

# Analysis of Aging Population on Consumption Structure: Creativity in Effective Industry Supply

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**Abstract**—Consumption upgrades lead the industry to upgrade, to increase new supply with institutional innovation, technological innovation, product innovation, to meet the creation of new consumption. The purpose of this study is to analysis the consumption structure on aging population, then standing on supply-side to creative supply opinions and style to promote the consumption upgrade. By using the ELES model to analysis the characteristics of Liaoning province residents in China according to the data from 2006-2016, the results show that the material consumption demand of residents has been basically met, the demand for service consumption has been increasing, and the traditional consumption has been upgraded to new consumption. While the effects on consumption of changes in aging population, this paper predicts the tendency of the consumption structure from 2017-2030. It suggests industry creative measures should be toward diversified consumption supply, environment and system to improve the effective industry supply, to stimulate economic development.

**Keywords**—aging population; consumption structure; creativity; industry supply

## I. INTRODUCTION

Creativity plays a significant role in the development of a country and our daily life. It can affect technology innovation, business, marketing, education, life design, science and other areas. Schumpeter (1912) pointed out the industrial dynamics development based on producer innovation[1]. Supply-side economics researchers believe that supply is in the primary and decisive position in the relationship between supply and demand. They affirmed the important role of the supply and effective use of production factors such as labor and capital[2]. Following these opinions, an important question is whether or not the age structure of the population can affect consumption structure in different areas[3]. Modigliani and Brumberg (1954) predicted that individuals' consumption are functions of their age, an individual borrows as young, saves as middle-age and disaves when old[4]. So the age of population in a country or a region maybe affect their consumption habits then affect the industry supply.

Population aging is the result of a decline in fertility and an increase in life expectancy, which in turn reduces the proportion of young in the total population and increases in the number of older. Internationally, in a country or region, when the population of aged 60 or over reach 10 %, or its population aged 65 or over reach 7 %, the population of that country or region is generally considered to be in an ageing

society. According to data from the Liaoning Statistical Yearbook 1990-2016[16], since 1997, the 65 years old population has reached 7.25 % of the total population of the province, rise to 13.51 % in 2016, the highest proportion in total provinces in China. While the fertility rate has declined, from 14.5 % in 1990 to 7.80 % in 2016(as shown in Fig.1), which shows that Liaoning Province has entered an ageing society.

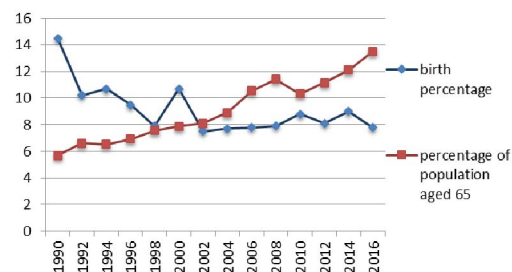


Fig.1 The birth rate in Liaoning Province 1990-2016 and the proportion of the elderly aged 65

After the population age structure changing, especially the aging population increasing will have a complex and far-reaching impact on economic growth and social development [17]. Considering the data on consumption expenditure from 2000 to 2016 in Liaoning Province, the sharp decline in 2003 reached a minimum of 31.6%, followed by annual growth of 47.4% in 2014 and -183.6% in 2016. With the aging of population, the pull of consumption is decreasing suddenly. Changes in the age structure of the population are bound to lead to alters in consumption structure. These changes can reflect the characters of the times and reflect the general laws of economic growth. Grasping the characteristics of the upgrading of the consumption structures have become the basic starting point for accelerating economic transformation and upgrading in Liaoning province in China.

As the age structure of residents changing, creative new supply with institutional innovation, technological innovation, product innovation, to meet the new consumption, and to form new power has gradually become a strategic development trend. So, understanding the relationship between age-structure, consumption structure and the industry supply is very important. It puts forward higher requirements for consumer quality and environment. Consumer-producer interactions are an increasingly important source of value creativity [5].

