DOI: 10.53469/jgebf.2025.07(04).08

Empirical Study on the Impact of Urban Residents' Income on Consumption Structure in Yantai City

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Abstract: ***In recent years, with the rapid development of Yantai's economy, the income level of residents in Yantai has also been significantly improved. The per capita disposable income of urban residents in Yantai City has reached 45143 yuan in 2022. With the growth of urban residents' income in Yantai City, the consumption structure of urban residents is also undergoing changes. In order to reveal the relationship and degree of the impact of income growth on consumption structure of urban residents in Yantai City, a model of income and consumption structure of urban residents in Yantai City was established by consulting the Yantai Statistical Yearbook and obtaining the required data. Empirical analysis and testing were conducted. Research shows that the expenditure of urban residents in Yantai City on food, housing, medical care, entertainment, and other aspects continues to increase with the increase of disposable income. The consumption expenditure of urban residents in Yantai City is transforming and upgrading towards spiritual consumption and development consumption. Finally, suggestions were put forward to increase the income of urban residents in Yantai and improve the consumption structure.***

Keywords: Yantai City, Resident income, Consumption structure**.**

1. Introduction

In 2022, Shandong Province's GDP was 8743.51 billion yuan, and its economic size ranked third in the country at the provincial level. Calculated at constant prices, it increased by 3.9% over the previous year. Yantai City is a prefecture-level city with a relatively developed economy in Shandong Province. In 2022, Yantai City's GDP was 951.586 billion yuan. The economic development of Yantai City will inevitably drive the improvement of residents' income level. In 2022, the per capita disposable income of urban residents in Yantai City has reached 45,000 yuan. The quantitative growth of income will inevitably lead to a qualitative change in the consumption structure. Consumption structure is one of the indicators reflecting the quality of life of residents, and it also reflects the development of the economy. Therefore, the study of consumption structure is very important. In the study of consumption structure, domestic and foreign scholars have conducted more qualitative research, less quantitative research, and less research on specific populations in specific regions. Based on this, this paper selects urban residents in Yantai City as the research object.

By reviewing domestic literature, the main view is that with the increase in residents' income level and the improvement in income structure, the consumption structure of Chinese residents has also changed [1-2]. As the income level increases, the marginal propensity to consume will gradually decrease [3]. There are regional and urban-rural differences in residents' income in China, which leads to regional and urban-rural differences in consumption structure. Narrowing the regional and urban-rural income gap will help China's economic and social development to continue to be healthy [4-10].

By reviewing and summarizing foreign literature, we can conclude that in the highly unequal social security system of the United States, additional household consumption expenditures are mainly used for housing and food, and growing economic inequality and status consumption may be a self-reinforcing process [11]. The stagnation of private fixed asset investment was the main reason for the slowdown in Japan's economic growth in the 1990s [12]. Due to corporate and government savings, China's economy-wide savings rate is at a high level compared with OECD countries [13]. Russian household savings are self-insurance against uncertainty [14]. The interaction between income inequality and commodity demand patterns is a potential source of persistent inequality [15].

There are a lot of studies on residents' income and consumption structure. After checking, I found that the scope of relevant research is relatively macro. Foreign countries generally study the whole society as a unit, while domestic studies are mostly based on the country or provincial administrative region. This paper selects Yantai, a prefecture-level city in Shandong Province, so this paper has a certain novelty in the research object area. This paper has consulted website data, checked textbook theories, and carefully carried out empirical research on the impact of urban residents' income on consumption structure in Yantai City, and marginal propensity to consume research, and found out the advantages and disadvantages in the income structure and consumption structure of urban residents in Yantai City, and proposed targeted improvement measures.

