

The Dynamic Effect of Consumption Psychology of Chinese Rural Residents

Fan Wu

Institute of Marine Economy and Culture, Shandong Academy of Social Sciences, Qingdao, China

Keywords: Time effect; Formation of consumption psychology; Panel ELES model; Consumption of rural residents

Abstract: Since China's economic growth is facing great uncertainty after the outbreak of the COVID-19 epidemic, how to give full play to the basic role of consumer psychology in economic growth and promote economic growth is a major problem we are facing. The expansion of residents' consumption should start with the basic needs of residents. According to the relevant consumption psychology theory, residents' basic needs in various types of consumption expenditures can be divided into physiological needs and psychological needs, which will be affected by the formation of consumption psychology. In this paper, China's rural areas were divided into high, middle and low-income areas according to the income level, and a panel ELES model including the theory of consumer psychology formation was constructed to empirically analyze the consumer psychology formation effects of various consumer expenditures of rural residents in high, middle and low-income areas in China at present, as well as the changes of psychological needs and physiological needs of various consumer expenditures in different income areas. The results show that the consumption psychology of development-oriented consumption expenditure (medical care, transportation and culture and education) is relatively large in rural high-income areas, while the consumption psychology of subsistence-oriented consumption expenditure (food, clothing and residence) is relatively large in middle-income areas. At present, rural residents in different income areas in China have the largest expenditure on housing consumption, while those in high-income areas, middle-income areas and low-income areas have the largest expenditure on transportation, education and medical care, respectively.

1. Introduction

Since the outbreak of the COVID-19 epidemic in 2020 has a huge impact on all walks of life in society and also leads to great uncertainty in China's economic growth, how to play the basic role of consumption in economic growth and promote economic growth are the major issues we face. The expansion of residents' consumption should start with the basic needs of residents. According to the relevant consumption psychology theory, residents' basic needs in various types of consumption expenditures can be divided into physiological needs and psychological needs, which will be affected by the formation of consumption psychology. Therefore, it is of great significance to master the changing laws and characteristics of the physical and psychological needs of residents in different income levels in the current price range in order to tap the potential consumption of residents and promote economic growth. Consumer behavior, as the embodiment and expression form of consumer psychology, has obvious differences among residents in different incomes and different regions. What is the influence of consumption psychology on the changes of residents' consumption structure in different income regions? What is the dynamic impact on the psychological and physiological needs of residents in different income regions in various types of consumer spending? And what are the differences among different types of consumer spending in different income regions? In order to answer the above questions, in this paper, taking rural residents in different income areas in rural China as the research object, the theory of consumer psychology formation was embedded into ELES model, and a panel ELES model including the theory of consumer psychology formation was constructed to empirically analyze the differences of consumer psychology on various consumption expenditures of rural residents in different income

areas in China at the current period, and to compare the dynamic changes of psychological needs and physiological needs of rural residents in different income areas.

Internal and external psychological formation theory is one of the important factors affecting residents' consumption. Duesenberry [1] was the first person to introduce psychological factors into the consumption function, and believed that consumption was influenced not only by current income, but also by past consumption behaviors. Since then, many scholars have brought psychological formation factors into different consumption functions and used different types of data to empirically test the theory of psychological formation. Heilen and Durham [2] studied the influence of psychological formation on consumption using the data of total consumption and concluded that the unobservable heterogeneity might exaggerate the effect of psychological formation. Pollak [3-4] first introduced the theory of internal and external psychological formation into ELES model. Based on Pollak's research, Philips [5] introduced the state variable representing the influence of previous behaviors into the ELES model to reflect the influence of income changes and previous behaviors on consumption structure. Kapteyn et al. [6] also introduced the formation of external psychology into the research of ELES (Extended Linear Expenditure System). Since then, psychological formation has been introduced into various studies such as household consumption expenditure and household savings. Holt and Goodwin [7] introduced An Almost Ideal Demand System (AIDS) to study the influence of psychological formation on American meat expenditure. Alessie and Teppa [8] found that psychological formation supported the saving behavior of Dutch residents. Muraviev [9] provided the detailed characteristics of the best consumption flow for the problem of maximizing the utility of psychological formation. Verhelst and Vanden Poel [10] empirically analyzed the influence of internal and external psychological formation on different levels of consumption expenditure by using spatial panel data model. De Vries et al. [11] studied the influence of psychological formation and individual pre-behavior on fruit consumption. Raj and Adam [12] found that the psychological formation of consumers led to excessive sensitivity and smooth consumption. Augeraud Veron, Bambi and Gozzi [13] improved the internal psychological formation model through infinite dynamic programming.

