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The application of eles in the analysis of urban residents' consumption structure in Jilin province

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ABSTRACT

In this essay, time series data and cross-section data are combined. Urban Residents' marginal propensity to consume in Jilin Province is calculated by adopting Extended Linear Expenditure System (ELES). According to the calculated result, the changes of urban residents' household consumption structure are analyzed.

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KEYWORDS

Extended linear expenditure system (ELES);
Consumption structure;
Marginal propensity to consume (MPC).

INTRODUCTION

In the operation of macro-economy, residents' consumption demand, which is the ultimate demand, is the fundamental power of economic growth. Marshall, British famous economist, once said, "The final moderator of all the demands is the consumers' demands."^[1] The market space, which is provided by consumer demand, can fuel economic growth greatly from two aspects, one is demand, and the other is supply. Consumption is the premise. Production must be subordinate to it all the time. Supply must be subordinate to demand.^[2] During analysing the operation of macro-economy and economic growth, consumption structure is a very important factor, which cannot be neglected. Reasonable consumption pattern can drive the upgrade of industrial structure and employment structure in a better way.

The GDP of Jilin Province in 2012 is 1193, 782 billion Yuan. GDP per capita has increased remarkably. It reaches 43.4 thousand Yuan, the eleventh of the whole country, and the first in the middle regions. In the middle

and western provinces, Jilin economic and social development increased rapidly. This indicates that Jilin Province has come into a brand new stage: people are rich and the province is powerful. Urban residents are about to begin a new round of consumption upgrade. The new consumption upgrade places more emphasis on development and enjoyment. This makes the high growth industry group become the major drive in industry upgrade and economic growth. This is the most reliable support in continuous and rapid economic growth at present and even in future. Therefore, it is necessary to study and analyze variation tendency of urban residents' consumption structure further, and guide residents' consumption idea and behavior better.

BASIC CONCEPTS

Consumption

Consumption is a process in which people's various demands are satisfied by making use of social products. Consumption can be divided into productive con-

sumption and individual consumption. Productive consumption refers to the use and consumption of production goods and labor force in the process of material goods production. Individual consumption refers to the behavior and process in which produced material goods and intellectual products are used to satisfy individual living needs. In this essay, the consumption refers to individual consumption.

Consumption Structure

Residents' consumption structure refers to the proportional relation of various kinds of consumption goods (including labor force) which are consumed in the process of residents' consumption in a certain social and economic condition. Many factors can affect residents' consumption structure. The main factors among them are: residents' disposable income, consumption habit, consumption environment, public policy, etc. Residents' disposable income is the most important among them. The disposable income level decides not only the consumption level and degree of reasonable consumption structure, but the tendency of consumption income, which is closely related to disposable income level, is also a vital factor which restricts the pulling function of consumption to economic growth.

Residents' disposable income

Residents' disposable income is an important index which can reflect residents' living standards. It refers to the total sum of residents' final consumption expenditure, non-obligatory expenditure and savings. That is the income which can be freely allocated by urban households. The specific components of disposable income are: the total income of households deduced individual income tax, social security fees paid by individual. The total income of households includes the salaries, net income from operations, funded income, and transfer income of all the members in the household during investigation. It doesn't include the income for selling property and credit.

Marginal propensity to consume (MPC)

Marginal Propensity to Consume: the ratio between consumption changes and income changes. That is the changes of consumption caused by one unit changes of income. Marginal Propensity to Consume is the slope of consumption curve. Its value is usually a positive num-

ber which is larger than 0 and less than 1. This indicates that consumption is increased with the increase of income. But the extent of consumption growth is less than the extent of income growth. That is, Marginal Propensity to Consume is decreased with the increase of income.

Consumption elasticity

The elasticity in economics refers to the sensitivity of certain ratio of changes of one variable to another. The concept can be used among all variables as long as they have the causal relation. The cause variable is often called independent variable. And the variable caused by independent variable and produced changes is called induced variable. In this essay, consumption elasticity refers to the sensitivity of residents' consumption changes caused by the changes of disposable income.

THE INTRODUCTION TO EXTENDED LINEAR EXPENDITURE SYSTEM

In analyzing residents' MPC, LES and ELES are often used in analyzing variation tendency of urban households to different kinds of consumable's MPC. And ELES is a more advanced econometric technique in analyzing and predicting consumption structure at present.

