Analysis of Influencing Factors on Per Capita Consumption Level of Urban Residents in Anhui Province

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Abstract

In recent years, the economic growth rate of Anhui Province is more prominent in comparison with other provinces, and residents' consumption plays a very important role in the economic development of Anhui Province. This paper establishes an econometric model through Eviews software based on the values of relevant indicators of per capita consumption expenditures of urban residents in Anhui Province from 2002 to 2021, and then examines and corrects the model through statistical test, partial correlation coefficient test, DW test, White test, etc., analyses the influencing factors of consumption level, and arrives at the optimal economic model, and tries to put forward reasonable policy suggestions to improve the per capita consumption level of Chinese residents. per capita consumption level, and try to put forward reasonable policy suggestions.

Keywords

Urban Consumption Level; Regression Model; Autocorrelation; Heteroscedasticity.

1. Introduction

Consumption, as one of the troika driving economic growth, is the ultimate driving force for sustained economic development, and the level and structure of people's consumption is a direct reflection of the standard of living. In recent years, the pioneering development of the eastern region and the gradual introduction of the western development process have achieved good results. Anhui Province, as an extension of the Yangtze River Delta region, fully grasp the development opportunities, economic development shows a good trend, the residents' income and consumption level increased year by year, but from the overall development situation, the contribution of consumption is still insufficient, in order to maintain sustained economic growth, increase the level of purchasing power, optimise the structure of residents' consumption, urban residents' consumption as one of the important components of the residents' consumption in Anhui Province, it is very important to analyse the factors affecting it. As one of the important components of Anhui Province residents' consumption, it is very important to analyse its influencing factors.

2. Variables and Data

Selection of explanatory and interpreted variables:

Y-Consumption expenditure per capita of urban residents in Anhui Province (unit: yuan);

X1-GDP per capita of urban residents (unit: yuan);

X2 - disposable income per urban resident (unit: yuan);

X3 - Consumer price index (unit: %);

X4 - Interest rate on savings deposits (unit: %).

Table 1. Relevant data for 2002-2021

certain year	Y	X1	X2	X3	X4
2002	4700	6238	6000	99.1	2.25
2003	5100	7001	6800	101.8	1.98
2004	5700	8279	7500	104.3	1.98
2005	6400	9193	8500	101.0	2.25
2006	7300	10630	9800	101.4	2.25
2007	8500	12989	11500	105.3	2.52
2008	9500	15535	13000	106.0	4.14
2009	10200	17715	14100	98.9	2.25
2010	11500	21923	15800	103.0	2.25
2011	13200	27303	18600	105.4	2.75
2012	15000	30697	21000	102.2	3.5
2013	14600	34404	22800	102.4	3.0
2014	16100	37580	24800	101.7	3.0
2015	17200	39692	26900	101.3	3.1
2016	19600	43686	29200	101.8	2.75
2017	20700	49092	31600	101.3	2.75
2018	21500	56063	34400	102.0	2.5
2019	23800	60561	37500	102.7	3.0
2020	22700	62411	39400	102.5	2.58
2021	26500	70321	43000	102.6	2.43