The theoretical basis of this paper comes from multiple disciplines such as Western economics and econometrics. It mainly involves literature research method, summarizing and organizing the classics, and roughly grasping the current status of relevant research in this paper; statistical analysis method, checking the time series data of per capita disposable income and per capita consumption expenditure of urban residents in Yantai from 2002 to 2022, and drawing relevant statistical charts; empirical analysis method, establishing ELES model to analyze and study the impact of per capita net income of urban residents in Yantai on living consumption and various consumption items. This has important positive

theoretical and practical significance for the Yantai Municipal Government to increase residents' income, open up emerging consumer markets, formulate reasonable consumption policies, optimize the consumption structure of Yantai residents, promote the sustainable, healthy and stable development of Yantai's urban economy, and ensure the safe operation of the urban economy.

2. Changes in Income and Consumption Structure of Urban Residents in Yantai City and Their Characteristics

2.1 Basic Overview of Yantai's Economic Development

Yantai City is located in the northeast of Shandong Peninsula, bordering the Bohai Sea and the Yellow Sea, with its back to the vast economic hinterland of Shandong Province and facing the developed international markets of Japan and South Korea. Yantai has been included in many national and provincial economic development plans. According to public data, the GDP of Yantai City in 2022 was 951.586 billion yuan, ranking third in Shandong Province, and increased by 5.1% over the previous year at comparable prices. Yantai City has a good industrial foundation, with fishery resources and high-quality agricultural products such as apples and cherries. Domestic and foreign trade and tourism have developed steadily, and the proportion of the three major industries is 7:42.3: 50.8. Yantai City has a permanent population of about 7 million. In 2022, the city's per capita GDP was 133,946 yuan, an increase of 5.4 % over the previous year.

Figure 1: Recent Gross Domestic Product of Yantai City

2.2 Income of Urban Residents in Yantai

At the beginning of this century, the per capita disposable income of urban residents in Yantai City had reached more than 8,000 yuan. By 2004, the per capita disposable income of urban residents in Yantai City had achieved a leapfrog growth of 10,000 yuan, reaching 10,802.6 yuan. In 2017, the per capita disposable income of Yantai residents was 32,299 yuan, an increase of 8.6% over the previous year, higher than the growth rate of my country's GDP during the same period. Wage income is the main driving force for the growth of urban residents' income in Yantai. From 2002 to 2006, the wage income of urban residents in Yantai City increased from 8,421 yuan to 11,799.7 yuan. As shown in the figure below, the wage income of urban residents in Yantai City has shown an upward growth trend since 2006. Transfer income and property income account for a relatively small proportion of the disposable income of urban residents in Yantai City. Among the sources of income for urban residents in Yantai in 2018, wage income accounted for 59%, which indicates that nearly 60% of urban residents in Yantai are working people. Transfer payments accounted for 14%, property income accounted for 9%, and operating income accounted for 18%. These three types of income have considerable room for improvement. The sources of income for urban residents in Yantai in 2022 have not changed significantly compared with 2018.

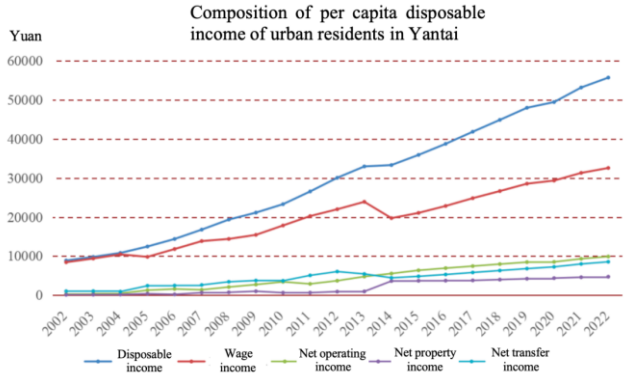

Figure 2: Composition of Per Capita Disposable Income of Urban Residents in Yantai City

2.3 Consumption of Urban Residents in Yantai

Data show that the per capita consumption expenditure of urban residents in Yantai City in 2022 was 33,577 yuan, as shown in Table 1.

