Advances in Applied Economics and Finance (AAEF)
Vol. 2, No. 4, 2012, ISSN 2167-6348

www.worldsciencepublisher.org

Analysis of influencing factors about consumption level of rural residents of Henan Province in China

[1]Ben Li, [2]Xintao Li, [3]Huimin Su

[1] University of Shanghai for Science &Technology, Shanghai, China
[2] University of Shanghai for Science &Technology, Shanghai, China
[3] University of Shanghai for Science &Technology, Shanghai, China

Email: hardyli2011@gmail.com

Abstract –This paper depend on the data of affect the level of consumption of rural residents in Henan Province, setting up the economic model of the consumption level of rural residents in Henan Province. Through the measurement analysis, research the degree of influence of the main variables for the model. And based on this, it put forward to policy Suggestions about enhancing the level of residents' consumption, in order to provide the reference for the economic development of Henan province in China.

Keywords –Consumption of rural residents; Influencing factors; Model analysis; Policy suggestions

1. Introduction

The reform and opening-up, with the establishment and development of the socialist market economic system, the life of rural residents in China has gradually into the well-off stage, the per capita living standards have greatly improved, its main performance in per capita disposable income growth. Henan Province as one of the provinces most of our rural population, the consumption of the rural population has become the important aspects that affect the economic growth of Henan Province. In Henan Province in 2009, per capita living of farmers expenses 3388.47 Yuan, an increase of 344.27 Yuan over the previous year, up 11.3%. The food consumption total living expenditure accounted for 36.0%, a decrease of 2.3 percentage points over the previous year.

Consumption structure of Henan farmers' was further optimized, changing in consumption patterns from quantitative changes to qualitative improvement. In addition to the basic consumption, farmers invest more money into consumption of enjoyment and services such as transportation, communication, education, and services, health care services. Therefore, the research about influencing factors of consumption level of rural residents in Henan Province will have a guiding role for rapidly development of Henan's economic.

Factors affecting the consumption level of rural residents can be attributed to three categories: The first category is the income level of farmers; The second category is the development of the macro-economic and agriculture, the price level of consumer goods and consumer environment; The third category is the consumer ethics and spending habits of thrift and economy of rural residents. Income is the factor that is the most directed and decisive. This paper puts emphasis on analyzing the consumption of resident of our country level influence factors, using the econometric model, with 1978 a 2009 years of data as sample. The per capita consumption level of the residents as the explanatory variables, based on experience introducing pure income of rural residents in Henan Province the—— x1, rural fixed investment ——x2, the consumer price index —— x3, then multiple linear regression analysis.

2. Theory and modeling

In 1936 Keynes published Theory of Employment, Interest and Money, proposed absolute income hypothesis that the consumer's actual consumption expenditure depends on the current period disposable income. The stable function relation exists between consumer spending and income, with the increase of income, people's consumption will increase. But consumption does not increase by the same proportion of income, an increase in consumption is lower than the increase of income that is the actual consumption——C depends on the actual income ——Y. Consumption function is. Where is the spontaneous consumption, is the marginal propensity to consume. Take into account the presence of other influencing factors u, in order to fully reflect the factors that affect the consumer, following the model set to introduce two additional factors that the retail price index and price index of agricultural production.

y——per capita consumption of rural residents actual expenditures ($);

——Real per capita net income of rural residents (¥);

——Social fixed investment (million);
——Rural Consumer Price Index;
——Residual term.

3. The analysis of model

3.1 Data collection and sorting

The original data are from 2010 Statistical Yearbook of Henan province. In this paper, the net income of rural residents in Henan Province, rural fixed investment of the whole society, the rural consumer price index for the explanatory variables, consumer spending of rural residents as interpreted variables. (See table1)