As far as consumption structure, creativity in effective industry supply is matter. Marx (1878) put forward the relationship between the consumption structure and the industrial structure, adjusting the industrial and product structure in time, using the information feedback of consumption to make the supply structure more compatible with the demand structure[6]. Following technical knowledge is changing rapidly and strong competition need a high degree of adaptability of the labor force, while aging society reduces the labor supply and rates of growth of per capita national income[7]. So it's very important for consumption structure upgrade to analysis creativity in industry supply.

Then, this paper describes analysis of aging population on consumption structure in Liaoning province firstly. And then, literature is reviewed in the section II. In third part, evolution of consumption structure in the province (2006 -2016) is modeled and the consumption structure in the province (2017-2030) is predicted in the section IV. The last section concludes the results and suggests creative measures for effective industry supply.

## II. LITERATURE REVIEW

The consumption structure reflects the level and quality of consumer, and it is an important indicator of the performance of the national economy [16]. Consumption structure defined economic in a multi-level and multi-angle scope, not only including people's consumption type and quantity, but also include the relationship between the different types of consumption and their proportion [8]. In real life, the specific performance is various living expenses.

On the problem of the consumption structure, many scholars have done a lot of researches. The study of consumption structures dates back as far as the late 19th century and early 20th century, when Edward (1868) first proposed a classification of household consumption structure expenditures [9]. Modigliani and Bromberg (1954) put forward Life-Cycle Hypothesis theory. They believes that residents of different ages have different consumption characteristics [4], Friedman (1958) proposed the idea of an annual persistent income hypothesis, which divides income into persistent and instantaneous income, and determines consumption based on sustained consumption, which is smoother and more stable than income[9]. For the study of consumer structure, Stone (1954) used the Linear Expenditure System Model (LES) to analyze consumer structure[10]. Then Luch (1973) revised the LES model and proposed an extended linear expenditure system(ELES) model, suggesting that the consumption structure depends not only on people's income but also on commodity prices[11]. Gordon (1993) investigated nine consumption items and found that farm household education, automobile, maintenance, and medical care are most sensitive to price changes[12]. Chomtohsuwan (2010) developed a house hold consumption adding household size and member age into the (LES)model [13]. Chonviharpan (2015)based on the ELES model to calculated the demand elasticities, then predict the demand for alcohol[14].As a result, people's research on income certainty and precautionary savings has gradually become the focus of consumption research.

According to the research on consumption structure in China, S.L. Zhou (1981) focusing on the problem of consumption structure firstly, then pointed out that the relationship between production and consumption should be handled correctly that lead to dealt with the problem of socialist consumption mode under the guidance of the route of the third plenary session of the eleventh central committee. [18]. X.C. Zhou (1983), S.M. Yang (1984) and other scholars have also begun to pay attention to the social consumption structure [19] [20]. Followed by a yearly increase in the number of studies on the consumption structure, with the largest number in 2008-2010, the research on consumption structure is mainly focused on the following aspects: first, the study on the evolution of consumption structure, mainly focused on the analysis of the consumption structure of urban residents and rural residents, such as Z.G. Yuan and X.Z. Li (2009) using inter-provincial panel data to estimate the effect of consumption expenditure and price levels on the consumption structure of urban residents[21]. T. Wen (2012) based on ELES model, he analyzed the consumption structure ,its evolution tendency and basic demand expenditure of rural residents 'marginal consumption [22]. Second, researches analyzed of various types of consumption structures, including information consumption, service consumption, energy consumption, food consumption and so on. For example, L.M. Chen (2013) analyzed the growth trend of rural information consumption and the time series change of consumption structure and concluded that traffic communication is an important reason for the rapid increase of information consumption in recent years [23]. Third, the relationship between consumption structure and industrial structure, economic growth and population transition is discussed. For example, J. Yu (2015) pointed out that when the relative expenditure ratio of urban and rural household industrial products and agricultural products is increased to characterize the upgrading of the consumer structure, it would promote the growth of Chinese manufacturing industry [24].