2. Methods

The research data of this paper are from the rural consumption structure data of 31 provinces in China Statistical Yearbook from 2009 to 2020. According to the practice of Liu Li [14], 31 provinces in China were divided into high-income regions including Liaoning, Beijing, Shanghai, Tianjin, Jiangsu, Zhejiang, Fujian, Shandong and Guangdong, middle-income regions including Hebei, Shanxi, Inner Mongolia, Anhui, Henan, Hubei, Hunan, Guangxi, Hainan, Yunnan, Chongqing, Shaanxi and low-income regions including Jilin, Heilongjiang, Jiangxi, Sichuan, Guizhou, Gansu, Qinghai, Ningxia, Xinjiang and Tibet according to the level of per capita income.

According to the current statistical standard, the consumption expenditures of rural residents in China were divided into 8 categories (i.e. M=8): food, clothing, household equipment and services, medical care, transportation and communication, education, culture and entertainment services, housing, and miscellaneous goods and services. In order to eliminate the influence of price factors, the disposable income and various consumption expenditures of rural residents were reduced with the rural consumer price index and classified price index of each province in 2009 as the base period. In this paper, the model (1) was used to empirically test the differences of psychological formation and the dynamic changes of psychological and physiological needs of rural residents in high, middle and low income areas in China at present.

$$Y_{it}^k = A_t^k + B^k I_{it} + C^k Y_{i,t-1}^k + \xi_{it}$$

k=1, 2, ..., 8; i=1, 2, ..., 31; t=2009, 2010, ..., 2020

Where,

k= the type of consumption;

i= the province;

t=the year.

Y_{it} , I_{it} = the rural residents' consumption expenditure and per capita disposable income in the first province in the t year, respectively;

$Y_{i, t-1}$ = the rural residents' consumption expenditure that lags behind one period, and the corresponding coefficient C^k reflects the internal psychological formation of rural residents.

3. Result

Table 1 shows that the psychological formation effect of food and clothing for rural residents in high-income areas in China is not significant, but there are psychological formation effects in other six consumption expenditures, and the consumption psychology of developmental consumption expenditures (medical care, transportation, culture and education) is relatively large. According to the marginal propensity of various consumption expenditures, the marginal propensity of residence and transportation is relatively large, while the marginal propensity of other consumption items is relatively small. The greater the psychological formation, the smaller the marginal tendency, which means the more cautious the consumer spending. On the contrary, the larger the psychological coefficient and the greater the marginal propensity to consume, the greater the consumption expenditure in this category. This shows that rural residents in high-income areas in China are spending more on housing and transportation.

Table 1 Estimated results of psychological formation and time effect of rural consumption in high-income areas