Table 1 influencing factors of rural residents' consumption

Year	Per capita consumption of rural residents actual expenditures ($)	Real per capita net income of rural residents (yuan)	Rural Consumer Price Index	Social fixed investment (million)
1990	413	526.95	100.0	82.87
1991	429	539.29	100.0	97.70
1992	469	588.48	105.2	104.50
1993	590	695.85	124.0	112.52
1994	776	909.81	171.3	152.67
1995	1065	1231.97	211.9	204.80
1996	1313	1579.19	243.5	271.71
1997	1404	1733.89	256.0	335.59
1998	1373	1864.05	246.3	409.12
1999	1339	1948.36	236.9	435.97
2000	1551	1985.82	234.4	479.95
2001	1647	2097.86	236.6	505.24
2002	1734	2215.74	238.5	552.78
2003	1819	2235.68	242.9	612.27
2004	2156	2553.15	260.2	664.50
2005	2372	2870.58	267.3	850.40
2006	2556	3261.03	272.5	1063.98
2007	2833	3851.60	291.8	1400.95
2008	3208	4454.24	321.0	1769.46
2009	3528	4806.95	322.6	2249.64

3.2 Parameter estimation of model

Though Eviews software and the method of least squares, regression analysis for these data. (See table2)

According to the result of regression analysis, the value of the F-statistic is 1025.706, which assumes that take a significant level of 0.05 , then it can be obtained at this time is F = 3.24, due to the critical values. Therefore significant linear relationship exists between the consumption level of rural residents in Henan Province and the explanatory variables. =0.994827, the Goodness of Fit is better. However, the explanatory variable of Social fixed investment T-test is not significant. And D.W< ,(when significant level is 0.05, =1.54), therefore it need to test and correct for the model.

Table 2 the result of regression analysis

Dependent Variable: LOG(Y)
Method: Least Squares
Date: 11/18/11 Time: 00:06
Sample: 1990 2009
Included observations: 20

variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.894369	0.433059	-2.065236	0.0555
LOG(X1)	1.122213	0.124085	9.043926	0.0000
LOG(X2)	-0.117711	0.085892	-1.370460	0.1895
X3	0.004200	0.002413	1.740861	0.1009
R-squared	0.994827	Mean dependent var		7.214718
Adjusted R-squared	0.993857	S.D. dependent var		0.659372
S.E. of regression	0.051678	Akaike info criterion		-2.910698
Sum squared resid	0.042730	Schwarz criterion		-2.711552
Log likelihood	33.10698	Hannan-Quinn criter.		-2.871822
F-statistic	1025.7	Durbin-Watson stat		0.94

	06		8884
Prob(F-statistic)		0.000000	

3.3 Multi-collinearity inspection and correction

Testing multi-collinearity between the various variables, the correlation coefficient of each variable is calculated using Eviews. (see table 3)

Table3. The variable coefficient correlation table

	X1	X2	X3
X1	1.000000	0.967616	0.181226
X2	0.967616	1.000000	0.182778
X3	0.181226	0.182778	1.000000

Drawn from the data in the table, the correlation coefficients between the explanatory variables x1 and x2, confirmed severe multi-collinearity between variables x1 and x2. Multi-collinearity exists between variables using stepwise regression method to correct the multi-collinearity.

First of all, a simple regression analysis about the X1, X2 and X3, then it attains results of parameter estimation, each regression equation including the estimated value of the coefficient of the explanatory variables, T statistics, probability P of the T statistic and the goodness of fit . (See table 4)

Table 4. The results of a simple regression analysis

	logX1	X2	X3
The estimated value	0.96035	0.65827	0.027335
T statistics	49.83171	21.6704	0.920927
Probability P	0.00000	0.0000	0.3693
R^2	0.992803	0.963085	0.044997

Arranged in accordance with the size of the goodness of fit, the result is X1>X2>X3. So we use the initial model of the X1 that lnY = 0.05871 +0.96035 lnX1 as the regression model, Then added to each variable to stepwise regression. (See table 5)

Table 5. The results of stepwise regression

	C	LnX1	lnX2	X3	R^2	D.W.
Y=f(X1)	0.058705	0.960354			0.992803	0.786457
T	0.407173	49.83171				
Y=f(X1,X2)	-0.633089	1.174460	-0.15057		0.993847	0.876589
T	-1.472999	9.219517	-1.69841			
Y=f(X1,X3)	-0.424881	0.953880		0.004927	0.994220	0.866502
T	-1.563939	52.83789		2.041173		

As can be seen in the table5, when added variable x2, the value of model goodness of fit is higher, but the coefficient of x2 is not through the T test under the 5% level of Confidence interval. Removing x2 variables, reintroducing x3 variables, the value of model goodness of fit is higher again, parameter symbol is reasonable and variable also passed the test. So consumption function is Y = f (x1, x3), the result for: lnY=-0.424881+0.953880lnX1+0.004927X3.