ELES includes the effects of income and prices to residents' consumption structure. It regards the residents' consumption expenditure as related and restricted. Hence, it can totally reflect the indexes of residents' consumption structure^[3]. Let's introduce ELES in the following part.

In 1954, in order to study the quantitative relations between residents' consumption structure, R. Stone, who is the British famous economist, Nobel Economics Prize Winner, proposed the linear expenditure system of demand function on the base of utility function^[3]. Its basic form is:

$$V_i = P_i X_i + b_i (V - \sum P_k X_k) \quad (i=1, 2, 3, \dots) \quad (1)$$

In formula (1), V_i is the consumption expenditure to the i kind of goods. V is the total consumption expenditure. It is the sum of V_i . X_i is the basic demand to the i kind of goods. $P_i X_i$ is the basic demand expenditure to the i kind of goods. b_i is the percentage which is used to purchase the i kind of goods beyond the basic

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demand expenditure. It is called marginal budget ratio. In 1973, without changing the basic principle of the model, C•Lluch, British economist, modified model (1) in two aspects: (1) disposable income Y is used to substitute for total consumption expenditure V , (2) MPC β_i is used to substitute for marginal budget ratio b_i . Thus Extended Linear Expenditure System is formed. The model is:

$$V_i = P_i X_i + \beta_i (y - \sum P_k X_k) \quad i=1, 2, 3, \dots, n \quad (2)$$

Conflate $P_i X_i$ and $\beta_i \sum P_k X_k$ in model (2), make

$$\alpha_i = P_i X_i - \beta_i \sum P_k X_k \quad (3)$$

Then formula (2) becomes

$$V_i = \alpha_i + \beta_i Y \quad (4)$$

$$\eta_i = \beta_i Y / V_i \quad (5)$$

By using ordinary least squares to formula (4), the estimated value of α_i and β_i can be calculated. According model (5), the elasticity of all kinds of consumer goods can be calculated..

THE APPLICATION OF ELES IN THE ANALYSIS OF URBAN RESIDENTS' CONSUMPTION STRUCTURE IN JILIN PROVINCE

Collection and analysis of the data

The main data are: the table of the mean of per capita consumption expenditure in Jilin urban households, and disposable income of urban residents^[4,5] from 2006 to 2011. Because of the limited space, the table of the mean of per capita consumption expenditure and disposable income in Jilin urban households is not listed below.

The use of the model and calculated result

Apply the cross-section data from 2006 to 2011 to Model (4), Undergo regression analysis by using SPSS. The MPC of different consumption expenditure (TABLE 1) and the consumption elasticity (TABLE 2) can be calculated.

RESULT ANALYSIS

i) Traditional food MPC is great. The tendency is falling after rising. But residents' consumption lacks elasticity.

From 2006 to 2008, the MPC of food expenditure

TABLE 1 : the MPC of Jilin Urban Residents from 2006 to 2011

MPC	2006	2007	2008	2009	2010	2011
food	0.13	0.13	0.15	0.14	0.13	0.11
dress	0.08	0.08	0.09	0.09	0.10	0.10
facilities and services	0.03	0.04	0.05	0.04	0.04	0.05
medical care	0.06	0.08	0.06	0.09	0.06	0.04
transportation and communication	0.11	0.07	0.08	0.15	0.01	0.1
education, culture and entertainment	0.08	0.06	0.07	0.05	0.06	0.05
habitation	0.06	0.06	0.07	0.06	0.05	0.06

TABLE 2 : the Consumption Elasticity of Jilin Urban Residents from 2006 to 2011

consumption elasticity	2006	2007	2008	2009	2010	2011
food	0.47	0.53	0.57	0.54	0.54	0.47
dress	1.02	0.82	0.95	0.86	1.01	1.02
facilities and services	1.10	1.12	1.14	1.09	0.89	1.10
medical care	0.66	1.12	0.87	1.07	0.79	0.66
transportation and communication	1.13	1.01	1.10	1.56	1.15	1.13
education, culture and entertainment	0.65	0.66	0.82	0.68	0.74	0.65
habitation	0.76	0.67	0.68	0.64	0.62	0.76