Towards literatures review, analysis of consumption structure mainly focuses on the consumption structure of urban or rural residents and the relationship between the population structure and consumption structure based on data of household, provincial levels. Most of researches on consumption structure focused on consumer-side and ignore the new consumption characteristics and supply-side. So, based on the ELES model, we analyze the dynamic evolution and new characteristics of the consumption structure, facing the consumption structure changes, proposing an effective supplier selection measures to maintain an interaction supply-relationship with consumers. Consumer-producer cooperation is a creative way to deal with the consumption structure problems. This study provides a comment in supply-side to the relevant industries in Liaoning province, which can help the revitalization of the old industrial base in northeast China.

### III. EVOLUTION OF CONSUMPTION STRUCTURE IN LIAONING PROVINCE: 2006-2016

#### A. Evolution of consumption structure

The classification of consumption structure referred in this paper is based on the Chinese Statistical Yearbook, which divides people's actual consumption expenditure into eight categories: food, clothing, living, home equipment and service (H&S), medical insurance (MI), transportation and communication services(T&C), entertainment and education(E&E) and all other consumers' goods and services. Using data from the Liaoning Provincial Statistical Yearbook for 2006-2016, the consumption structure of urban and rural residents in Liaoning Province for 2006-2016 was obtained, as shown in Fig. 2 and Fig.3

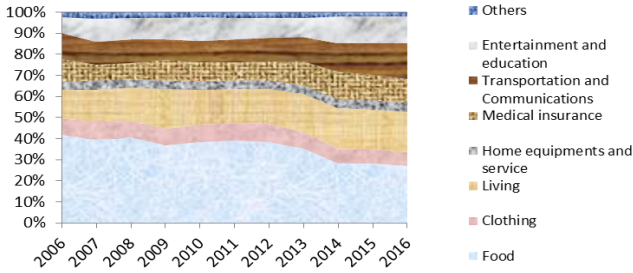


Fig.2 2006-2016 Change of consumption structure of rural residents in Liaoning Province

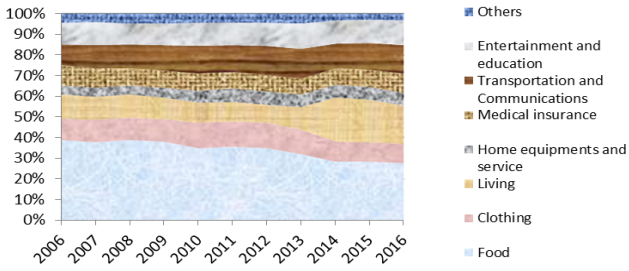


Fig.3 2006-2016 Change of consumption structure of urban residents in Liaoning Province

Comparing with the consumption structure between rural and urban residents, there are some differences in each consumption structure. Among them, medical insurance, living, transportation and communications, entertainment and education are the main cost except food, the medical insurance percentage in rural residents is higher than urban, while the clothing consumption in urban is more high than rural. Based on these structures, the deep analysis should be done.

#### B. Analysis of the consumption structure

##### 1) Select the model

The ELES model is one of the most widely used models in the study of consumption structure. This model is based on the extended linear expenditure model, considering the influence of consumer demand and price factors on the consumption structure.

$$P_i X_i = P_i X_i^0 + \beta_i \left( Y - \sum_{k=1}^n P_k X_k^0 \right) \quad (i, k=1, 2, \dots, n) \quad (1)$$

$P_i$ —Price of type i commodities;

$X_i$ —Total consumption of category i commodities;

$X_i^0$ —Basic requirements for type i commodities;

$\beta_i$ —The marginal consumption tendency of i commodity;

$Y$ —Family income;

$n$ —Commodities.