3.4 Heteroscedastic inspection and correction

In the paper using white heteroscedasticity test , the estimated results of the regression equation is in the table 6:

Table 6. the results of heteroscedasticity test

F-statistic	1.726389	Prob. F(3,16)	0.2018
Obs*R-squared	4.890814	Prob. Chi-Square(3)	0.1800
Scaled explained SS	3.890582	Prob. Chi-Square(3)	0.2735
Test Equation:			
Dependent Variable: RESID^2			
Method: Least Squares			
Date: 11/18/11 Time: 00:17			
Sample: 1990 2009			
Included observations: 20			

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.004333	0.012545	-0.345388	0.7343
(LOG(X1))^2	0.000706	0.000440	1.602718	0.1286
(LOG(X2))^2	-0.000528	0.000372	-1.417427	0.1755
X3^2	-1.16E-06	6.86E-07	-1.690666	0.1103

R-squared	0.244541	Mean dependent var	0.002137
Adjusted R-squared	0.102892	S.D. dependent var	0.003456
S.E. of regression	0.003273	Akaike info criterion	-8.429068
Sum squared resid	0.000171	Schwarz criterion	-8.229922
Log likelihood	88.29068	Hannan-Quinn criter.	-8.390193
F-statistic	1.726389	Durbin-Watson stat	1.951747
Prob(F-statistic)	0.201809		

As can be seen from the table, Obs*R-squared=4.890814, P=0.18, higher than the test level a = 0.05. So do not reject the null hypothesis, and heteroscedasticity of residual series do not exist.

3.5 The autocorrelation inspection and correction

Seen by the regression model, D.W. values 0.866502. Confidence level a = 0.05 level, DL = 1.20, the DW value is less than the DL value. So the model may exist First-order autocorrelation. Then using the Q statistic and the LM statistic test, specific data as follows: (See table 7)

Table 7. Sequence autocorrelation LM test

F-statistic	4.922279	Prob. F(2,15)	0.0227
Obs*R-squared	7.924921	Prob. Chi-Square(2)	0.0190

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 11/18/11 Time: 14:45

Sample: 1990 2009

Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002032	0.225470	-0.009012	0.9929
LOG(X1)	0.001721	0.015639	0.110058	0.9138
X3	-9.24E-05	0.002001	-0.046189	0.9638
RESID(-1)	0.755245	0.241300	3.129902	0.0069
RESID(-2)	-0.394815	0.268521	-1.470328	0.1621

R-squared	0.396246	Mean dependent var	3.70E-16
Adjusted R-squared	0.235245	S.D. dependent var	0.050130
S.E. of regression	0.043838	Akaike info criterion	-3.204295
Sum squared resid	0.028827	Schwarz criterion	-2.955362
Log likelihood	37.04295	Hannan-Quinn criter.	-3.155701
F-statistic	2.461140	Durbin-Watson stat	2.109549
Prob(F-statistic)	0.090249		

Seen from Table 7, OBS * R-squared = 7.924, P= 0.0190, P less than the test level a = 0.05. Therefore reject the null hypothesis that residual does not exist sequence of autocorrelation. To further identify the order of the AR model, using correlation diagram analysis and the Q statistic analysis, the results shown in Table8 as follows:

Table8. Correlation analysis and the Q statistic analysis

Date: 11/18/11 Time: 14:57

Sample: 1990 2009

Included observations: 20

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
.|**** |	. |**** |	1	0.545	0.545	6.8772	0.009
| . |	***| . |	2	0.039	-0.367	6.9141	0.032
.**| . |	. *| . |	3	-0.269	-0.161	8.7860	0.032
*****| . |	****| . |	4	-0.616	-0.564	19.213	0.001

****| . |	. *| . |	5	-0.600	-0.095	29.759	0.000
.**| . |	. *| . |	6	-0.250	-0.070	31.729	0.000
| . |	. | . |	7	0.062	-0.057	31.859	0.000
|**. |	. | . |	8	0.337	-0.009	36.030	0.000
|*** |	. *| . |	9	0.426	-0.133	43.302	0.000
|**. |	. | . |	10	0.270	-0.054	46.517	0.000
| . |	.**| . |	11	-0.021	-0.239	46.538	0.000
. *| . |	. |* . |	12	-0.167	0.142	48.073	0.000

From the first order to order 12 of residuals autocorrelation function presents significant trend of exponential decay. Autocorrelation function (AC) from an order to 12 order except for 1 order and 2 order and 5 order value at the 95% confidence interval, that is a low-order AR process. Residuals of the partial correlation functions (PAC) value is not in the 95% confidence interval, so the establishing the AR (1) model to eliminate residual autocorrelation.

