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The Impact of the Income Gap in Rural China on Residents' Consumption Based on Theil Index

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Abstract This paper measures the Chinese regional income distribution gap based on the Theil index with data of 31 provinces in China from 1998 to 2011. The results showed that overall the income gap between China's rural areas was on the rise from 1998 to 2006, and the income gap was mainly caused by the gap between the East China, Central China and West China. After 2006, it showed a slow decline. The dynamic panel data model established for consumer demand, spending habits, income, regional income disparities showed that income and regional income disparities significantly influence consumer demand of rural residents. Before 2006 regional income gap inhibited the consumption of rural residents, but it promoted consumption after 2006.

Key words Theil index, Regional income gap, Rural residents, Consumer spending

1 Introduction

With the advancement of China's reform and opening up, China has experienced rapid economic growth, but at the same time, there is also the trend of increasingly expanded income gap. The rural residents are the consumer groups with the largest potential in China, and their consumer demand is an important part of China's final consumption expenditure. The imbalance in the China's economic development causes great differences in the rural residents' income between different regions, and also leads to different effects on farmers' consumption.

In recent years, most of the scholars have carried out empirical studies on the relationship between the income inequality and consumption growth, and the studies conclude that the widening income gap will reduce residents' propensity to consume (Wu Xiaoming *et al.*, 2007; Li Jun, 2003)^[1-2]. The test results of Wang Shaoguo and Wang Zhen (2009) show that the Chinese urban-rural income gap has deviated from moderate levels, and will inhibit the consumer demand^[3].

There are also some scholars having conducted many studies on the trends and causes of regional inequality in China, and the results show that the economic development is not balanced in the eastern, central and western regions of China, and the income gap between the three regions is expanding; the large gap within the eastern regions is the main reason for the expansion of regional income gap (Gao Lianshui, Zhou Yunbo *et al.*, 2010; Wan Guanghua, Zhang Ouxiang *et al.*, 2008; Wang Xiaolu, Fangang, 2004)^[4-6]. As to the reason for continuing expanded income gap,

some scholars have conducted studies from the perspectives of income, human capital, education, agricultural production, urban-rural structure and government transfer payment. Tang Ping (2006) mentions that the operating income inequality of farm families, and the regional income gap is the main reason for rural income gap; the expansion of farmers' wage income and property income gap is an important reason for the total income gap^[7].

The studies of Wen Jiaoxiu (2010) and Yao Hongxin (2009) suggest that the education has a significant impact on the expansion of rural income gap in China^[8-9]. Lu Ming (2004) uses the panel data on the central regions to carry out study, and concludes that the industrial restructuring affects the income gap between urban and rural residents, and accelerating the urbanization is conducive to narrowing the income gap between urban and rural residents. The study of Jia Junxue and Ning Jing (2011) shows that the size and structure of local government spending, have exacerbated the residents' income gap between China's provinces^[11].

In summary, the results of previous studies show that the regional income gap is incessantly expanded, and has an impact on the urban residents' consumer demand, but there is a shortage of studies of the impact on the rural residents' consumer spending, therefore, this paper uses the inter-provincial panel data to empirically test the impact of the regional income gap on rural residents' consumer demand, and put forth the appropriate policy recommendations based on the test results.

2 The trends of the regional income gap between China's rural residents and composition analysis

Economic system reform has made the Chinese economy experience the rapid growth, and the income distribution pattern of China's residents has also undergone dramatic changes. The imbalance in regional economic growth leads to the increasingly serious inequality in income distribution between regions.

In accordance with the economic characteristics, this paper

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divides China's 31 provinces into eastern, central and western parts, and calculates the Theil index to measure the rural income gap of the three regions. The Theil index results are shown in Fig. 1.

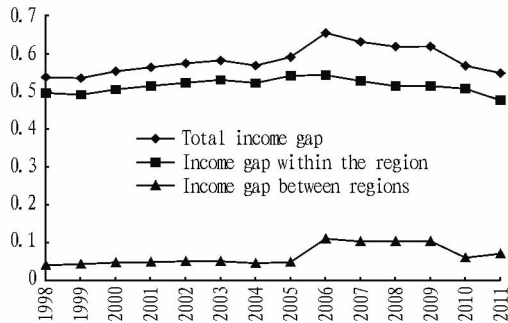


Fig. 1 The comparison of overall rural Theil index, Theil index between regions and Theil index within the region in the period 1998 – 2011

As can be seen from Fig. 1, the Theil index in rural China showed an overall increasing trend before 2006, indicating that the income gap in China's rural areas continued to expand; it decreased slowly after 2006, and there was a slight rebound in 2009, possibly due to the implementation of "home appliances to the countryside" consumer policy in 2009; there was a slight change in the income gap in the eastern, central and western regions, while the income gap between regions experienced 126.53% of the substantial growth in 2006, faster than the rate of change in income gap within the region; the income gap in the eastern, central and western regions contributed most to the rural income gap of China, but this contribution rate showed a downward trend, decreasing from 91.696% in 2005 to 83.016% in 2006, while the contribution rate of income gap between regions rose from 8.304% to 16.984%, indicating that the income gap between the three regions was gradually expanded.