in Jilin increased gradually. The increase reached 12.7% from 2006 to 2007. The main reasons are: on one hand the price of farm and sideline products increased greatly; on the other hand in 2008, Jilin per capita GDP was 3920 dollars which showed the transition from simply having adequate food and clothing to fairly well-off. Residents' food consumption structure entered an upgraded stage. According to elasticity theory, when income increases to a certain amount, the MPC of food expenditure decreases gradually. From 2008 to 2011, the MPC of Jilin food expenditure decreased continuously. The demand of food expenditure waited for a new round of upgrade. Jilin is the traditional agricultural province. It's necessary to develop traditional competitive industries. Deepen food processing industries. Optimize the layout of industrial structure. Spur the benign development of the province economy.

ii) The consumption elasticity of dress, facilities and services, transportation and communication is great. But the MPC of dress is large, the MPC of facilities and services, transportation and communication is less.

According to the group standard of World Bank to various countries' income level in 2010, Jilin per capita GDP has risen to 38,460 Yuan in 2011 from 15,720 Yuan in 2006, which indicates the development from the lower side of medium level to the upper side of medium level. Therefore, in the process of the transition from adequate food and clothing to fairly well-off,

or even to wealthy life, with the acceleration of technical renovation and the changes of consumption idea, with material consumption demand met, residents seek for more spiritual consumption. The range of consumption is broadened day after day. Hence, the development space of the three items' consumption expenditure is great. With the information technical renovation and the widespread of internet, electronic products and services, and transportation and communication have met unprecedented opportunities. Developing consumption in these aspects is not limited by resources, such as land, energy, etc. It can optimize consumption structure. So residents should be guided to transit from material consumption to spiritual consumption.^[6]

iii) Urban residents' consumption of entertainment, education, culture, and services tends to be more personal. The variation of the MPC is not stable.

The MPC and consumption elasticity of Jilin urban residents' consumption of entertainment, education, culture, and services are less. With the better living standard, in the process of transition to wealthy life, the demand for spiritual consumption will be more and more. The development space of consumption expenditure in entertainment, education, culture, and services will be great. Developing expenditure in this field isn't limited by material resources. So entertainment, education, culture, and services should be enriched continuously in order to meet residents' constantly improving demand in spiritual consumption products.

iv) The MPC of Jilin expenditure in transportation and communication tends to decrease year after year. But the income elasticity occupies the most in the whole consumption structure. The reason is: in the period of adequate food and clothing consumption, the consumption expenditure in transportation and communication occupied small part. It's the last in various consumption proportion. So the elasticity of consumption expenditure in transportation and communication is very great. With the increase in income, the changes of consumption structure from adequate food and clothing to fairly well-off, the state invested a large sum of money in infrastructure of transportation and communication. This makes the cost of transportation and communication decrease greatly. The MPC of transportation and communication expenditure decreases. The reduction of transportation and communication cost provides con-

venience for urban residents to expend transportation and communication consumption and advance consumption level. The increase in income must spur the upgrade in transportation and communication consumption, and the income elasticity of consumption must increase further. These two factors influence each other. This makes urban residents' transportation and communication consumption become new consumption hot spot.

v) Jilin habitation MPC tends to fall after rise. Habitation consumption lacks elasticity.

From 2006 to 2008, urban residents' habitation MPC tended to rise. With the improving living standard, residents tend to improve their housing condition naturally. But after 2008, the price of housing increased greatly. The increase of residents' disposable income cannot match with the increase of housing price. Hence, urban residents' habitation MPC tends to decrease. On the whole, urban residents' habitation income elasticity of consumption is between 0.6 and 0.8 in recent years.

CONCLUSIONS

Jilin urban residents' consumption in transportation and communication has become a new consumption hot spot. The elasticity of consumption in transportation and communication is the largest in the whole consumption structure. So we should invest more in order to meet residents' growing consumption demand. Food and clothing are traditional competitive industries. The MPC of consumption expenditure is great. We should develop deep processing in food industries and build up brands in clothing industries in order to upgrade them. The variation of MPC in urban residents' entertainment, education, culture and services isn't stable. But in future, the developing space is great. Therefore, the moment we increase residents' income, through optimization and upgrading in consumption structure, we should improve the optimization and upgrading of industrial structure. And spur the rapid increase in economy.

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