Table 1: Annual per capita expenditure of urban residents in Yantai City

Years	Consumer Spending	Food Tobacco Alcohol	Clothes	Live	Life Supplies Serve	Transportation Communications	Educate Culture Entertainment	Medical Health care	Other Supplies Serve
2002	7173	2539	1131	541	358	507	557	1235	305
2003	7479	2719	1079	634	376	595	678	1100	298
2004	8054	3003	1128	672	401	639	719	1200	294
2005	9035	3361	1458	793	272	933	883	997	338
2006	10316	3578	1769	753	328	1112	1067	1202	508
2007	11829	3949	2007	1065	363	1183	1380	1384	497
2008	13152	4750	2104	1604	432	1006	1455	1581	220
2009	14537	5233	2310	1470	511	1267	1787	1647	311
2010	15792	5116	2789	1333	819	996	2459	1504	776
2011	18395	6192	3209	1558	1135	1200	2139	1905	1058
2012	20315	6934	3594	1381	1447	1152	2766	1923	1118
2013	22006	7482	3656	1549	14955	2101	2763	1803	1157
2014	21572	6123	2475	5069	1511	2867	1721	1247	559
2015	23410	6969	2517	5176	1703	2947	1941	1473	685
2016	25737	8018	2721	5463	1717	3360	2091	1634	735
2017	27894	8490	2856	6216	1744	3734	2226	1799	830
2018	29495	8828	3086	6447	1967	3928	2521	1829	889

2019	31259	9373	3129	6727	2051	4164	2747	2101	965
2020	31843	9523	3044	6989	2152	4353	2772	2120	890
2021	34178	10142	3232	7166	2226	5008	3228	2233	944
2022	33577	9989	3118	7046	2176	4960	3158	2209	921

According to the above figure, from 2002 to 2022, the consumption structure of urban residents in Yantai City has continued to improve, and the quality of life has continued to improve. From the horizontal perspective of the table, the proportion of food consumption of urban residents in Yantai City in the eight consumption items is the largest, followed by clothing and housing consumption, but the proportion of medical care, education, culture and entertainment service consumption expenditure is relatively small. From the vertical perspective of the table, the proportion of transportation, communications and culture, education and entertainment consumption expenditure of urban residents in Yantai City has been increasing year by year, while the proportion of food consumption is gradually decreasing. These show that the quality of life of urban residents in Yantai City has improved, and has shifted from material consumption such as food and accommodation to modern consumption such as transportation and communications. The consumption field of urban residents in Yantai City has gradually shifted from material consumption to spiritual consumption and development consumption. Among them, the consumption expenditure on education, culture and entertainment has grown rapidly.

2.4 The Income and Consumption of Urban Residents in Yantai City Show Similar Growth Trends

According to the theory of economics master Keynes, there is a basic economic rule between the consumption and income of urban residents in Yantai City: the consumption expenditure of urban residents in Yantai City will increase with the increase of disposable income, but the increase of the former is smaller than the increase of the latter. This relationship between consumption and income is called the consumption function.

Figure 3 is a line graph of the per capita disposable income and total consumption expenditure of urban residents in Yantai City based on the data in Figure 2 and Table 1. The graph intuitively shows the growth trend of the per capita disposable income and total consumption expenditure of urban residents in Yantai City, proving the above-mentioned Keynesian theory.

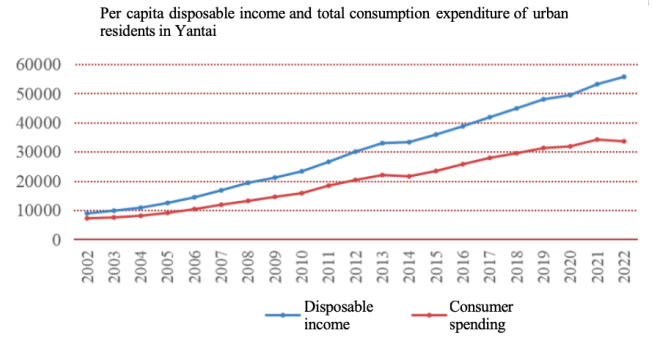

Figure 3: Trends in Per Capita Disposable Income and Total Consumption Expenditure of Urban Residents in Yantai City