Set  $\alpha_i = P_i X_i^0 - \beta_i \sum_{k=1}^n P_k X_k^0$ , so (1) change into

$$P_i X_i = \alpha_i + \beta_i Y \quad (2)$$

Formula (2) is a univalent linear equation, which can be calculated by regression and estimated parameters. The formula for calculating the basic total consumption expenditure is:

$$\sum_{k=1}^n P_k X_k^0 = \sum_{i=1}^n \alpha_i / \left( 1 - \sum_{i=1}^n \beta_i \right) \quad (3)$$

The basic consumption expenditure formula for each commodity group is:

$$P_i X_i^0 = \alpha_i + \beta_i \sum_{i=1}^n \alpha_i / \left( 1 - \sum_{i=1}^n \beta_i \right) \quad (4)$$

The formula for calculating the income elasticity of demand for various types of goods is:

$$E_n = (\partial X_i / \partial Y)(Y / X_i) = \beta_i Y / C_i \quad (5)$$

The formula for calculating price elasticity of demand for various commodities:

$$E_{ii} = (\partial X_i / \partial P_i)(P_i / X_i) = (1 - \beta) P_i X_i / C_i - 1 \quad (6)$$

Based on the data on income and consumption in Liaoning Statistical Yearbook, the study uses SPSS 24.0 to have a linear regression analysis, set  $C_i$  to describe major categories of expenditure, such as food and so on, the consumption demand structure is as shown in table I-II.

TABLE I. CONSUMPTION DEMAND OF URBAN RESIDENTS IN LIAONING PROVINCE: 2006-2016 TABLE STYLES

Items	$\alpha_i$	$\beta_i$	T-test	F-test
Food $C_1$	2122.840	0.140	9.965	99.297
Clothing $C_2$	387.006	0.610	8.510	72.415
Living $C_3$	-1464.63	0.173	5.963	35.552
H&S $C_4$	-170.733	0.051	23.625	558.144
MI $C_5$	112.771	0.056	8.836	78.069
T&C $C_6$	-154.344	0.101	13.063	170.63
E&E $C_7$	-52.061	0.085	15.521	240.896
Others $C_8$	267.379	0.017	4.681	21.908
Total	1048.232	0.684	—	—

TABLE II. CONSUMPTION DEMAND OF RURAL RESIDENTS IN LIAONING PROVINCE: 2006-2016 TABLE STYLES

Items	$\alpha_i$	$\beta_i$	T-test	F-test
Food C <sub>1</sub>	575.460	0.167	139.128	11.795
Clothing C <sub>2</sub>	49.817	0.047	316.070	17.778
Living C <sub>3</sub>	-300.272	0.158	158.490	12.589
H&S C <sub>4</sub>	-46.997	0.035	163.854	12.801
MI C <sub>5</sub>	-259.882	0.104	103.962	10.196
T&C C <sub>6</sub>	-230.952	0.134	55.963	7.481
E&E C <sub>7</sub>	-52.061	0.105	60.951	7.807
Others C <sub>8</sub>	36.594	0.013	35.982	5.998
Total	-228.293	0.763	—	—

2) Upgrade: from survival to developmental consumption

The marginal propensity to consume (MPC) is the slope of the consumption curve, from table □ and table □, during 2006-2016 in Liaoning province, the MPC of urban residents is 0.684, while rural residents is 0.763, which means among the newly added income, urban residents 68.4% and rural residents 76.3% of the income are spent on living consumption. For urban residents, the most cost is living, new demands for modern transportation, communication tools and housing improvements are growing. For rural residents, food expenditure still ranks the first, comparing with urban residents, the medical and education cost has a higher proportion. The proportion of marginal consumption propensity of household equipment is very low, indicating that durable goods consumption is not the focus of people's consumption. Developmental consumption has gradually become a major part of living consumption.

3) Change: from mass into personalized consumption

Food expenditure as a whole is still the highest in the last 30 years of 1985-2016, but the Engel coefficient has declined from 54.7 percent in 1985 to 27.6 percent in 2016 on urban residents, while for rural residents, in 2016 is 26.9%, indicating a gradual improvement in the standard of living towards higher levels; compared with the Engel coefficient of urban and rural residents, it is found that the coefficient of rural residents has declined very rapidly. As for household appliances, the trend of decline shows that household appliances have gone from luxury goods to consumer goods. On the other hand, health care, communications and housing are increasing, which indicates a growing demand for leisure time, health care and communications; at the same time the reform of the housing system and real estate stimulated the living consumption. People have more disposable income to pursue personalized consumption.