3. Model Building and Testing
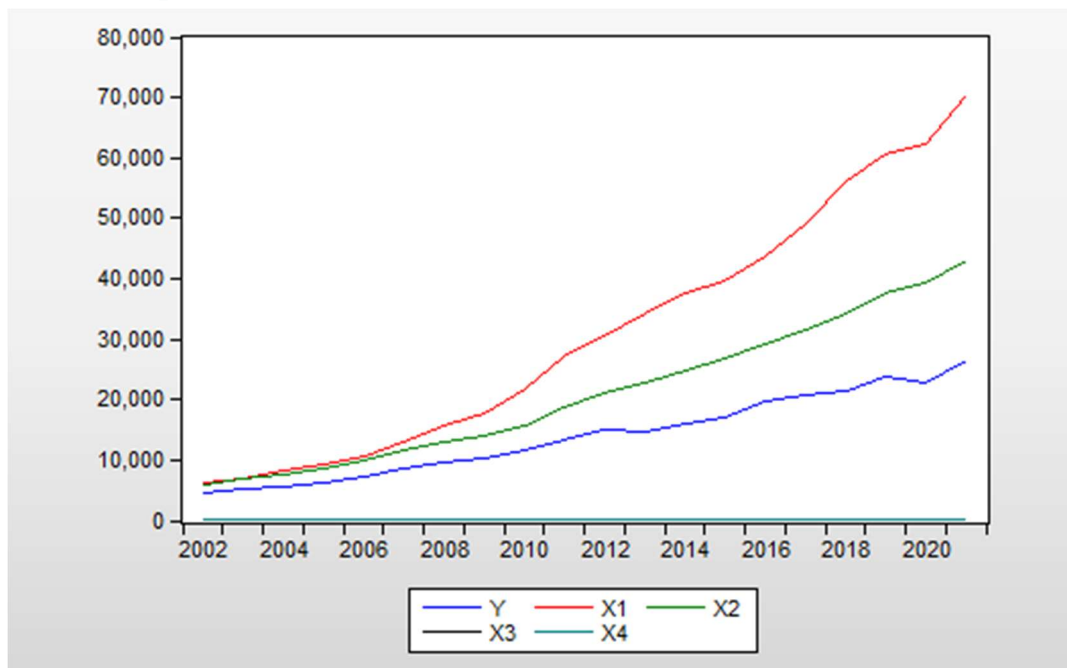
3.1. Trend Graph Analysis

Figure 1. Consumption Level Chart

From the above figure, we can see that each explanatory variable has the same direction of change with the explanatory variable, and the gap is bigger the further it goes.

3.2. Regression Model Analysis

Dependent Variable: Y
Method: Least Squares
Date: 12/24/22   Time: 15:36
Sample: 2002 2021
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	891.9421	9264.355	0.096277	0.9246
X1	-0.045058	0.169033	-0.266563	0.7934
X2	0.651030	0.298139	2.183649	0.0453
X3	-3.948906	92.52688	-0.042678	0.9665
X4	435.3461	367.0278	1.186139	0.2540

R-squared	0.992122	Mean dependent var	13990.00
Adjusted R-squared	0.990022	S.D. dependent var	6827.028
S.E. of regression	681.9600	Akaike info criterion	16.10014
Sum squared resid	6976042.	Schwarz criterion	16.34907
Log likelihood	-156.0014	Hannan-Quinn criter.	16.14873
F-statistic	472.2853	Durbin-Watson stat	1.824237
Prob(F-statistic)	0.000000		

Figure 2. Regression model coefficients

Model of per capita consumption level of urban residents in Anhui Province:

$$Y= 891.9421 - 0.0451x_1 + 0.6510x_2 - 3.9489x_3 + 435.3461x_4$$
$$S= (9264.355) (0.1690) (0.2981) (92.5269) (367.0278)$$
$$T= (0.0963) (-0.2666) (2.1836) (-0.0427) (1.1861)$$

3.2.1. Statistical Test

Goodness of fit: =0.9921 is close to 1, indicating that the model has a high goodness of fit.

F test: F = 472.2853 is larger than the critical value of 3.06 and the accompanying probability of P = 0 is also significantly smaller than 0.05, indicating that the total impact of disposable income per capita of urban residents, consumer price index of urban residents and interest rate of savings deposits on the per capita consumer expenditure of urban residents Y is significant, and the model has a significant linear relationship.

T-test: the absolute value of t-statistics of urban residents' per capita disposable income X2 is greater than 2 indicating that urban residents' per capita disposable income X2 has a significant impact on urban residents' per capita consumption expenditure Y, while the absolute value of t-statistics of other explanatory variables is less than 2, indicating that these explanatory variables have no significant impact on the explained variables.

