

The Empirical Analysis of Income and Food Consumption Structure of Urban Residents in China

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Abstract: Using the panel data of food income and expenditure, this study further analyzes how income influences on food consumption structure based on analysis of evolution characteristics of income and food consumption structure of urban residents in China during 2000-2010 year. In addition, the study compares the difference of food consumption structure of eastern, central and western areas in China. The results are showed as following: with the improvement of income level, the Engel's coefficients keep falling. At the same time, the food consumption structure upgrade from single staple food to the diversification equilibrium of staple and non-staple food and significant difference of food consumption structure exist in different regions and income level. Therefore, the government should speed up the pace of economic development, improve the level of residents income, adjust the food industry structure and improve the income distribution pattern.

Keywords: Empirical analysis, food consumption structure, per capita income, urban residents

INTRODUCTION

Since the reform and open policy, the pace of economic growth has accelerated, the level of per capita income has improved and the average disposable income of urban residents has increased from 343.4 yuan to 19109.4 yuan per head during 1978-2010 year. Income is the dominant variable in consumer behavior and income growth necessarily brings changes of consumption structure and consumption level. However, because food consumption plays an important role in consumption structure, consumer will tend to safety, healthy and nutritious food as people's food safety awareness enhanced (Jiang, 2010). Therefore, studying on the relationship between income and food consumption structure has important guiding significance for making food industry policies and speeding up the shift of mode of economic development of our country. The food consumption structure in the study is to point to the proportion of the food expenditure such as grain, animal products, aquatic products and vegetables in the general food costs.

Chinese scholars had done many deeper researches on the relationship between income and food consumption structure, mainly concentrating on the influence of income on food consumption structure, the evolution of consumption structure and the related factors analysis of consumption structure. Based on the analysis of consumption structure and urban per capita disposable income of China, Shaoqian (2006) pointed

that consumption structure was coordinated with marketization index, modernization index and the consumer confidence index. Income of urban residents and the balance mechanism among all kinds of consumption have played an important role in constraining consumption structure, especially the food consumption. Dezhang and Jialiang (2010) established an analytical model of the food consumption structure upgrade under new situation and analyzed the correlation quantitative effects of income growth on food expenditure and food consumption upgrade. He thought that the standard of measuring the rich and poor was the proportion of the expenditure of green and organic foods. Xinhua and Ruihao (2009) examined the changes of food consumption behavior of urban residents in 1995-2007. The results showed that the factors of per capita disposable income, changes of food consumption idea and consumption law influenced the behavior of urban residents in China. Zhen and Shuquan (2011) analyzed the concrete influence of family income structure on consumer behavior in rural based on four areas of China panel data in 1997-2008. Enhu and Lutang (2007) analyzed the evolution of food consumption structure of urban and rural residents after reform. He found that the "food revolution" had quietly spread with the development of economy and income. Finally, he made China's agricultural development strategy by borrowing ideas of food consumption structure changes in industrialization and agriculture structure adjustment from the UK, Japan and other

countries. Jun (2011) and Yimin and Deli (2009) had made empirical analysis on food consumption structure of urban residents in Wuhan and Shanghai city respectively.

Researches on the food consumption above show that income is the important factor in influencing food consumption structure of urban residents and most scholars focus researches on a region(country or provinces and cities, etc), lacking the comparison of areas. Therefore, from the micro perspective, the study will mainly study on the evolution characteristics of income and food consumption structure and compare the influence degree of income on the food consumption structure in different regions. At the same time, the study will summarize rules of food consumption structure with the improvement of income.

ANALYSIS OF THE EVOLUTION CHARACTERISTICS OF INCOME AND FOOD CONSUMPTION STRUCTURE OF URBAN RESIDENTS IN CHINA

With the constant increase of urban resident's income in China, the people's consumption level has gone up notably, especially food consumption level, composition of consumption and consumption idea have changed greatly, which mainly embodies in the following three aspects.

Food consumption level rose and Engel's coefficient declined: Since the reform and opening up, the improvement of China's urban residents income level has contributed to the growth of consumption level, especially food consumption level. In 2010, the per capita food spending is 4804.71 yuan, it is 2.45 times more than the expense 1958.3 yuan in 2000. However, because income growth rate is faster than food spending's, Engel's coefficient - food consumption

expense accounts for the proportion of the total amount of personal consumption expenditure is still falling.

According to the United Nations Food and Agriculture Organization of the proposed standards, Engel's coefficient more than 59% is poverty, 50-59% for food and clothing, 40-50% for a well-off, 30-40% for rich and less than 30 percent for the most affluent. In 2010, the Engel's coefficient of urban households in China is 35.7, realizing the crossing from well-off level to rich, specific in Table 1.