From Figure 3 that both curves are on an upward trend, but the disposable income curve is steeper than the consumer expenditure curve, which indicates that the growth of consumer expenditure is lower than the growth of disposable income, from 1,695 yuan in 2002 to 4,058 yuan in 2006, and then to 22,123 yuan in 2022. The gap between the two gradually widened between 2002 and 2022, and it was more prominent in 2022. The growth rate of consumer expenditure of urban residents in Yantai City was lower than the growth of income.

3. Empirical Analysis of the Impact of Urban Residents' Income on Consumption Structure in Yantai

3.1 Introduction to the ELES Model Theory

Based on the linear expenditure system model of British econometrician Stone, economist C. Liuch introduced the extended linear expenditure system model (ELES) in 1973. According to this system, it is assumed that the demand of urban residents in Yantai for various commodities (services) depends on their own disposable income and the prices of various commodities, and the demand of urban residents in Yantai for various commodities is divided into two parts: basic demand and demand beyond basic demand. This system believes that basic demand has nothing to do with income level. Only after the basic needs of urban residents in Yantai are met will they arrange various non-basic consumption expenditures according to a certain marginal propensity to consume with the remaining income. The calculation formula of the ELES model is:

$Vi=Piqi+bi(YV_0)$ *(Formula 3.1)*
Assume: $ai=Piqi-biV_0$*, then the model can be expressed as:*
$Vi=ai+biY$ *(Formula 3.2)*

In this model, Vi is used to represent the consumption expenditure of urban residents in Yantai on a certain type of commodity, the commodity price is Pi, the basic demand for the commodity is qi, bi can be understood as the marginal propensity to consume, that is, the proportion of urban residents in Yantai who purchase additional commodities or services in the balance after their basic needs are met, V0 is the total expenditure on basic needs, and Y is the disposable income level. This model is the "Extended Linear Expenditure System Model" (ELES Model). The ELES model of urban residents in Yantai can be calculated using the surveyed data.

3.2 Parameter Estimation and Testing

3.2.1 Data Source

The data in this article are derived from the "Yantai Statistical Yearbook". The data sample range is from 2002 to 2022. Following the statistical yearbook, the consumption expenditure of urban residents in Yantai is divided into clothing, housing, food, education and culture.

3.2.2 Parameter estimation and testing

3.2.2.1 Relationship between per capita disposable income and total consumption expenditure of urban residents in Yantai

Taking total consumption expenditure V as the dependent variable and per capita disposable income Y of urban residents in Yantai as the independent variable, regression analysis was performed using the econometrics software Eviews. The results are shown in the figure below:

Table 2: Regression Analysis Results

Dependent Variable:V				
Method: Least Squares				
Date:04/29/24 Time: 14:36				
Sample: 2002 2022				
Included observations: 21				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1318.862	158.204	8.336	0.000
Y	0.626	0.006	108.042	0.000
R-squared	0.999	Mean dependent var		16834.88
Adjusted R-squared	0.999	S.D. dependent var		7395.509
S.E. of regression	273.626	Akaike info criterion		14.172
Sum squared resid	1123068	Schwarz criterion		14.270
Log likelihood	-118.458	Hannan-Quinn criter.		14.181
F-statistic	11673.03	Durbin-Watson stat		1.403
Prob(F-statistic)	0.000			

The corresponding expression is: V = 1318.862 + 0.626Y
R^2 =0.99 9 AdjustedR^2 =0.99 9 F=11673.03 DW=1.403

