

Research on the Upgrading Path of Consumption Structure of Rural Residents in Qingyuan Based on ELES Model- Under the Background of Rural Revitalization

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Abstract: Under the background of rural revitalization, a strategy for transforming rural areas, this research is carried out to promote economic development and upgrade the consumption level of rural residents in Qingyuan. To be specific, the statistical data from 2016 to 2020 were collected and built into an ELES Model by EVIEWS7.2, based on which the marginal propensity to consume (MPC) and income elasticity of demand of rural residents in Qingyuan were analyzed to generalize the changes in their consumption structure. The conclusion was that the Engel coefficient of rural residents in Qingyuan was high. The proportion of eating and drinking in total household consumption was high while less money was left for enjoyment and development consumption. Most rural residents still had lower accessibility and affordability to medical treatment. And the rising house prices accounted for the biggest share of consumption expenditure of rural households.

Keywords: rural revitalization; consumption structure of rural residents; ELES Model

1 Introduction

The rural revitalization strategy aims to improve the living standard and consumption levels of rural residents and fulfill their wish for a good life. The strategy is also necessary for expanding domestic demand and boosting domestic circulation.

The *Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of Qingyuan* clarifies that one of the development strategies is promoting rural revitalization, guaranteeing urban-rural integration, upholding the people-oriented ideology, and improving people's wellbeing. In 2020, the proportion of permanent rural residents in Qingyuan accounted for 45.5% of the total population, which means that the consumption level of rural residents, which held a large share of the total social consumption, needs to be improved to stimulate consumption growth. Consumption structure, which can reflect the level and changing trend of residents' consumption in a region, is crucial for consumption studies. An empirical analysis of the consumption structure changes of rural residents in Qingyuan may serve to disclose their consumption demand, which can be useful for

implementing the rural revitalization strategy and boosting domestic circulation, better satisfying the reasonable consumption demand of rural residents, and promoting the healthy development of rural economy in Qingyuan.

2 Literature review

The previous studies on the consumption of rural residents under the background of rural revitalization mainly focus on the following two dimensions.

The first one is the factors influencing the consumption of rural residents under the background of rural revitalization. Lu Q. carried out empirical research on the influencing factors and intrinsic mechanism of rural residents' consumption through the provincial panel data in the past ten years. It was found that rural consumer finance, rural residents' income, and the development of e-commerce platforms could improve the consumption level in rural areas [5]. Du J. and Fang M. conducted an empirical analysis of the panel data of 31 provinces (Hong Kong, Macao, and Taiwan excluded) from 2000 to 2017 and demonstrated that the income and food expenditure had a significant effect on the consumption level of rural residents [3].

The second one is the consumption structure analysis of rural residents under the background of rural revitalization. Deng W.S. and Li Z.C. carried out both dynamic and static analyses of the consumption structure of rural residents in Heze based on the ELES Model and the relevant data from 2007 to 2017. They also proposed that the consumer markets, medical care, and medical security system in rural areas need to be improved while the cultural and entertainment consumption should be encouraged, and correct consumption concepts need to be spread to more people [4]. Chen J. et al., based on the consumption amount and consumer price index of 8 types of main farm products of rural residents in Guizhou Province from 1978 to 2016, adopted the LA-AIDS model to examine the consumption structure of rural residents in Guizhou Province, using ITSUR option and Hicks elasticity. It was revealed that the proportion of subsistence expenses was high. And the price changes of food, culture, entertainment, and housing had a large impact on other consumer products, among which the substitution effect often takes place to the former two consumption items while the crowding-out effect may influence the last one [1].

The review above showed that the income of rural residents was the deciding factor in rural consumption expenditure. What's more, the proportion of survival expenditure (SE) in the consumption structure of rural residents was higher. The statistical review of Qingyuan showed that in the consumption structure of rural residents in Qingyuan, the expenditure on food, tobacco, and alcohol accounted for 42.26%, clothing for 3.34%, housing for 19.01%, daily necessities and services for 5.73%, transportation and communication for 12.56%, educational, cultural and recreational commodities for 6.53%, medical care for 8.96%, and other supplies and services for 1.51%. It can be seen that the survival consumption occupied a considerable share while the development and enjoyment consumption was less. The transformation and upgrading of the consumption structure of rural residents and the implementation of rural revitalization still top the agenda of the government.