TABLE III. ANALYSIS OF ENGEL COEFFICIENT BETWEEN URBAN AND RURAL RESIDENTS (%)TABLE STYLES

Year	Per capita disposable income /UR	Per capita disposable income /RR	Engel coefficient /UR	Engel coefficient /RR
1990	1551.0	836.2	55.3	54.1
1995	3691.4	1756.5	51.9	60.3
2000	5357.8	2355.6	40.7	46.5
2005	9107.6	3690.2	38.8	41.6
2010	17712.6	6908.0	35.1	38.2
2014	29081.7	11191.5	28.3	28.3
2016	32876.1	12880.7	27.6	26.9

4) Growth: traditional to new consumption

Income elasticity is positive, showing that the demand for various types of commodities is increasing. Comparative data for 2005, 2010 and 2016 show as following:

a) The income elasticity of food and clothing, which are essential for a living, is relatively stable and does not change much, and that food and clothing are less affected and relatively stable by changes in income;

b) The decline in the elasticity of demand for household equipment supplies indicates that household equipment consumption, mainly household appliances, has stabilized;

c)The greater flexibility of transportation and communication indicates that transportation and communications are sensitive to changes in income;

d) The general sensitivity of health care to income indicates that this consumption is becoming an evolution in the way people live their daily lives. The price elasticity of demand is negative, which indicates that both demand and price are in the opposite direction. The most sensitive price is transportation and communication.

TABLE IV. DEMAND INCOME ELASTICITY AND DEMAND PRICE ELASTICITY OF URBAN RESIDENTS TABLE STYLES

Province	category	Year	Food	Cloth	H&E	MI	T&C	E&E	Living	Others
Liaoning province	Demand income	2005	0.514	0.953	1.272	0.854	0.998	0.868	0.802	0.952
		2010	0.577	0.919	1.023	0.948	1.710	1.037	0.787	1.374
	elasticity	2016	0.667	0.864	1.076	0.796	0.963	0.926	1.228	0.70
		2005	-0.381	-0.531	-0.671	-0.480	-0.554	-0.492	-0.454	-0.508
	price	2010	-0.564	-0.794	-0.869	-0.811	-1.362	-0.885	-0.683	-1.151
		2016	-0.505	-0.754	-0.844	-0.967	-1.49	-1.013	-0.796	-1.049

IV. PREDICTION OF CONSUMPTION STRUCTURE IN LIAONING PROVINCE

Huying (2010) forecasted the total number of people of all ages in the future, that the current distribution is highest in 20-40 age groups, while by 2050 it will be the 60-80 age groups [25]. This shows that in the next 30 years, the age structure of Chinese residents will obviously tend to be aging, such as Liaoning Province's age structure and the National convergence.

In addition to the aging of the population, the income level, wealth status and education level of the Chinese residents will be changed greatly in the future, which will influence the consumption structure of the residents. Therefore, this paper focuses on the effect of population aging on consumption structure. Based on constant income, wealth and other factors during 2006-2016, if the population age structure changes according to the forecast trend, what kind of changes will occur in consumption structure.

This paper follows the decomposition method proposed by Mankiw and Weil (1989) adopts the linear trend forecasting method[15],selects the data of eight major consumption items of urban residents and rural residents from 2006 to 2016, establishes the trend consumption value of time series, constructs a linear regression equation, and solves according to the least squares method to calculate the constant  $\alpha$  and Trend line slope  $\beta$ , specific formula (7)

$$Y_i = \alpha_i + \beta_i \hat{t} \quad (i=1, 2, \dots, 8) \quad (7)$$

Among:  $Y_i$  — the  $i$  commodity time series trend value;

$\alpha_i$  — the  $i$  constant;

$\beta_i$  — the MPC of  $i$  commodity;

$\hat{t}$  — Time label.