According to the results of the regression analysis in the above figure, the estimated parameters ai=1318.862, bi=0.626, indicating that for every one yuan increase in the disposable income of urban residents in Yantai, on average, the consumption expenditure of urban residents in Yantai will increase by 0.626 yuan, which is consistent with the actual economic situation. The coefficient of per capita disposable income Y is 0.626, indicating that the per capita disposable income and consumption expenditure in Yantai City are positively correlated. After adjustment, the coefficient of determination R value still reached 0.999, so 99.9% of the changes in consumer expenditure can be explained by changes in per capita disposable income, and the model fit is very high. The coefficient of consumption expenditure has a t-value of 108.042 at the 5% significance level, which passes the t-test. At the 5% significance level, k=1, n= 22, and from the table, we get DL=1.13, Du=1.38, DW=1.403, Du<DW<4-Du, and the DW test shows no autocorrelation.

3.2.2.2 Relationship between per capita disposable income of urban residents in Yantai and eight items of consumption expenditure

The theme to be discussed in this paper is the impact of the income level of urban residents in Yantai on the consumption structure. Therefore, we cannot only select the single variable of per capita consumption expenditure of urban residents in Yantai to measure the consumption structure of residents. In order to further understand the relationship between the per capita disposable income of urban residents in Yantai and various consumption expenditures, this model uses the per capita disposable income of urban residents in Yantai as the independent variable, and housing, medical care, transportation, etc. as the dependent variable Vn. The 8 dependent variables are estimated with the per capita disposable income Y, and the results are shown in the following table.

Table 3: Estimated values and statistical test results of eight consumption expenditure items parameters

Consumer expenditure items	ai	bi	R^2	t	F
Food Expenditure V_1	1174.173	0.174	0.971	22.387	501.214
Clothing expenditure V_2	940.582	0.0568	0.648	5.257	27.637
Housing expenditure V_3	-1618.55	0.164	0.784	7.371	54.334
Daily necessities and services V_4	-304.968	0.0517	0.936	14.867	221.027
Healthcare V_5	405.720	0.033	0.756	6.824	46.568
Transport and Communications V_6	-225.682	0.093	0.981	27.526	757.689
Consumer expenditure items	ai	bi	R^2	t	F
Education, culture and entertainment services V_7	788.863	0.035	0.907	12.121	146.931
Other goods and services V_8	158.726	0.019	0.499	3.868	14.959

According to the above table, the coefficients before per capita disposable income Y are all positive, which shows that with the continuous increase in the income of urban residents in Yantai City, the various consumption expenditures of urban residents in Yantai City have increased, which is in line with the actual social and economic phenomenon. At the 5% significance level, an F test was conducted on the eight models, and the results showed that each model was significant and the coefficients of each model were also significant, which shows that the per capita disposable income of urban residents in Yantai City has a relatively significant impact on the consumption of eight categories of goods, and the overall explanatory effect of the model is good. At the 5% significance level, the t values of all bi values are greater than the critical value of 2.12, and the t test passes. From the determination coefficient R2 of the regression equation, except for clothing expenditure 0.648 and other goods and services expenditure 0.499, the determination coefficients of other equations are all greater than 0.7. The explanatory power of the model is good. The per capita disposable income of urban residents in Yantai City has a strong linear relationship with various types of consumption expenditure.

3.2.2.3 Analysis of Marginal Propensity to Consume

The marginal propensity to consume (bi) of expenditure indicates the consumption preference of urban residents in Yantai City for eight categories of goods, which reflects the expenditure allocation direction of the new purchasing power of urban residents in Yantai City. The marginal propensity to consume of urban residents in Yantai City is obtained by using the regression analysis results in Figure 6, as shown in Table 4.