AR model for the Consumption Function:

$$\ln y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \mu$$

Table 9. AR model estimation

Dependent Variable: LOG(Y)				
Method: Least Squares				
Date: 11/18/11 Time: 15:38				
Sample (adjusted): 1991 2009				
Included observations: 19 after adjustments				
Convergence achieved after 10 iterations				
	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.009083	0.432614	-0.020995	0.9835
LOG(X1)	0.926610	0.050963	18.18199	0.0000
X3	0.003049	0.001813	1.681322	0.1134
AR(1)	0.619491	0.221736	2.793820	0.0136
R-squared	0.995623	Mean dependent var	7.277417	
Adjusted R-squared	0.994747	S.D. dependent var	0.613136	
S.E. of regression	0.044438	Akaike info criterion	-3.204788	
Sum squared resid	0.029621	Schwarz criterion	-3.005959	
Log likelihood	34.44548	Hannan-Quinn criter.	-3.171138	
F-statistic	1137.244	Durbin-Watson stat	1.501530	
Prob(F-statistic)	0.000000			
Inverted AR Roots	0 .62			

AR model using an iterative algorithm to estimate and the estimated results show that the number of iterations is 16 times. Except for constant term, AR model parameter t statistics are significant. Statistics F = 1137.244, probability p is very small, thus it indicates that the estimated AR model overall significant. T test of constant term is not significant, therefore it does not contain constant of AR model estimation. (See table 10)

Table10 AR model estimation without constant term

Dependent Variable: LOG(Y)				
Method: Least Squares				
Date: 11/18/11 Time: 15:51				
Sample (adjusted): 1991 2009				
Included observations: 19 after adjustments				
Convergence achieved after 9 iterations				
	Coefficient	Std. Error	t-Statistic	Prob.
LOG(X1)	0.925706	0.022708	40.76486	0.0000
X3	0.003030	0.001611	1.880987	0.0783
AR(1)	0.621468	0.192719	3.224740	0.0053
R-squared	0.995623	Mean dependent var	7.277417	
Adjusted R-squared	0.995075	S.D. dependent var	0.613136	

S.E. of regression	0.043027	Akaike info criterion	-3.310022
Sum squared resid	0.029622	Schwarz criterion	-3.160900
Log likelihood	34.44521	Hannan-Quinn criter.	-3.284785
Durbin-Watson stat	1.502006		
Inverted AR Roots	.62		

All parameter estimates AR model estimation without constant term is significant. The goodness of fit for R ^ 2 = 0.995623, it indicates that the effect of model fit is good. When DW= 1.502, confidence level a = 0.05, DU = 1.41, AR model is no residual first-order autocorrelation. The reciprocal of the AR model lag polynomial root is 0.62, less than 1, so AR model is stationary. After the above analysis and its amendments consumption level of rural residents in Henan Province influencing factors can be expressed as:

$$\ln y = 0.925706 \ln x_1 + 0.003030 x_3 + 0.621468 AR(1) + \mu$$

4. Conclusions and recommendations

4.1Conclusions

Based on the above analysis it shows that the model goodness of fit has reached 0.995623. If you continue to increase the explanatory variables, it is difficult to improve the accuracy of the goodness of fit. This proves that the consumption of rural residents in Henan Province Factors Influencing can be representative and strong explanatory. Adopted three factors are the net income of rural residents, the social rural fixed assets investment and rural residents' consumption price index in this paper, Social rural residential fixed investment and rural residents' consumption is not significantly related. It proves that investment in fixed assets of rural areas cannot really increase the consumption expenditure of rural residents and benefit the rural residents. Net income of rural residents and rural consumer price index showed a significant positive correlation with the consumption level of rural residents. The net income is the main factor affecting the consumer level.