3.2.2. Multicollinearity Test and Correction

Multi-collinearity test: the correlation coefficient test is carried out in Eviews software, and the correlation coefficient matrix is obtained as follows:

Table 2. correlation coefficient

Correlation					
	Y	X1	X2	X3	X4
Y	1.000000	0.993169	0.995419	0.009331	0.303139
X1	0.993169	1.000000	0.998763	-0.008025	0.249997
X2	0.995419	0.998763	1.000000	-0.002934	0.270703
X3	0.009331	-0.008025	-0.002934	1.000000	0.372895
X4	0.303139	0.249997	0.270703	0.372895	1.000000

From the above figure, it can be seen that there is a high linear correlation between the explanatory variables and the explained variables and the explanatory variables, and many of these values are greater than 0.8, indicating that there may be a certain degree of multicollinearity in the model.

3.2.3. Auxiliary Regression Model Test and Variance Inflation Factor Test

Table 3. Auxiliary model statistics results

model	R^2	F-statistic	Prob F	VIF
X1=f(X2,x3,x4)	0.997987	2643.947	0.000000	496.7400
X2=f(X1,x3,x4)	0.998012	2677.007	0.000000	502.9388
X3=f(X1,x2,x4)	0.15502	0.982053	0.425912	1.184135
X4=f(X1,x2,x3)	0.352327	2.901276	0.067154	1.543989

The F-statistics of the above auxiliary regression models, the existence of concomitant probabilities are close to zero, indicating the existence of multicollinearity in the model, this conclusion can also be obtained through the X1=f(X2,x3,x4), X2=f(X1,x3,x4) in the Variance Inflation Factor (VIF) are greater than 10.

3.2.4. Autocorrelation Test and Correction

DW test: given the significance level of 0.05, sample size n = 20, k = 2, check the DW table, get the lower limit value dL = 1.10, the upper limit value dU = 1.537, and the model dU = 1.537 < DW = 1.784619 < 4-dU, so the preliminary judgement that there may not be a first-order autocorrelation in the model.

bias correlation coefficient test: the autocorrelation coefficient and bias correlation coefficient of each period are obtained in the EVIEWS software as follows:
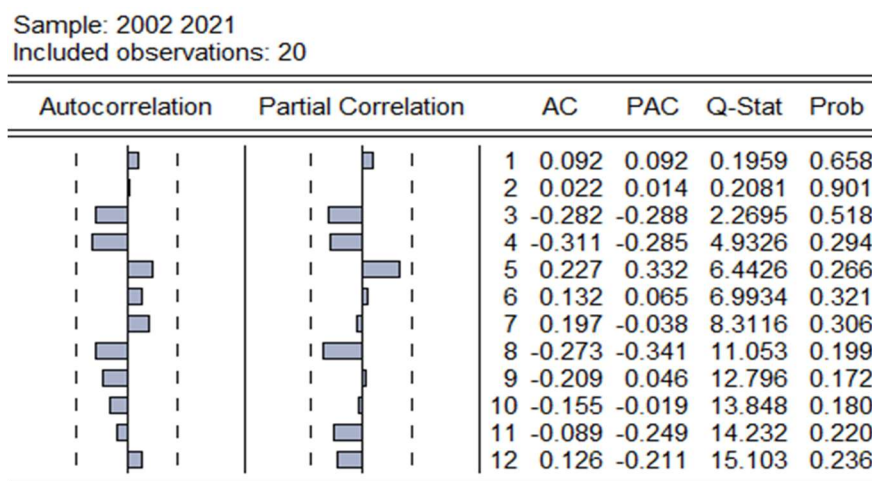

Figure 3. Partial correlation coefficient test

From the above figure, it can be seen that the PAC values of correlation coefficients in the regression model are all less than 0.5, so the model of the average consumption level of urban residents in Anhui Province does not exist in the first-order, second-order, third-order, fourth-order, fifth-order and other high-order autocorrelation.