Select a food item for demonstration, that is, according to the formula, the forecast trend of food in rural residents' consumption can be obtained, as showing in the table V:

TABLE V. PREDICT THE TENDENCY OF RURAL RESIDENTS

Year	$\hat{t}$	Food(Y)	$\hat{t} Y$	$t^2$
2006	1	1124.30	1124.30	1
2007	2	1334.20	2668.40	4
2008	3	1549.00	4647.00	9
2009	4	1563.33	6253.32	16
2010	5	1714.15	8570.75	25
2011	6	2116.30	12697.80	36
2012	7	2299.99	16099.92	49
2013	8	2518.88	20151.04	64
2014	9	2210.86	19897.71	81
2015	10	2498.80	24988.03	100
2016	11	2678.65	29465.15	121
Total	66	21608.46	146563.42	506

According to the relevant data in the above table, the linear trend equation is determined by the least square's method, and the trend value of each period is calculated. The equation of food expenditure is:

$$Y=1014.9+153.752\hat{t} \quad (8)$$

Then, the predicted value of food consumption in 2017 is

$$Y_{2017}=1014.9+153.752*12=2886.91$$

According to solution of the linear trend equations for each project, the final predicted of rural and urban residents' consumption are obtained, as shown in the following table VI

TABLE VI. PREDICTION OF RURAL POPULATION CONSUMPTION STRUCTURE 2017-2030 TABLE STYLES

Year	Food	Clothing	Living	H&S	MI	T&C	E&E	Others
2017	2886.91	695.38	1901.48	446.26	1187.15	1479.70	1225.64	209.69
2018	3040.67	738.32	2048.60	479.20	1283.30	1602.77	1323.28	221.15
2019	3194.42	781.26	2195.72	512.13	1379.51	1725.83	1420.93	232.61
2020	3348.17	824.20	2342.85	545.07	1475.69	1848.89	1518.57	244.06
2021	3501.92	867.15	2489.97	578.01	1571.87	1971.96	1616.22	255.52
2022	3655.67	910.09	2637.09	610.95	1668.05	2095.02	1713.86	266.97
2023	3809.42	953.03	2784.21	643.89	1764.23	2218.09	1811.51	278.43
2024	3963.18	995.97	2931.34	676.83	1860.41	2341.15	1909.16	289.88
2025	4116.93	1038.91	3078.46	709.76	1956.59	2464.21	2006.80	301.34
2026	4270.68	1081.86	3225.58	742.70	2052.77	2587.28	2104.45	312.80
2027	4424.43	1124.80	3372.71	775.64	2148.95	2710.34	2202.09	324.25
2028	4578.18	1167.74	3519.83	808.58	2245.13	2833.41	2299.74	335.71
2029	4731.93	1210.68	3666.95	841.52	2341.31	2956.47	2397.39	347.16
2030	4885.68	1253.62	3814.07	874.46	2437.49	3079.53	2495.03	358.62

TABLE VII. PRIDITION OF URBAN POPULATION CONSUMPTION STRUCTURE 2017-2030 TABLE STYLES

Year	Food	Clothing	Living	H&S	MI	T&C	E&E	Others
2017	7105.71	2537.70	4531.76	1629.19	2072.94	3423.91	2949.72	878.28
2018	7440.62	2682.62	4922.40	1749.22	2202.90	3663.42	3149.49	919.77
2019	7775.53	2827.55	5313.03	1869.25	2332.86	3902.94	3349.27	961.27
2020	8110.44	2972.48	5703.67	1989.28	2462.82	4142.45	3549.04	1002.77
2021	8445.36	3117.41	6094.30	2109.32	2592.78	4381.97	3748.81	1044.26
2022	8780.27	3262.34	6484.94	2229.35	2722.75	4621.49	3948.58	1085.76
2023	9115.18	3407.27	6875.57	2349.38	2852.71	4861.00	4148.36	1127.26
2024	9450.09	3552.19	7266.21	2469.41	2982.67	5100.52	4348.13	1168.75
2025	9785.01	3697.12	7656.85	2589.44	3112.63	5340.04	4547.90	1210.25
2026	10119.90	3842.05	8047.48	2709.47	3242.59	5579.55	4747.68	1251.74
2027	10454.80	3986.98	8438.12	2829.51	3372.55	5819.07	4947.45	1293.24
2028	10789.70	4131.91	8828.75	2949.54	3502.52	6058.59	5147.22	1334.74
2029	11124.70	4276.84	9219.39	3069.57	3632.48	6289.10	5346.99	1376.23
2030	11459.60	4421.76	9610.03	3189.60	3762.44	6537.62	5546.77	1417.73