Surrounded as it by Greater Bay Area to the south and the domestic market to the north, Qingyuan signed the *Strategic Cooperation Framework Agreement of Deepening Guangzhou-*

Qingyuan Integration and the Cooperation Intention Agreement of Guangqing Airport Modern Logistics Industry New Town in 2019. Afterward, Qingyuan began to undertake the industrial transfer of Guangzhou, bringing new opportunities for rural development. In 2021, Qingyuan brought forward the strategy of developing industries that benefit people and villages according to the *Implementation Plan of Guangzhou-Qingyuan Special Cooperation Zone of National Urban-Rural Integration Development Demonstration Zone*, which broke a new path for improving the incomes of rural residents. In this context, this research has a significant effect on guaranteeing rural residents join in domestic circulation, boosting the transformation and upgrading of consumption of rural residents, and promoting rural revitalization and urban-rural integration in Qingyuan by seizing the opportunity brought by supply-side structural reform.

3 Method and data source

3.1 Method

Two methods were used in this research, namely literature review and empirical analysis.

A literature review is conducted by collecting, identifying, and sorting out the previous studies related to a specific topic so as to develop a theoretical framework and methodology for the current research. This research mainly consulted the strategic policies of rural revitalization, the 14th five-year plan of Qingyuan and relevant policy papers, and more than 20 domestic academic researches on rural residents' consumption. It was found that there were still deficiencies in previous studies and needed to be examined further.

The empirical analysis was mainly carried out based on the ELES model, namely the extended linear expenditure system (ELES). The model is a demand function system introduced by economist C. Liuch on the basis of the linear expenditure system model of British econometric economist Stone in 1973.

The system assumes that people's demand for various commodities (services) in a certain period depends on their prices and people's income. Besides, the demand is divided into two types, namely the most basic demand and the demand beyond the basic one. The model also holds that basic demand has nothing to do with income level, and the residents will satisfy their non-essential demands according to a certain marginal propensity after the basic demand is met.

When people's consumption expenditure is divided into i types, the model of the expenditure on various commodities is as follows.

$$C_i = P_i q_i + b_i(Y - C_0) \quad (1)$$

Where C_i represents the consumption expenditure of commodity i . P_i and q_i are the prices and basic demand of commodity i respectively while b_i is the marginal propensity to consume (MPC). C_0 refers to the total expenditure on basic demand, and Y refers to income level.

The income elasticity of demand is a measure of how much demand is relative to a change in income, with all other factors remaining the same. The formula is as follows.

Income elasticity=change in quantity demanded/ change in income

The income elasticity of demand can be positive as well as negative. If the numerical value is greater than 1, it is a luxury or superior good; if the elasticity of demand is less than 1, it is a necessity good. If the numerical value is 1, it means that the income elasticity equal to unity. If the income elasticity is negative, it is an inferior good.

3.2 Data Source

The reliability of data sources has a direct bearing on the empirical analysis result. The data used in this research was from the Statistical Review of Qingyuan from 2016 to 2020. The data collected were the per capita disposable income composition and consumer spending composition of permanent residents in Qingyuan. The ELES model was constructed based on EVIEWS 7.2 for disclosing the responsiveness of consumer spending C_i to the change in consumer's income. C_i ($i=1.2.3...8$) stands for eight expenditure items, including food, clothing, housing, household facilities and services, transportation and communication, cultural, educational, and recreational commodities, medical care, and other goods and services.

4 ELES model analysis

Firstly, the changes in income and consumption of rural residents in Qingyuan from 2016 to 2020 were analyzed in general and the changes in the proportions of 8 items of consumption expenditures were examined in detail. Then, the ELES model was established to demonstrate the marginal propensity to consume (MOC) and the income elasticity of demand of the eight items from 2016 to 2020.

4.1 General Analysis

It can be seen from Figure 1 that the per capita disposable income and per capita consumption of rural residents in Qingyuan increased gradually from 2016 to 2020. To be specific, the per capita disposable income increased from 12873 Yuan in 2016 to 17881 Yuan in 2020 with an annual growth rate of 8.56%. The per capita consumer spending increased from 11234 Yuan in 2016 to 14191 Yuan in 2020 with an annual growth rate of 6.06%, which was lower than that of per capita disposable income.

Next, the consumption structure changes of rural residents in Qingyuan from 2016 to 2020 were analyzed. It can be seen from Figure 2 that among the 8 items of consumption expenditures, food accounted for the largest share followed by housing, transportation and communication, medical care, cultural, educational, and recreational commodities, household facilities and services, clothing, and other goods and services, the proportion of each one lower than the last. Thus, most of the expenditures of rural residents in Qingyuan were on food and housing, which were for subsistence at an inferior level.