From the above analysis, the income gap within the region is still the main cause of overall income gap. Rural residents' income distribution gap is the largest in the eastern regions of China, indicating that the economic development is rapid in the eastern regions, and the per capita income of rural residents continues to grow, followed by the western regions; rural residents' income gap is the smallest in the central regions.

Around 2006, there was a small level of growth and decline of the rural income gap in the eastern regions, but in general it showed a growing trend, rising from 0.6920 in 1998 to 0.7098 in 2011, with an average growth rate of 0.8190%; there was the sharpest change in the rural income gap in the central regions, and it showed a decrease of 20.17% in 2006, probably due to the implementation of "Rise of Central China" program; the rural income gap in the western regions of China declined from 0.4145 in 1998 to 0.3612 in 2011, showing an overall downward trend.

Within the three regions, there is also a large difference in the rural residents' income distribution gap between different prov-

inces. In the eastern regions, the rural residents' income gap is large in Beijing, Shanghai and Tianjin, while the rural residents' income gap is the smallest in Shandong Province; in the central regions, the rural residents' income gap is the largest in Jilin Province, while the rural residents' income gap is the smallest in Henan Province; in the western regions, the rural residents' income gap is large in Ningxia, Tibet and Qinghai, and it has been growing since 1998 in Tibet, and the rural residents' income gap is the smallest in Sichuan Province, which may be due to the large number of migrant workers in Sichuan Province.

3 Model analysis

The purpose of this paper is to examine the impact of income distribution gap in rural areas on the rural consumer demand, and the urban-rural dual structure and traditional concept in China have a great impact on rural residents' consumption, so the regional income gap and spending habits are introduced into the Western consumption function model. According to the analysis of the second part, the regional income gap in China underwent dramatic changes in 2006. In order to examine the specific impact of this change on farmers' consumption, we set the dummy variable D in the model, and get the following econometric model:

$$\ln C_{it} = \alpha_i + \beta_1 \ln C_{i,t-1} + \beta_2 \ln Y_{it} + \beta_3 Theil_{it} + \beta_4 D_{it} + \beta_5 (Theil_{it} \times D_{it}) + \mu_{it} \quad (1)$$

where $i = 1, 2, 3, \dots, 31$ represent 31 different provinces in China; t represents time; C_{it} represents the rural residents' real per capita consumption expenditure in life in China's different provinces; $C_{i,t-1}$ represents the spending habits of Chinese rural residents; Y_{it} represents the per capita real net income of rural residents in China's different provinces; $Theil_{it}$ represents the income distribution gap in rural areas; D_{it} represents time dummy variable, $D_{it} = 0, t < 2006$; $D_{it} = 1, t \geq 2006$. The above variables all use the rural consumer price index for reduction, and this paper uses the inter-provincial dynamic panel data in the period 1998 – 2011.

To avoid endogeneity problems, we select the generalized method of moments $Theil_{it}$ (GMM) for parameter estimation, and select the second-order lag of $\ln C_{it}$, the first-order lag of $\ln Y_{it}$, and $Theil_{it}$, D_{it} and $Theil_{it} \times D_{it}$ as instrumental variables.

Before the parameter estimation, we carry out the stationarity test of each variable. Using Eviews6.0 software, the IPS test and Fisher-ADF test results show that $\ln C_{it}$, $\ln C_{i,t-1}$ and $\ln Y_{it}$ are the integrated of order 1 at the 10% significance level, indicating that the first-order difference of the variables is stationary, $Theil_{it}$, D_{it} are the stationary series, in line with the requirements of the model establishment.

Introducing the dummy variable, the test results are as follows:

$$\begin{aligned} \ln C_{it} = & -0.4150 \ln C_{i,t-1} + 1.2504 \ln Y_{it} - 8.594 Theil_{it} + \\ & 1.3065 D_{it} - 9.6230 (Theil_{it} \times D_{it}) \\ & (-25.09728) \quad (73.6342) \quad (-7.4083) \quad (33.8482) \\ & (-3.9384) \end{aligned} \quad (2)$$

where Sargan test value is 0.2467, indicating that it can not reject the instrumental variables' constraint on the valid null hypothesis, and it is valid for the instrumental variables to excessively identify the constraint; the coefficient of D_{it} , $Theil_{it} \times D_{it}$ is significantly different from 0, indicating that there has been a structural change in the impact of regional income gap on consumption since 2006, in line with the analysis results of the second part.