Table 4: Marginal Consumption Tendency of Urban Residents in Yantai City

Consumer expenditure items	Food expenses	Clothing expenses	live expenditure	Daily necessities and services	Healthcare	Transport and Communications	Education, culture and entertainment services	Other goods and services
bi	0.174	0.057	0.164	0.052	0.032	0.093	0.035	0.019

As shown in Table 4, the above 8 marginal propensities to consume bi are accumulated to get ∑bi = 0.626, which indicates that more than 60% of the income of urban residents in Yantai will be used for consumption expenditure. In addition, it can be seen from bi that in the newly added disposable income of urban residents in Yantai, food expenditure accounts for 0.174, and housing expenditure accounts for 0.164, which shows that the consumption expenditure of urban residents in Yantai presents a consumption pattern dominated by food and housing. Secondly, clothing expenditure is 0.057, household equipment expenditure is 0.052, medical care expenditure is 0.033, transportation and communication expenditure is 0.093, education, culture and entertainment service expenditure is 0.035, and other goods and services expenditure is 0.019, which shows that the consumption structure of urban residents in Yantai has improved, and modern consumption hotspots such as transportation and household equipment have initially appeared, and the quality of life of urban residents in Yantai has been continuously improved.

The above data show that with the increase in disposable income, the change in consumption characteristics of the times is reflected in the change in the consumption structure of urban residents in Yantai. The consumption structure of urban residents in Yantai has initially reached a medium-to-high level. In the future, development and enjoyment-oriented consumption will be further improved in the consumption structure of urban residents in Yantai.

4. Conclusion and Recommendations

4.1 Research Conclusions

The above analysis shows that wage income is the main driving force for the growth of urban residents' income in Yantai, while property income and operating income are insufficient. The consumption structure of urban residents in Yantai continues to improve, and the consumption pattern is in a period of transformation from material consumption dominated by food and housing to spiritual consumption and development consumption, and has initially reached a medium-to-high level. About 62% of the newly added disposable income of urban residents in Yantai will be used for consumption. In addition to basic food and housing consumption, new consumption hotspots have emerged, such as transportation and communications, household equipment and services.

4.2 Countermeasures and Suggestions

4.2.1 Increase urban residents' income and consolidate and expand the consumption base

First, we must ensure and increase the employment rate, develop tourism, foreign trade exports, and processing and manufacturing in light of Yantai's specific conditions. Secondly, we must optimize the income distribution system, raise the threshold for personal income tax, and appropriately lower the personal income tax rate. We must vigorously support entrepreneurship and innovation, optimize the market trading environment, and increase residents' operating income. We must rectify and develop the financial market, provide residents with financial products, and help them establish financial management concepts to obtain property income.

4.2.2 Improve relevant security systems and optimize the consumption environment

The perfect social security system has solved the worries of residents in consumption, and residents can consume with confidence. We should speed up the construction and improvement of various social security systems, further improve the minimum living standard, and improve the laws and regulations related to the trading market and consumer market to ensure that residents can consume with peace of mind.

4.2.3 Appropriately develop credit consumption and promote consumption transformation

Credit consumption can promote pre-consumption and activate the consumer market. The consumption structure of urban residents in Yantai is in a period of transformation and upgrading, and new consumption hotspots such as culture, education, entertainment, transportation and communications have emerged. Therefore, it is necessary to establish and improve the consumer credit system, expand the scale and variety of consumer credit, and promote the transformation and upgrading of consumption of urban residents in Yantai.

4.2.4 Develop service-oriented and enjoyment-oriented consumption and explore new consumption areas

Production determines consumption. We should vigorously develop the tertiary industry, develop service-oriented enterprises, and improve service standards. Yantai urban residents have great potential in transportation and communication consumption, cultural and educational entertainment consumption, and medical and health care consumption, so we should develop supporting services. We should properly guide residents' consumption concepts and cultivate consumption hotspots, such as tourism consumption and cultural consumption. Let residents obtain both material and spiritual satisfaction.

Acknowledgements

Funded Projects: Qinghai Minzu University Graduate Innovation Project "Research on the Domestic Spatial Distribution and Influencing Factors of Qinghai Hualong Ramen Stores Based on POI under the Background of High-quality Development" (No.: 65M2023071).

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