In view of the proportion of different types of consumption, the food expenditure was declining year after year to 42.26% in 2020. The expenditures on housing, transportation and communication, and medical care increased yearly. As for the growth rate of proportions of different items, the proportion of transportation and communication increased by 1.95% from 2016 to 2020, while that of medical care increased by 1.36%, and that of housing increased by

1.19%. It showed that the consumer goods of rural residents in Qingyuan became more diversified, and the quality of life improved.

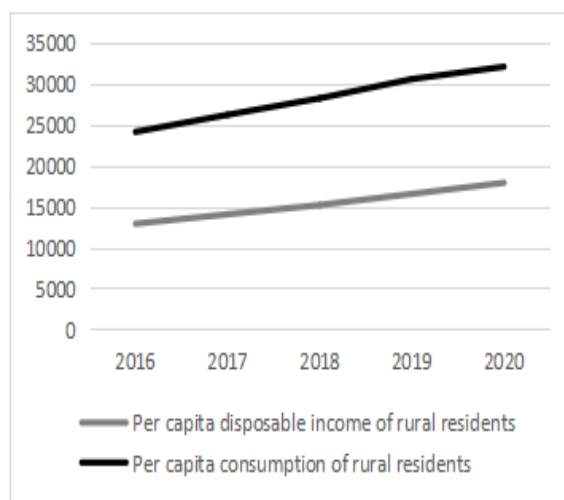


Figure 1 Per capita disposable income and per capita consumption expenditure of rural residents in Qingyuan

Data Source: Statistical Review of Qingyuan

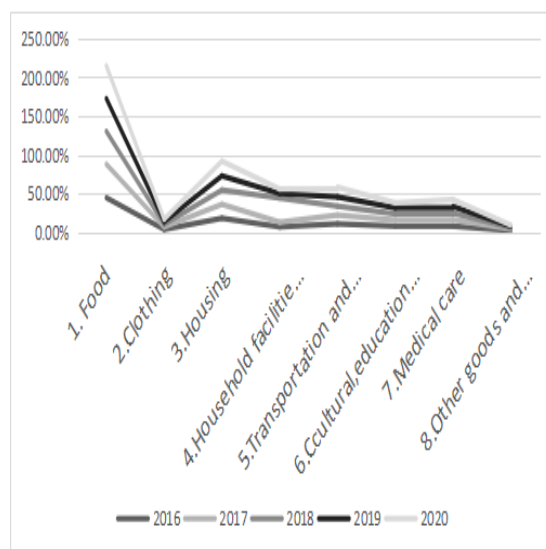


Figure 2 Consumption expenditure structure of rural residents in Qingyuan

Data Source: Statistical Review of Qingyuan

4.2 ELES Model Analysis

Firstly, the fitting degree of the model was analyzed. Then the relationship between consumption and income was examined from two dimensions, namely the marginal propensity to consume (MPC) and income elasticity of demand, among which the former was adopted to explore the changes in consumption willingness of residents as their income increases while the latter was used to evaluate the growth rate of income and expenditure.

Model results analysis: Table 1 listed the results of the ELES model of rural residents in Qingyuan. It can be seen that the minimum R^2 was 0.517 while the second smallest one was 0.818. But the correlation coefficient could not prove that that a_i maintained a linear relation with b_i . And T was subject to verification. The statistics by the model showed that regression coefficient b_i passed through the T-test. The C4 (household facilities and services) and C6 (cultural, educational, and recreational commodities) became significant at the level of 5% while the rest 6 items became significant at the level of 1%, indicating the great fitting degree of the model.

Table 1 Fitting degree and significance level of ELES model

Consumption expenditure items	2016-2020		
	T	P	Correlation coefficient R^2
C1 (food)	28.5	0.001	0.991
C2 (clothing)	23.8	0.003	0.981
C3 (housing)	18.9	0.000	0.997
C4 (household facilities and services)	38.1	0.01	0.818
C5 (transportation and communication)	14.3	0.000	1.000
C6 (cultural, educational, and recreational commodities)	22.0	0.03	0.517
C7 (medical care)	14.5	0.001	0.992
C8 (other goods and services)	32.7	0.004	0.995

Note: $P < 0.01$ means that there is a significant correlation at the level of 1%; $P < 0.05$ means that there is a significant correlation at the level of 5%.