Item s	Food	Clothing	Housing	Equipme nt	Medical care	Transportati on	Culture and education	Miscellane ous
C	0.0148	0.0010	0.6055***	0.0663** *	0.6075***	0.8914***	0.8766***	0.4749***
B	0.0009	0.0089***	0.0564***	0.0020	0.0040	0.0495***	0.0119***	0.0049**
A ₂₀₀₇	51.1223** *	13.5350** *	-60.1654	17.4827* **	-134.5881 ***	46.2940* *	-87.2453* **	-35.4997***
A ₂₀₀₈	122.6658 ***	55.1887** *	-81.4375* *	23.6961* **	-115.5421 ***	22.3407	-96.2686* **	-24.6657**
A ₂₀₀₉	65.6962** *	28.3265** *	-119.8163 **	8.2318**	-94.0820* **	56.8311**	-47.2340* **	-13.9604
A ₂₀₁₀	13.3173* *	30.9089** *	-46.5810	20.5597* **	-121.3994 ***	21.6481	-96.1202* **	-17.8982*
A ₂₀₁₁	8.6078	28.1484** *	-62.7774	18.7194* **	-142.8397 ***	4.0931	-94.1711* **	-8.7364
A ₂₀₁₂	30.9682** *	29.0587** *	-132.4510 ***	27.5746* **	-121.0729 ***	-22.3703	-87.2453* **	-22.7166**
A ₂₀₁₃	21.8954* *	48.9456** *	-53.1407	27.7824* **	-116.9372 ***	5.5634	-43.0785* *	-26.2290**
A ₂₀₁₄	113.2863 ***	127.1379 ***	-139.4460 ***	90.4312* **	-154.2771 ***	-40.5753** *	-58.7803* *	-19.2240**
A ₂₀₁₅	67.7145** *	44.4241** *	-187.2835 ***	20.1442* **	-45.3640* **	-73.4234***	-142.3054 ***	6.4806
A ₂₀₁₆	151.3980 ***	60.3930** *	-301.3119 ***	94.9527* **	-86.9584* **	-19.9562***	-54.5654* *	7.7371
A ₂₀₁₇	97.2580** *	39.4375** *	-19.0657	64.7760* **	0.5194	-25.2495	4.8876	30.7506***
A ₂₀₁₈	80.9527** *	-14.4452* **	-49.4997* **	7.2523	11.4968	-42.7817***	8.9066	40.4071***
A ₂₀₁₉	44.6318** *	11.7838** *	129.2849	63.7371* **	13.8516***	39.3287***	-62.3124	-10.1414***
A ₂₀₂₀	107.5379 ***	25.8233** *	-10.4777* *	60.2940* **	-0.4551	186.5514***	33.2142	-6.5103*

P value	0.6332	0.2869	0.5541	0.4650	0.2968	0.4353	0.2177	0.6134
AR(1)	0.6530	0.5640	-	0.9102	-	-	-	-
AR(2)	0.3265	0.9300	-	0.4749	-	-	-	-

Note: "****", "***" and "*" represent the significance at levels of 1%, 5% and 10% respectively. "-" indicates that the estimated value is not significant.

Table 2 shows that rural residents in middle-income areas of China have psychological effects in all kinds of consumption expenditures, and they have a larger consumption psychology in subsistence consumption expenditures (food, clothing and housing). Relative to high-income and low-income areas, the psychological coefficient and the marginal propensity of various consumer spending are relatively large, especially the marginal propensity to live and culture and education is the largest, which indicates that at the present stage the rural residents in middle-income areas in China spend more on living and culture and education.

Table 2 Estimated results of psychological formation and time effect of rural consumption in middle-income areas

Items	Food	Clothing	Housing	Equipme nt	Medical care	Transportati on	Culture and education	Miscellaneo us
C	0.7975***	0.9201** *	0.7331***	0.7421***	0.7223** *	0.8707***	0.5501***	0.7015***
B	0.0396***	0.0168** *	0.1009***	0.0297***	0.0485** *	0.0257***	0.1425***	0.0168***
A ₂₀₀₇	22.0933	13.4855	129.3937* **	27.2580* **	50.5089* **	-21.4601**	275.1521* **	18.7956***
A ₂₀₀₈	62.3619** *	18.0368	112.6729* **	24.1018	45.2749* **	-26.3972**	265.0603* **	27.5449***
A ₂₀₀₉	110.3379* **	33.5604* *	115.2354* **	34.6389* *	58.4933* **	-19.9859	280.5938* **	30.2657***
A ₂₀₁₀	58.4340**	23.3498	161.6284* **	31.7597* *	56.4848* **	-20.6488*	269.6115* **	33.3626***
A ₂₀₁₁	40.3279**	27.2778*	142.3351* **	27.3173*	38.5569* *	-41.2778***	219.1521* **	31.4728***
A ₂₀₁₂	30.4537	14.3067	115.9874* **	24.2502*	30.5131* *	-62.1838***	188.6786* **	23.0431***
A ₂₀₁₃	24.9428	21.0841	113.4446* **	31.1166* **	38.1809* **	-57.0884***	182.9401* **	25.4869***
A ₂₀₁₄	22.7166	23.4587* *	74.9668** *	25.6947*	24.9824* *	-72.1075***	130.7987* **	23.1025***
A ₂₀₁₅	17.7300	50.4000* **	88.6601** *	51.8545* **	56.4156* **	-54.7930***	79.4686* *	35.5294***
A ₂₀₁₆	33.4714**	34.9951* **	80.8736** *	23.1421* *	45.1067* **	-58.7110***	34.0057** *	33.8771***
A ₂₀₁₇	-23.7456* **	11.0318	40.9612** *	34.1145* **	49.1732* **	-16.7802	65.8149** *	11.2198***
A ₂₀₁₈	70.9202** *	49.3711* **	106.1132* **	34.3322* **	58.4142* **	-14.3958	143.7598* **	16.2361***
A ₂₀₁₉	18.8876** *	13.2382* **	23.8742** *	19.8078* **	14.3760* **	-7.9251	44.1668** *	5.7484***
A ₂₀₂₀	4.7986* *	6.4806** *	32.6997** *	21.7470* **	-2.4834	-0.5541	43.7810** *	1.3753
P	0.4254	0.5244	0.5343	0.5739	0.3463	0.1682	0.8608	0.4057