Food consumption expenditure structure upgrade:

In price system influence, per capita food expense will bring the change of food consumption structure (Table 2). In longitudinal perspective, food consumption expenditure structure of urban residents has shown a trend of diversified and food spending has changed from past single structure such as grain and vegetables to balanced structure of non-staple and staple food such as milk and milk products, dry fresh fruits and melons. On average, in fifteen food expenditures, the proportion in the top five are: dining out, meat and processed products, vegetables, dry fresh fruits and aquatic products. In lateral perspective, all kinds of food in the proportion of total expenditures have changed over time. The proportion of grain has dropped from 9.63% in 2000 year to 8.02% in 2010 year and grease, meat and beast products and sugar have been down from 3.39, 21.0 and 1.24% in 2000 to 2.61, 19.03 and 0.87% in 2010 year, respectively. On the contrary, the proportion of vegetables, fresh fruits and milk and processed products have rose from 9.82, 6.51 and 3.50% in 2000 to 10.44, 7.88 and 4.13% in 2010 year respectively, which indicates that urban residents have paid more attention to the balance of nutrition with increasing awareness of food safety and they have reduced the consumption of fatty and sugary foods. In addition, dining out has held very large proportion in food consumption and has been

Table 1: Per capita income, expenditure and Engel's coefficient unit: yuan, %

Year	Per capita disposable income and growth rate	Per capita consumption expenditure and growth rate	Per capita food expenditure and growth rate	Engel's coefficient
2000	6280.0 (7.3)	4998.0 (8.3)	1958.3 (1.4)	39.4
2001	6859.6 (9.2)	5309.0 (6.2)	2028.0 (3.6)	38.2
2002	7702.8 (12.3)	6029.9 (13.6)	2271.8 (12.0)	37.7
2003	8472.2 (10.0)	6511.0 (8.0)	2416.9 (6.4)	37.1
2004	9421.6 (11.2)	7182.0 (10.3)	2709.6 (12.1)	37.7
2005	10493.0 (11.4)	7943.0 (10.6)	2914.4 (7.6)	36.7
2006	11759.5 (12.1)	8679.0 (9.5)	3111.9 (6.8)	35.8
2007	13785.8 (17.2)	9997.0 (14.9)	3628.0 (16.6)	36.3
2008	15781.0 (14.5)	11242.9 (12.5)	4259.8 (17.4)	37.9
2009	15781.0 (8.83)	12264.6 (9.09)	4478.5 (5.1)	36.5
2010	19109.4 (11.3)	13471.5 (9.84)	4804.7 (7.3)	35.7

"China statistical yearbook (2000-2011 year) "

Table 2: The changes of food consumption structure of urban residents in China unit : %

Classifications	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Grain	9.63	9.34	8.40	8.03	8.81	8.31	7.92	7.67	7.71	7.46	8.02
Oil and Fats	3.39	2.92	2.84	3.25	3.29	2.93	2.80	3.23	3.87	2.89	2.61
Meat and Beasts	21.00	20.53	20.03	2.52	19.44	19.38	17.53	19.38	21.05	19.37	19.03
Beans	1.52	1.54	1.29	1.30	1.32	1.32	1.23	1.20	1.28	1.30	1.38
Eggs	2.89	2.82	2.60	2.52	2.52	2.45	2.17	2.31	2.15	2.07	2.04
Aquatic Products	7.33	7.55	7.47	7.05	6.57	6.48	6.52	6.72	6.58	6.73	6.80
Vegetables	9.82	9.65	9.40	9.78	9.47	9.45	9.59	9.61	9.61	9.97	10.44
Condiments	1.52	1.50	1.47	1.46	1.33	1.27	1.28	1.25	1.23	1.30	1.32
Sugar	1.24	1.26	1.11	1.10	1.04	1.00	1.07	0.95	0.84	0.85	0.87
Wine and Beverage	5.27	5.16	4.94	4.97	4.57	4.62	4.77	4.73	4.52	4.96	4.79
Fruits	6.51	6.52	7.38	7.24	7.00	7.08	7.72	7.50	6.89	7.43	7.88
Cake	2.14	2.11	2.20	2.21	2.12	2.11	2.06	2.04	1.96	2.04	2.05
Milk	3.50	3.98	4.61	5.16	4.89	4.76	4.83	4.43	4.46	4.38	4.13
Other Food	2.14	2.18	2.37	2.42	2.30	2.15	2.19	1.93	1.73	1.63	1.67
Dining out	14.70	15.60	18.20	18.13	19.69	20.84	22.21	20.97	20.61	21.79	21.21

“China statistical yearbook (2000-2011 year) ”