Marginal propensity to consume: The marginal propensity to consume (MPC) is calculated as the ratio of the change in consumption to the change in disposable income, measuring the portion of added disposable income a household would spend on consumer goods.

Table 2 Marginal propensity to consume of rural residents in Qingyuan

Consumption expenditure items	2016-2020	
	Normal and basic consumption a_i	Marginal propensity to consume b_i
C1 (food)	-102.1125	0.71

C2 (clothing)	-33.4527	0.07
C3 (housing)	30.1207	0.11
C4 (household facilities and services)	-142.7831	0.06
C5 (transportation and communication)	93.4219	0.13
C6 (cultural, educational, and recreational commodities)	134.3406	0.16
C7 (medical care)	92.423	0.18
C8 (other goods and services)	292.2442	0.03
Total		1.45

Table 2 showed that the marginal propensity to consume C1 (food) was 0.76, the biggest one among the eight items, demonstrating that the rural residents in Qingyaun spent most of their money on subsistence.

According to Table 3, the marginal propensity to consume b_i of C1 (food) decreased yearly as the per capita disposable income increased, which meant that the food expenditure was on the trend of reducing.

Table 3 Marginal propensity to consume (MPC) of C1 (food) by rural residents in Qingyuan

Time	Normal and basic consumption a_i	Marginal propensity to consume (MPC) b_i
2016-2017	-146.7634	0.82
2017-2018	-51.7905	0.62
2018-2019	-273.2062	0.58
2019-2020	-125.609	0.26

The statistical review of Qingyuan demonstrated that C3 (housing) ranked top among the eight items of consumption expenditures of rural residents in Qingyuan in 2020. However, the marginal propensity to consume (MPC) of C3 was relatively low, which might be attributed to the high price of commercial housing in the last 5 years.

C7 (medical care) was the second-highest expenditure, which meant that the rural residents in Qingyuan paid more attention to personal health. And on closer examination, it was found that b_i , the marginal propensity to consume (MPC) of C7 (medical care), increased from 0.16 to 0.26 as the per capita disposable income increased.

The third one was C6 (cultural, educational, and recreational commodities), indicating that the rural residents in Qingyuan focused more on spiritual enjoyment and were more willing to spend more money on recreation and education. From 2016 to 2020, the marginal propensity to consume (MPC) b_i of C6 grew from 0.24 to 0.32. Nonetheless, the C6 expenditure plunged to negative in 2020, maybe due to the impact of COVID-19. It can be concluded that the recreational expenditure declined in 2020 because of the prevention and control measures of COVID-19.

The fourth was C5 (transportation and communication). It was probably the improvement of life quality and the development of the Internet that stimulated rural residents' demand for transportation facilities and made them spend more money on communication.

C3 (housing) ranked fifth. According to the statistical review of Qingyuan, the proportion of C3 (housing) to the total consumption expenditure of permanent rural residents in Qingyuan maintained in the second place from 2016 to 2020. But its marginal propensity to consume ranked fifth, which may be due to the high price of commercial housing in Qingyuan during the past five years

The expenditures of C4 (household facilities and services) were relatively stable with small changes in marginal propensity to consume. This low bi may be induced by the fixed demand for household appliances and other large items with no obvious increment. The marginal propensities to consume of C2 (clothing) and C8 (other goods and services) showed no evident changes.

Income Elasticity of Demand: The income elasticity of demand is calculated by the percentage change in the quantity demanded to the percentage of income. The specific results were listed in the following Table 4.

Table 4 Income elasticity of demand of rural residents in Qingyaun

Time	C1	C2	C3	C4	C5	C6	C7	C8
2016-2020	0.59	0.56	1.11	0.89	0.81	1.12	1.01	0.58

It can be seen from Table 4 that all the income elasticity of demand of the eight items was positive. According to the standard necessities have an income elasticity of demand of between 0 and +1 while that of luxury goods is usually greater than 1, the income elasticities of demand of C3 (housing), C6 (cultural, educational, and recreational commodities), and C7 (medical care) were all greater than 1, while those of the rest 5 items were less than 1, indicating that the most of the consumption expenditure of rural residents in Qingyuan was for subsistence.