4.2 recommendations

4.2.1 Develop modern agriculture and increase farmers' income

Attention should be paid to the development of modern agriculture to transform the rural and agricultural economic structure, strengthen the agricultural infrastructure, encourage and organize scientific and technical personnel to carry out the "three rural" activities, with advanced science and technology to develop aquaculture, horticulture and efficient agriculture. It can increase the net income of farmers, transform rural production structure, and develop modern agricultural technology, broad agricultural employment channels. At the same time to maintain the growth mode from quantity to efficiency, adjusting the industrial and product structures, to play a regional comparative advantage, optimizing the layout of agricultural production, focusing on the development of green agriculture. We should update our ideas, bold innovation; combine the development of ecological agriculture, tourism, agriculture, tourism agriculture, education, agriculture with protection of the ecological environment.

4.2.2 Formulate preferential agricultural policy and increase financial investment to rural

The government has increased its financial input and strengthen investment in rural infrastructure and the construction of water conservancy facilities, the rural residents not only affordable, but also conducive to the overall planning and construction of rural residents. The government should set up a special fund to take a proactive fiscal policy and monetary policy to speed up construction of rural infrastructure. Public services of equalization provided by Financial all residents of the whole of society is each resident to enjoy preferential. Finally, we need to increase the efforts of workers in skills training for rural residents to increase their employment opportunities and employability, and increase the proportion of wage income of rural residents.

4.2.3 Develop appropriate law, strengthen supervision and optimization of the purchase subsidy policy

Price factors may lead to the improvement of farmers' consumption level, but not it don't affect consumption of rural residents. Government should take the appropriate measures, develop appropriate laws and regulations, strengthen supervision, and abate the impact of the price factor by subsidies of benefiting farmers. According to the actual situation, the subsidies in accordance with the need to allocate so different income rural residents can enjoy the benefits.

5. Limitations and Prospects

This article take several factors, including the consumption expenditure of rural residents, the net income of rural residents, as well as investment in fixed assets is the name, and don't eliminate the price factors, may impact data analysis. It is not possible to measure the consumer price index so using the consumer price index to analyze. The corresponding deviation impact might be interested in these indicators. It may have impact of corresponding deviation on these indicators. This paper only analyzes several obvious factors of affecting the consumption level of rural residents, no analysis of factors such as financial investment, bank interest rates, family structure in rural areas. No analysis

of these factors may impact specific model of the overall significant.

References

[1] Xiao Jinglong, the analysis of affecting consumption factors of rural resident in Fujian, Employment and Security, 2011(5):41-42.

[2] Fu Zhicheng, the Analysis and Recommendations about affecting consumption factors of rural resident, Journal of Financial Development Research, 2009(6):85-86.

[3] Yin Zongcheng, Influencing factors of Chinese rural residents' consumption, Consumer Economics, 2009(2):27-30. [6]Xie sanming. China's economic growth potential and economic cycle research [M]. Beijing: China plans press, 2001.

[4] Wuqiao Sheng Cheng Jinhua. Changes in energy consumption in the process of industrialization in China - econometric model based on the empirical analysis [J]. China Industrial Economy, 2005, (4) :30 -37.

[5] Chien-Chiang Lee, Chun-Ping Chang. Energy Consumption and Economic Growth in Asian Economies: A More Comprehensive Analysis Using Panel Data [J]. Resource and Energy Economics, 2008, (30): 50－65.

[6] Hong Jiang, Hong Yu. Study on consumption tax end-result from the elasticity of demand measurement in China. Contemporary financial, 2004, 05.

[7] Zhengzhong Mao, Jialin Jiang. Study on Cigarette demanding and price policy. China's health economic.1997; 16(6):50~52.

[8] Hu Tw, Mao Z. Effects of cigarette tax on cigarette consumption and the Chinese economy. Tob Control.2002; 11:105–108.

[9] Zhengzhong Mao, Dewei Hu, Gonghuan Yang. Study on the reappraisal of China's cigarette demand. China's health economic.2005; 24(5): 45–47, 616-621.

[10] Bai Y, Zhang Z. Aggregate cigarette demand and regional differences in China. Applied Economics, 2005:2523–2528.

[11] Tian Xu, The Study on Taxable Mode in China’s Cigarette Consumption Tax, Advances in Asian Social Science (AASS), [J], Vol. 3, No. 1, 2012