Table 3: The major food consumption structure of urban residents in different income groups unit : yuan

Classifications	Ave rage	Minimum income10%	Low Income 10%	Below average20%	Middle income20%	Above average20%	High income10%	Highest income10%
Grain	385.51	295.63	326.37	357.68	393.05	425.51	453.87	492.37
Meat and beasts	914.22	563.93	728.82	835.87	955.23	1051.41	1142.37	1242.16
Eggs	98.02	68.04	80.53	91.21	102.38	111.87	117.74	121.80
Aquatic Products	326.86	137.50	192.22	253.14	313.76	416.30	497.25	635.46
Milk	198.47	91.57	127.59	158.92	198.97	245.85	296.69	346.35

“China statistical yearbook (2011 year) ”

increasing, which mainly because as changing of the way of life and speeding of the life rhythm, people has paid more attention to the value of time. Convenient dining would become the trend of food consumption. The proportion of condiments, cake and beans are basic stability in food consumption structure of urban residents, which shows that the influence of income on food consumption structure is basic unchanged under traditional way of life influence.

The food consumption demands are far apart in different income groups of urban residents in China: The income gap between urban residents will lead to the change of food consumption expenditure. From Table 3 we can see that the food consumption structure in different income groups of urban residents is different, that is, the main food expenditure of 10% minimum income households, 10% low-income and 20% middle below income households are all lower than average and middle-income and above households are all higher than the average. The 10% lowest income households spending most of the foods are grain and meat and beasts, the expenditure is 295.63 yuan and 563.93 yuan per head respectively. However, the 10% highest income households spending most of foods are meat and beasts and aquatic products, respectively is

1242.16 yuan and 635.46 yuan per capita. In 2010, the mik expenditure of the supreme income households is 346.35 yuan per capita, it is 3.78 times of the lowest income households spending 91.57 yuan and eggs expenditure is the 1.79 times of the lowest income households. If we consider dining out expenditure, the food consumption demands in different income groups will be more far apart.

To sum up, with the development of economy and urbanization, the “food revolution” of urban residents has quietly spread and Engel’s coefficient has declined. The grain consumption gradually declined, reversely, the consumption of milk, fruit and dining out gradually raised and beans, cake and eggs were basically unchanged. The food consumption of urban residents has moved from staple food to the direction of nutritious and healthy food structure.

EMPIRICAL ANALYSIS ON THE INFLUENCE OF INCOME ON FOOD CONSUMPTION STRUCTURE OF URBAN RESIDENTS

In order to further analyze the influence of income on food consumption structure and explain the changes of food consumption structure of urban residents in China from time and space dimensions, the study will

Table 4: The influence of income on the per capita food consumption structure of urban residents*

Food classifications	2000-2002				2008-2010			
	National	Eastern	Central	Western	National	Eastern	Central	Western
Total food	0.2991	0.3012	0.2956	0.3110	0.2595	0.2518	0.2610	0.2843
Grain	0.0271	0.0232	0.0322	0.0301	0.0201	0.0170	0.0250	0.0242
Oil and fats	0.0090	0.0075	0.0116	0.0102	0.0079	0.0064	0.0097	0.0098
Meat	0.0612	0.2994	0.0596	0.0679	0.0512	0.0463	0.0503	0.0603
Beans	0.0043	0.0040	0.0053	0.0034	0.0034	0.0029	0.0046	0.0030
Eggs	0.0082	0.0072	0.0099	0.0075	0.0054	0.0049	0.0065	0.0049
Aquatic products	0.0223	0.0334	0.0143	0.0101	0.0174	0.2355	0.0119	0.0078
Vegetables	0.0287	0.0266	0.0317	0.0312	0.0261	0.0227	0.0304	0.0298
Condiments	0.0045	0.0043	0.0047	0.0047	0.0033	0.0031	0.0035	0.0038
Sugar	0.0036	0.0033	0.0035	0.0048	0.0022	0.0021	0.0021	0.0028
Liquor	0.0153	0.0152	0.0160	0.0160	0.0124	0.0124	0.0124	0.0129
Fruits	0.0205	0.0201	0.0207	0.0214	0.0193	0.0189	0.0203	0.0206
Cake	0.0064	0.0068	0.0058	0.0057	0.0052	0.0055	0.0051	0.0046
Milk	0.0123	0.0131	0.0112	0.0143	0.0112	0.0110	0.0110	0.0126
Other food	0.0067	0.0068	0.0057	0.0072	0.0043	0.0033	0.0044	0.0065
Dining out	0.0490	0.0525	0.0402	0.0491	0.0551	0.0581	0.0463	0.0605