C3 (housing) had an income elasticity of demand greater than 1, revealing that the consumption expenditure on housing was increasing along with the growing income. However, the marginal propensity to consume C3 (housing) was only 0.11, implying that the rising house prices drove the expenditure high. The growth rate of housing expenditure outpaced that of income, crowding out the disposable income of rural residents.

The income elasticity of demand for C6 (cultural, educational, and recreational commodities) was also greater than 1, indicating that with the increase in the income of rural residents in Qingyuan, the demand for C6 also increased greatly. The income increment allowed people to spend more money on education and spiritual entertainment on the basis of basic living demands fulfilled, transforming into enjoyment consumption.

C7 (medical care) was also elastic. The expenditure on medical care increased along with the income. Nonetheless, the marginal propensity to consume C7 (medical care) was only 0.18, reflecting that the rural residents were still confronted with the difficulty and high cost of getting medical services. The growth rate of income was less than that of medical care expenditure.

5 Conclusions and suggestions

5.1 Conclusions

Firstly, the per capita disposable income and consumption expenditure of rural residents in Qingyuan increased yearly yet with a high Engel's coefficient from 2016 to 2020. Among the consumption expenditures, C1 (food) held the largest share but decreased year by year. The expenditures on C5 (transportation and communication), C7 (medical care), and C3 (housing) consumption increased yearly, indicating a more diversified consumption type. The large proportion of food and housing expenditures showed the low consumption level of rural residents in Qingyuan.

Secondly, the marginal propensity to consume revealed that the rural residents in Qingyuan were more willing to consume. However, affected by the COVID-19 in 2020, the recreational expenditure of C6 (cultural, educational, and recreational commodities) dropped with its marginal propensity to consume bi down to negative. In terms of the marginal propensities to consume the eight items, C1 (food) enjoyed the largest propensity. Yet with the increase in income, the expenditures on C1 (food) decreased marginally. On the whole, the rural residents in Qingyuan spent more money on subsistence and less on development and enjoyment.

Thirdly, the income elasticity of demand revealed that as the per capita disposable income of rural residents in Qingyuan increased, the expenditures on housing, cultural, educational, and recreational commodities, and medical care rose as well, among which the medical care and housing boasted the largest growth rate, which revealed that the rural residents in Qingyuan still had low accessibility and affordability to medical care services. Besides, the rising house price, which drove the total consumption expenditure high and outpaced the growth rate of income, crowded out the disposable income of residents.

5.2 Suggestions

Firstly, the income of rural residents in Qingyuan needs to be improved. Only the growing income can stimulate consumption. The rural industries according to local conditions as well as the rural tourism industry can be developed to guarantee the absolute income. In addition, the subsidies for enjoyment consumptions such as automobiles and household appliances can be increased to ensure residents' relative income to increase their purchasing power. The financial support for agriculture-related industries and preferential agricultural loan services, which had been affected by the COVID-19, could also be provided.

Secondly, the medical security system for rural residents in Qingyuan needs to be perfected. The coverage of reimbursement for diseases in rural areas could be expanded while the reimbursement rate for serious diseases could be raised so as to ensure that rural residents in Qingyuan could get medical services at a lower cost. In addition, the consumption concept of medical care for rural residents may well transform from "treating diseases" to "preventing diseases". The scope and frequency of physical examination could be improved to ensure that the rural residents could get a regular physical examination for early detection and treatment. All these measures could ease residents' anxiety in getting medical care, lower the proportion of medical and health care expenditure, and promote the diversification of rural consumption [2].

Third, the house prices in Qingyuan need to be held down. Since the purchase limit has been enforced in hotspot cities such as Guangzhou, Dongguan, Foshan, and Zhongshan, the "Pearl River Delta" cities are experiencing a positive market demand spillover. Qingyuan, with its regional advantages, the support of the Guangzhou-Qingyuan integration strategy in the fields of transportation, industry, and tourism, as well as the expansion and quality improvement of the central urban area driven by a series of favorable policies, has witnessed its house prices splurging during the past five years. In this context, three measures could be adopted to curb the rising house prices. The first one is to introduce strict purchase limit policies to curb speculative demand. The second measure is guiding rural residents to consume rationally, raising their awareness of "buying houses would only drive the house price high", enabling them to know more about the information of real estate and its changes, and avoiding buying houses for showing off. The residents should be encouraged to rent houses and buy houses within their affordability. The last measure is that the Qingyuan Municipal government may establish a system of low-rent housing and price-fixed housing to stabilize house prices.

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