value								
AR(1)	-	-	-	-	-	-	0.5442	-
AR(2)	-	-	-	-	-	-	0.1385	-

Note: "****", "***" and "**" represent the significance at levels of 1%, 5% and 10% respectively. "-" indicates that the estimated value is not significant.

According to Table 3, rural residents in low-income areas of China have psychological effects in all kinds of consumption expenditures, and their consumption psychology in subsistence consumption expenditures (food, clothing and housing) is relatively small, but their consumption psychology in development-oriented and enjoyment-oriented consumption expenditures is relatively large. As far as the marginal propensity of various consumer expenditures is concerned, the marginal propensity of residence and medical treatment is the largest, which indicates that the rural residents in low-income areas in China have larger consumption expenditures on residence and medical treatment at this stage.

Table 3 Estimated results of psychological formation and time effect of rural consumption in low-income areas

Items	Food	Clothing	Housing	Equipme nt	Medical care	Transportati on	Culture and education	Miscellaneo us
C	0.6461***	0.6669***	0.5887***	0.8044***	0.7450***	0.7846***	0.8004***	0.5442***
B	0.0267***	0.0336***	0.0386***	0.0139**	0.0425***	0.0307***	0.0247***	0.0099**
A ₂₀₀₇	-18.8283	15.0191	-57.9788**	-	34.0551* **	-35.4403*	0.4294	-
A ₂₀₀₈	-8.5979	16.6021*	-80.7944** *	-	34.3718* **	-42.8806*	-11.8629	-
A ₂₀₀₉	60.2545* **	26.1103* **	-66.3788**	-	52.3590* **	-32.7689	-3.2254	-
A ₂₀₁₀	-30.1767	14.2573	-41.6438*	-	34.9852* *	-53.4375**	-18.4028	-
A ₂₀₁₁	-25.6947 *	17.6905* *	-79.2707** *	-	25.5463* *	-53.6552**	-29.1873* *	-
A ₂₀₁₂	-39.1703 **	11.5166	-54.3774**	-	35.9152* **	-74.7887***	-34.0255* **	-
A ₂₀₁₃	-42.6926 **	15.8403* *	41.0007	-	41.2184* **	-77.6184***	-34.5795* **	-
A ₂₀₁₄	-25.0417	11.2297	-112.6729* **	-	-2.8693	-93.5478***	-43.2764* **	-
A ₂₀₁₅	-19.4120	32.4226* **	-70.5937** *	-	31.3937*	-66.2304***	-68.7237* **	-
A ₂₀₁₆	-9.3795	26.0113* **	-119.2227* **	-22.5089 **	28.6629* **	-73.5025***	-64.0933* **	-
A ₂₀₁₇	-42.1979	11.4078* *	-18.6304*	19.6297* **	33.1944* *	13.2085	-55.2481* *	-
A ₂₀₁₈	-15.4050	35.0248* **	-36.6573	28.4650* **	9.4389	-47.8474	74.8580* *	-
A ₂₀₁₉	9.2509	5.5901* *	-13.1986**	-	22.3505* *	-34.1937	24.2601	-
A ₂₀₂₀	-60.0764	-3.2947* **	-70.0990** *	-	60.3633	-45.2453	-17.2650	-
P value	0.3265	0.6431	0.3661	0.7124	0.5244	0.2968	0.4254	0.4155
AR(1)	-	-	-	-	-	-	-	-
AR(2)	-	-	-	-	-	-	-	-

)								
---	--	--	--	--	--	--	--	--

Note: "***", "**" and "*" represent the significance at levels of 1%, 5% and 10% respectively. "-" indicates that the estimated value is not significant.