3.2.5. Heteroskedasticity test and correction

White test: do the following in the eviews software:

Heteroskedasticity Test: White

F-statistic	0.522210	Prob. F(5,14)	0.7557
Obs*R-squared	3.143752	Prob. Chi-Square(5)	0.6778
Scaled explained SS	3.689758	Prob. Chi-Square(5)	0.5949

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/26/22   Time: 16:37
Sample: 2002 2021
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	475640.7	7169291.	0.066344	0.9480
X2^2	1.07E-05	0.002137	0.004997	0.9961
X2*X4	-17.45767	53.89084	-0.323945	0.7508
X2	68.16399	166.2169	0.410091	0.6879
X4^2	129867.1	763045.1	0.170196	0.8673
X4	-569568.1	5133123.	-0.110959	0.9132

R-squared	0.157188	Mean dependent var	350546.4
Adjusted R-squared	-0.143817	S.D. dependent var	648268.1
S.E. of regression	693318.7	Akaike info criterion	29.97969
Sum squared resid	6.73E+12	Schwarz criterion	30.27841
Log likelihood	-293.7969	Hannan-Quinn criter.	30.03801
F-statistic	0.522210	Durbin-Watson stat	2.641770
Prob(F-statistic)	0.755685		

Figure 4. White test

From the White test, it is known that nR = 3.143752, while the value of X^2 with degree of freedom 2 and significance level 0.05 is 5.9915, and the value of nR is significantly smaller than the value of 5.9915. Its P-value is equal to 0.6778 and is greater than the given significance level = 0.05, so the original hypothesis is accepted and there is no heteroskedasticity in the regression model.

ARCH test: the results are shown below:

Heteroskedasticity Test: ARCH

F-statistic	10.67492	Prob. F(8,3)	0.0386
Obs*R-squared	11.59276	Prob. Chi-Square(8)	0.1703

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/26/22   Time: 17:15
Sample (adjusted): 2010 2021
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	708041.0	294544.7	2.403849	0.0955
RESID^2(-1)	-0.479478	0.225879	-2.122719	0.1239
RESID^2(-2)	-1.080426	0.410412	-2.632538	0.0782
RESID^2(-3)	-0.711063	0.385787	-1.843150	0.1625
RESID^2(-4)	1.653994	0.408091	4.053001	0.0271
RESID^2(-5)	-0.357797	0.643545	-0.555978	0.6170
RESID^2(-6)	-1.742005	0.628668	-2.770945	0.0695
RESID^2(-7)	0.164059	0.639268	0.256636	0.8141
RESID^2(-8)	2.332279	0.638554	3.652437	0.0354

R-squared	0.966063	Mean dependent var	508851.9
Adjusted R-squared	0.875565	S.D. dependent var	806148.9
S.E. of regression	284372.2	Akaike info criterion	28.06766
Sum squared resid	2.43E+11	Schwarz criterion	28.43134
Log likelihood	-159.4060	Hannan-Quinn criter.	27.93301
F-statistic	10.67492	Durbin-Watson stat	1.879371
Prob(F-statistic)	0.038582		

Figure 5. ARCH test

The result of the above figure shows the result when the lag period is 8 periods, the $(n-p)R$ of the lag period 8 is the largest in 8 periods, $(n-p)R = 11.59276$ is significantly smaller than the X^2 value of 15.507 which has the degree of freedom of 8 and the significance level of 0.05, so the result shows that the regression model does not have heteroskedasticity.

Through the above tests, the final model estimation of this paper is determined as:

$$Y= 673.8273 + 0.571746X2 + 468.3894X4$$
$$S= (757.0115)\ (0.013004)\ (2889395)$$
$$T= (0.890115)\ (43.96552)\ (1.621064)$$

The economic significance of the equation is interpreted as when the disposable income per capita in Anhui Province increases by 1 unit, the consumption expenditure per capita y will increase by 0.57 per cent on average, and when the GDP per capita increases by 1 unit, the consumption expenditure per capita y will increase by 468.3894 yuan on average. These knowledge theoretical explanations, show that there may be a discrepancy with the explanation.

4. Conclusion

Through the establishment of econometric models, the study concludes that with the development of social and economic development, the consumption level of urban residents in general is increasing. Of course its consumption expenditure is also affected by many factors, the disposable income of residents is the most important factor affecting the consumption of urban residents, the increase of disposable income will increase the consumption expenditure and level of residents, on the contrary, the decrease of disposable income will also reduce the level of consumption expenditure; interest rate on consumption expenditure regulation is small; consumer price index and consumption expenditure is positively correlated, rural residents in Anhui Province consumption is rigid, more than is the basic needs of life; Anhui Province per capita GDP has a certain impact on residents' consumption.

