of 4.3% ~ 7.0%.

2.2 Linear regression analysis of urbanization rate and consumption structure of rural residents

By using statistical methods, we take the urbanization rate as the independent variable and theeightitems of consumption structure of rural residents as the dependent variable. The linear regression model between the urbanization rate and the consumption structure of rural residents is established through statistical software SPSS to analyze how the urbanization development affects the consumption of rural residents. The output is shown in Table 1.

Table 1Parameter estimation of linear regression analysis between urbanization rate and consumption structure of rural residents

Consumption expenditure structure (%)	Intercept	Coefficient	R^2	F	Sig
Food(Engelcoefficient)Y_1	70.794	-.700	.974	632.188	.000
ClothingY_2	7.323	-.024	.219	4.762	.043
HousingY_3	12.706	.115	.262	6.045	.025
Householdequipment and servicesY_4	.661	.103	.703	40.227	.000
Transportationand communicationY_5	-8.588	.421	.960	411.892	.000
Culture,education,entertainment and servicesY_6	16.101	-.102	.164	3.345	.085
Medical careY_7	-4.389	.253	.914	179.938	.000
Other goods and servicesY_8	5.438	-.068	.529	19.079	.000

It can be seen from Table 1 that the three consumption expenditure ratios of clothing proportion Y2, housing proportion Y3 and culture, education, entertainment and service proportion Y6 have a low degree of good fit with X, that is, the fitting effect of the equation is poor, which are 0.219, 0.262 and 0.164 respectively.When the significance level α=0.05, we can see from the Sig column that the clothing proportion Y2 and the housing proportion Y3 passed the significance test, but the culture, education, entertainment and service proportion Y6 did not pass the significance test.The goodness of fit between the proportion of household equipmentand services Y4 and the proportion of other goods and services Y8 and the urbanization rate are 0.703 and 0.529, respectively. The fitting effect is relatively good, and the regression models established by Y4, Y8 and X also pass the significance test.In addition, the proportion of the remaining consumption expenditure, the proportion of food Y1, the proportion of transportation and communication Y5 and the proportion of medical care Y7, have a very good

fitting effect with the urbanization rate X, with goodness of fit of 0.974, 0.960 and 0.914 respectively. Therefore, we can see that most of the models fit well between the proportion of consumption structure and urbanization rate X.

By observing the intercept and coefficient columns in Table 1, it can be seen that the proportion of food, clothing, culture, education, entertainment and services, and other goods and services (Y1, Y2, Y6 and Y8) is negative in the regression model established between the proportion of consumption expenditure and the urbanization rate X. That is to say, in the process of increasing the urbanization rate, the proportion of these consumer expenditures in the total consumption expenditure changes in the opposite direction with the change of the urbanization rate, that is, the proportion of these consumer expenditures is gradually decreasing. Among them, the regression coefficient between the proportion of food and the urbanization rate is -0.7, which means that for every 1% increase in the urbanization rate X, the proportion of food expenditure in the total consumption expenditure will drop by 0.7 %, and the decline is the largest, the proportions of other types of consumer expenditures decrease with the increase in the urbanization rate, but the decline is relatively small. The regression coefficients of Y3, Y4, Y5 and Y7 with urbanization rate X are positive in the regression model, that is to say, in the process of urbanization rate increasing, the proportion of these consumption expenditures in the total consumption expenditure and urbanization rate change in the same direction, that is, the proportion of these consumption expenditures is gradually increasing. Among them, the regression coefficient between the proportion of transportation and communication and the urbanization rate is 0.421, that is to say, for every 1% increase in the urbanization rate X, the proportion of food expenditure in the total consumption expenditure will rise by 0.421%, and the increase rate is the largest, followed by the proportion of medical care. For every 1% increase in the urbanization rate X, it will rise by 0.53%. With the urbanization rate increasing by 1%, the proportion of residents will increase by 0.115 %.

3. Conclusion and suggestion

3.1 Conclusion

We summarize the above empirical results and draw the following conclusions:

Firstly, the per capita consumption expenditure of rural residents increases with the increase of urbanization rate.

Secondly, in the consumption structure of rural residents, Y1, Y3, Y5 and Y7 (the proportion of food, residence, transportation and communication, and health care) are greatly affected by the urbanization rate. Moreover, with the increase of urbanization rate, food consumption accounts for a smaller proportion in the total consumption expenditure, while transportation, communication and health care account for a larger proportion.

3.2 Suggestions

Urbanization can promote the main consumption structure of rural residents in Shandong Province. In order to improve the consumption level of rural residents, we need to start from the urbanization construction, optimize the consumption structure through the new urbanization strategy, improve the consumption level of rural residents, and narrow the gap between urban and rural areas.

(1) In the process of urbanization, we should vigorously develop urban service industry, support the development of local emerging industries, create more jobs for rural residents, improve employment opportunities, and increase the income of rural residents. Income is the premise of consumption. Increasing income can promote consumption and create income source for rural residents.

(2) We will improve the land rights and interests system, so that rural residents can get fair benefits from land transfer, and promote the transfer of rural labor to cities. This will not only increase the income of rural residents, but also promote the process of urbanization.

(3) Enriching the consumption knowledge of rural residents. First of all, rural residents must master the knowledge of consumption, and then learn the skills of consumption to change the concept of consumption. The government should strengthen the guidance of consumption knowledge of rural residents and let them learn to use some modern consumption methods, such as online shopping and credit consumption.

(4)We should improve the rural public infrastructure, reduce the consumption expenditure of rural residents in public services, improve the medical service system and the poverty guarantee system for rural residents, and improve the lives of rural residents.

Reference

1. Xiaofang Jia, Dan Li, Rui Huang(2019). An empirical study on urbanization development and consumption structure change of rural residents in Hunan Province [J].*Journal of Hengyang Normal University*, 40(01):77-83.
2. Yongqing Li, Huifang Lu (2016).Analysis on the influence of urbanization on the consumption structure of rural residents in Henan Province [J]. *Journal of Commercial Economics*, 2: 40-41.
3. Huazhang Du (2011).Analysis on the impact of urbanization development on the consumption structure of rural residents - taking Jiangsu Province as an example [J].Business Economy,10:11-14.
4. Xiuqing Lin (2011).Research on the relationship between the level of urbanization and the consumption of rural residents [J].*Commercial Times*, 3:10-12.
5. Duesenberry, J. S. (1949). Income, saving, and the theory of consumer behavior. *Review of Economics & Statistics*, 33(3), 111.
6. Renaud, B. (1982). National urbanization policy in developing countries. *Population and Development Review*, 8(1), 199.