4. Conclusion

In this paper, the ELES model of psychological formation embedded in the panel was constructed to empirically analyze the psychological effects of rural residents in China's high, middle and low income areas on various consumption expenditures. The results show that:

First, the psychological formation of rural residents in high-income areas in China is not significant in food and clothing, but there is a psychological formation effect in the other six items of consumer spending, and the consumption psychology of development-oriented consumer spending (medical care, transportation, culture and education) is larger. The rural residents in middle-income areas have psychological effects in various consumption expenditures, and their consumption psychology is relatively strong in subsistence consumption expenditures (food, clothing and residence). The rural residents in low-income areas have psychological effects in various consumption expenditures, a relatively small consumption psychology in subsistence consumption expenditures (food, clothing and residence), but a relatively large consumption psychology in development-oriented and enjoyment-oriented consumption expenditures, which indicates that although the income of rural residents in low-income areas in China is relatively low, they have a huge psychological demand for development-oriented and enjoyment-oriented commodity consumption.

Second, considering the psychological formation parameters and marginal propensity of rural residents in various consumption expenditures, rural residents in different income regions in China have the largest expenditures in residential consumption at the present stage. As for the expenditures of other consumption items, the high-income regions, middle-income regions and low-income regions have the largest expenditures in transportation, culture, education and medical treatment, respectively.

References

- [1] Duesenberry, J.S., *Income, Saving, And The Theory Of Consumer Behavior*. Cambridge, MA: Harvard University Press, 1949.
- [2] Heilen, D. and Durham, C., A test of the habit formation hypothesis using household data. *Review of Economics and Statistics*, Vol.73, No.2, 1991.
- [3] Pollak, R. A., Habit formation and dynamic demand functions. *Journal of Political Economy*, Vol.78, No.4, 1970.
- [4] Pollak, R. A., Interdependent preferences. *American Economic Review*, Vol.66, No.3, 1976.
- [5] Philips, L., Illusions in testing for administered prices: A reply. *Journal of Industrial Economics*. Vol.21, No.2, 1973.
- [6] Kapteyn, A., Vande Geer, S., Vande Stadt, H. and Wansbeek, T., Interdepent preferences: An econometric analysis. *Journal of Applied Econometrics*, Vol.12, No.6, 1997.
- [7] Holt, M.T. and Goodwin, B.K., Generalized habit formation in an Inverse Almost Ideal Dem and System: An application to meat expenditures in the US. *Empirical Economics*, Vol.22, No.2, 1997.
- [8] Alessie, B. and Teppa, F., Saving and habit formation: Evidence from Dutch panel data. *Empirical Economics*, Vol.38, No.2, 2010.
- [9] Muraviev, R., Additive habit formation: Consumption in incomplete markets with random end owments. *Mathematics and Financial Economics*, Vol.5, No.2, 2011.
- [10] Verhelst, B. and Vanden Poel, D., Deep habits in consumption: A spatial panel analysis using scanner data. *Empirical Economics*, Vol.47, No.3, 2014.

- [11]De Vries, H., Eggers, S. M., Lechner, Van Osch, L. and Van Stralen, M. M., Predicting fruit consumption: The role of habits, previous behavior and mediation effects. BMC Public Health, Vol.14, No.1, 2014.
- [12]Raj, C. and Adam, S., Consumption commitments and habit formation. Econometrica, Vol.84, No. 2, 2016.
- [13]Augeraud-Veron, E., Bambi, M. and Gozzi, F., Solving internal habit formation models through dynamic programming in infinite dimension. Journal of Optimization Theory and Applications, Vol.173, No.2, 2017.
- [14]LIU Li, Habit formation, impact of retirement and consumption structure of urban residents. Forum on Statistics and information, No.9,2017.