In view of the final conclusion of this paper, the following policy recommendations are proposed to stimulate consumption and promote economic growth.

Firstly, in order to increase the consumption level of the residents, the main thing is to increase the income of the residents and establish a sound social security system. According to the economic theory and the model of consumer spending, in order to increase consumer spending to stimulate consumption, the most important thing is to increase the level of income of the residents, so as to increase people's confidence in the current and future consumption. In particular, it is necessary to continuously raise the income level of the low-income class and reduce the income gap. Only then will the level of consumption rise significantly. Establish a sound social security system to enhance anticipatory consumption. Anticipatory consumption depends on the raising of expectations, and the raising of expectations depends on people's confidence. Therefore, it is necessary to cultivate a sense of security in the families of urban residents through the establishment and improvement of the social security system, and to protect the lives and properties of the residents. Building a good, safe and secure environment can in turn enhance residents' confidence in consumption, increase the propensity to consume, and stimulate consumption.

Secondly, expand social investment and cultivate new points of economic growth. In the slow economic development, moderate expansion of investment, not only can directly increase the demand for investment goods, but also part of the fixed asset investment will be converted into consumption funds, indirectly expanding the demand for consumer goods. Therefore, expanding social investment is also an effective measure to stimulate consumption and pull

consumption. The current new economic growth points in Anhui Province mainly refer to the real estate industry, education industry, information and communication industry, tourism and high-tech industry, community service industry and other non-polluting, low-energy consumption, low material consumption, and suitable for the survival and development of Anhui Province. Attention should be paid to the cultivation of these economic growth projects, and these growth projects should be used to drive the consumption of the residents and improve the consumption level.

Thirdly, reasonable adjustment of market interest rates to ensure social justice. The adjustment of market interest rates must be combined with psychological expectations. The Chinese nation has always advocated thrift, so the value of the time preference rate is relatively high, resulting in the past interest rate cuts to stimulate consumption does not play a large role, only in the interest rate cuts at the same time, supplemented by other measures to adjust the psychological expectations of the residents, will increase the immediate consumption. Specifically, it is necessary to further deepen the reform of the distribution system, use tax leverage to establish and improve a multi-level tax system, protect low-income urban residents and limit excessive income. In addition, the further widening of the income gap can be curbed by increasing the government's ability to make transfers, expanding the surface of the minimum subsistence guarantee, and raising the minimum subsistence guarantee standard.

Fourthly, improve the credit environment and raise residents' awareness of consumption. On the one hand, we can speed up the construction of the legal system of consumer credit and regulate the legal environment of consumer credit, and at the same time, we can deregulate consumer credit and increase the supply of consumer credit; on the other hand, we can speed up the construction of the personal credit system and set up a national unified social credit system. It is necessary to encourage urban residents to accept credit credit, mortgage credit, guaranteed credit and other forms of credit consumption. Attention should also be paid to adjusting China's industrial and product structure to accommodate the upgrading of residents' consumption structure.

Fifthly, further improve the income distribution system, and improve and perfect the urban social security system. Friedman persistent income theory that income comes from persistent income and temporary income two big parts, consumption and temporary or due to climate, unexpected income or loss of impermanent influence disappears the relationship between the level of persistent income is constant, which means that only continue to improve the income distribution and distribution structure, in order to promote the residents' income in the case of continuous economic growth and steadily increase. Aging social pressure makes urban residents traditional old-age, disease prevention worries increased, in the expected income uncertainty and the dual role of inflation, to a certain extent, constraints on urban residents to improve consumption. For this reason, it is necessary to improve the social pension system; at the same time, speed up the medical reform and expand the coverage of medical insurance, further reduce the proportion of family payment expenses, and improve the ability of urban residents to spend on other aspects of consumption.

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