Choosing 2017-2030 as the inspection window, the consumption of goods and services such as food, housing and household equipment both in rural and urban residents continues to increase. The structure development trends are towards quality consumption, such like information and communication. On the other hand, with the increase of the aging population, health care consumption as medical care, housekeeping services, elderly supplies, and caregiving will continue to increase in rural residents and the number of the young people decline will affect the education industrial. While the rural consumer market has greater space for development.

#### V. CONCLUSION: CREATIVITY IN EFFECTIVE INDUSTRY SUPPLY

In view of the analysis of the evolution of the consumption structure in Liaoning province, it is concluded that the characteristics of consumption in Liaoning province have changed from subsistence to service consumption; mass to personalized consumption, form a new consumption hotspot. At the same time, the ageing of the population will also have an impact on the consumption. There are some problems on the consumption development.

1) "There is demand and lack of supply" has become the main problem facing the release of consumer demand. Taking the old-age service as an example, the trend shows that the demand for MI and the old-age industry will continue to increase over 12% in the future, but the development of the health service industry is seriously lagging.

2) The level of service supply is generally not high. Personalized consumption asks for more service and quality. While due to weak industrial innovation capability, lack of technology reserves and high-end talents, there are more restrictions on access in emerging industries and modern service industries.

3) The soft and hard environment of consumption is still not perfect. T&C consumption is main consumption, in terms of hard environment, such as the unreasonable layout of commercial outlets and the shortage of parking infrastructure. It is difficult to stop parking, which directly restricts the

consumption of automobiles. In terms of soft environment, the quality and safety of consumer goods has always occurred.

From the results of this paper, the main contradiction that restricts economic development is that supply and demand are not matched, uncoordinated and unbalanced. The main aspect of the contradiction is not on the demand side, but on the supply side. So, transfer concept to supply-side, making three kinds of creative supply become very important:

1)*Creativity in diversified consumption supply.* The key factor is to expand the scale of service consumption supply. Encourage all types of capital investment to focus on services. Increase personalization and diversified new supply of consumption. Promote product innovation with technology, better meet the needs of intelligent, personalized and fashionable consumption, which would lead, create and expand new demands. Support the development of emerging consumer products with broad prospects such as wearable devices, smart homes and digital media. Improve the quality of consumer supply. Improve corporate product quality commitment and quality service commitment mark and management system and carry out special actions for service industry quality in key areas such as network consumption.

2)*Creativity in supply environment.* Form a strong supply and consumption supervision system and improve the laws governing the consumer market. For example, the operator must not only ensure that the goods it provides, the service meets the requirements for the protection of personal and property safety, but also take appropriate security measures for the service facilities of the business premises to form an effective consumer protection system.

3)*Creativity in supply system.* It is mainly for the government to decentralize power, eliminate monopoly, reduce tax burden and factor costs, and encourage entrepreneurship, therefor increasing production, promoting competition, reducing costs, digesting inflation that may be caused by stimulus policies, and at the same time increasing employment, increasing residents' income and promoting consumption.

According to the analysis of the characteristics of the consumption structure on urban and rural residents in Liaoning Province in China, from the perspective of the supply side, in the context of population aging, innovative supply solutions to promote the healthy development of the consumption structure. Since this study predicts future consumption, the time series method is used, some additional factors are not considered during the prediction process, such as age, technology, policy. The accuracy of the prediction equation may be reduced. In the future study, using multi-equation to predict the tendency may be can enhance the accuracy, making the study more practical.

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