* The compare of demand-income elasticity during the year 2000-02 and 2008-10; "China statistical yearbook (2001-2003,2009-2011)"

compare and analyze the food consumption structure of different regions in 2000-2002 and 2008-2010. The panel data are from per capita disposable income and all kinds of food expenditure of urban residents of the eastern, central and western areas in China. In the panel model, per capita disposable income is the independent variable and the dependent variables are per capita total food spending, grain, oil and fats, meat, beans, eggs, aquatic products, vegetables, condiments, sugar, beverage and liquor, milk and dining out. Using Eviews 5.0 software, the study makes regression analysis on the panel data and all the regression results are significant at 1% significant level, indicating that income has very significant influence on food consumption structure. Table 4 shows the influence of income on the per capita food consumption structure of urban residents.

In the time dimension, compared with influence degree of income on total food expenditure in 2000-02 year (0.2991), it fell off in 2008-10 year (0.2595).

The most rapid decline area in influence degree is the eastern (0.0494) and it is greater than the national average drop degree (0.0396).and the next are central (0.0346) and western (0.0267) regions. The most rapid decline in influence degree of income on food consumption structure is meat and processed products (0.0100) and the fastest rising influence degree is dining out (0.0061). The minimum influence coefficient of three foods are sugar, beans and processed products and condiments in both 2000-02 and 2008-10 year. The phenomenon above shows that the overall food consumption is declining with improvement of per capita income level of urban residents and people's living standard is improving, food consumption tend to convenient and nutrient food.

In the space dimension, in 2000-2002, the influence degree of income on fifteen kinds of food in

top seven are meat, dining out, vegetables, grain, aquatic products, fresh fruits and liquor and beverage, the influence coefficients are 0.0612, 0.0490, 0.0287, 0.0271, 0.0223, 0.0205 and 0.0153, respectively. These coefficients mean that urban residents have increased these food expenditure with the improvement of per capita income. The influence coefficient of sugar, condiments and cake are the minimum, the coefficients is 0.0036, 0.0045 and 0.0064 respectively, meaning that urban residents have stable expenditure for these three foods. In addition, the food consumption structure is different in the eastern, central and western regions. In eastern region, the income demand elasticity coefficients of fifteen foods rank first seven are dining out, aquatic products, meat, vegetables, grain, fresh fruits and liquor and beverage. In central region, the food of larger influence degree of income on food consumption structure are meat, dining out, grain, vegetables, fresh fruits, liquor and beverage and aquatic products respectively and in western area, the foods are meat, dining out, vegetables, grain, fresh fruits, liquor and beverage and milk respectively. In 2008-2010, meat, dining out, grain and vegetables are still the main food for urban residents in China, people consumption habits are basic stable, but the income demand elasticity has changed greatly in eastern, central and western regions. Aquatic products have exceeded dining out and meat and become the most important food in eastern region, the income demand elasticity is 0.2355, that is, per capita income increases by 1%, the expenditure of aquatic products will increase by 0.2355%. In central and western areas, the mian foods still are meat, vegetables and grain.

Through comparison of food consumption structure in time and space dimensions, we can see that dining out plays an important role in food expenditure of urban

residents and its influence coefficient has been growing, while the income demand elasticity of other food has reduced under the price system influence. Aquatic products and meat have replaced grain and become main food spending in the eastern region, while grain is still the main food in central and western regions. This phenomenon indicates that the influence of regional income disparity on food consumption structure in different regions is great. With the improvement of income level, the eastern food consumption structure has changed for healthy, nutrient food and residents have paid more attention to balanced staple and non-staple food, while food consumption of the Midwest is exceeding from "Eating good" to "Eating nutritious".

CONCLUSION AND RECOMMENDATIONS

- With the improvement of income level, the trend of Engel's coefficient has continued to fall, which indicates that urban residents living standards have improved and income has significant influence on food consumption structure. Therefore, raising the income level of residents and enhancing the purchasing power of safety food are the effective measures to stimulate the economic development of China.
- The food consumption structure of urban residents in China has upgraded. At present, in the food consumption expenditure of urban residents, the proportion of staple food such as meat, grain is declining, while the proportion of nutrient food such as fresh fruits, vegetables, liquor and beverage and milk is increasing. Dining out always plays more important role in food expenditure and the consumption of cake, eggs and beans is basic stable. Predictably, the food consumption structure of urban residents still has some space to upgrade. Therefore, changing the development mode of traditional food industry and adjusting industrial structure are the direction of food industry development.
- The structure in different income groups and different regions in China still has certain difference. Therefore, the government should speed up the economic development in the Midwest,

improve the people's income level and reduce the gap of food consumption structure between different regions and different income groups so as to improve the food quality.

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