Now we re-estimate the consumption model before and after 2006, and the results are as follows:

$$(i) \text{ Before 2006, } \ln C_{it} = -0.2959 \ln C_{it-1} + 1.256 \ln Y_{it} - 7.5155 Theil_{it} \quad (3)$$

$$(-14.9022)^{***} (56.3882)^{***} (-8.6611)^{***}$$

where Sargan test value is 0.1096, indicating that it can not reject the instrumental variables' constraint on the valid null hypothesis, and it is valid for the instrumental variables to excessively identify the constraint.

$$(ii) \text{ After 2006, } \ln C_{it} = 0.622 \ln C_{it-1} + 0.0594 \ln Y_{it} + 0.3739 Theil_{it} \quad (4)$$

$$(-14.9022)^{***} (56.3882)^{***} (-8.6611)^{***}$$

where Sargan test value is 0.7486, indicating that it can not reject the instrumental variables' constraint on the valid null hypothesis, and it is valid for the instrumental variables to excessively identify the constraint.

4 Empirical analysis

(i) The consumption habits had a significant negative impact on the consumer behavior of the Chinese rural residents before 2006, but had a significant positive impact on the consumer behavior of the Chinese rural residents after 2006, with the impact coefficients of 0.2959 and 0.6221, respectively.

This shows that the rural residents have not yet formed relatively stable consumption habits, and the consumer spending will not be greatly changed with the increase of income, probably because they are uncertain about the future income and environment.

(ii) Whether it is before or after 2006, the income factor had a significant positive impact on the rural residents' consumption. The degree of impact of income on the consumer spending was 1.2563 before 2006, while the degree of impact of income on the consumer spending was 0.0594 after 2006, indicating that before 2006, due to the low level of rural residents' income and imperfect consumer policy, the income was the main factor determining the rural residents' consumption.

Since 2006, the state has vigorously promoted various consumption policies, gradually improved the social security measures, and improved rural residents' living standards, so the impact of income is reduced.

(iii) From the test results, before 2006, the overall income gap expansion in rural China had a significant negative impact on the rural residents' consumer spending, and the impact coefficient reached 7.5155, that is, for each additional one percentage point of the income gap in rural China, the rural residents' real consumer spending would drop by 7.5155%, indicating that from 1998 to

2006, the overall gap in income distribution in rural areas due to the rapid economic development, played a role in inhibiting the rural residents' consumer spending.

Since 2006, the Theil index has started to have a significant positive impact on the rural residents' consumption, with the impact coefficient of 0.3739, indicating that the income gap in rural China plays a role in stimulating the consumption, and the current rural income gap between different regions is reasonable, so the government can continue to implement preferential agricultural policy to encourage more rural residents to increase income by more entrepreneurial forms, which will stimulate consumption and boost overall domestic demand.

5 Conclusions and policy recommendations

The income and the regional income gap are the important factors affecting rural residents' consumption. Since 2006, the overall income gap in rural China has had a significant positive impact on the rural residents' consumption. On the premise of ensuring the improvement of rural residents' income level, appropriate inter-regional income gap can be allowed.

But at the same time, the regional income gap shows an overall widening trend, mainly caused by the widening income gap within the eastern, central and western regions. Therefore, the government must pay attention to the problem of inequality of income distribution, accelerate the construction of the central and western rural areas, improve the social security system in rural areas, increase transfer payment to low-income groups in rural areas, and improve the per capita income of rural residents, to improve the purchasing power of rural residents, narrow the income gap in rural areas, expand rural residents' consumer demand, and promote the continuous economic growth.

References

- [1] ZHOU JH, JIANG LQ. An analysis on vegetable farmers' behaviors and the food safety system [J]. Journal of Zhejiang University (Humanities and Social Sciences), 2007, 37(2): 118-127. (in Chinese).
- [2] XU LL, SHAN LJ, WU LH. Empirical analysis of farmer's perception and behavior in implementing agricultural products traceability system: Take apple planting farmers as an example [J]. Finance and Trade Research, 2011, 22(5): 34-40. (in Chinese).
- [3] WANG HM, QIAO J. Analyze on farmers' behavior and produce efficiency by participating in food safety traceability system case of vegetable farmers in Beijing [J]. Problems of Agricultural Economy, 2011(2): 45-51. (in Chinese).
- [4] Diogo M. Souza Monteiro, Julie A. Caswellb. Traceability adoption at the farm level: An empirical analysis of the Portuguese pear industry [J]. Food Policy, 2009(34): 94-101.
- [5] Sebastien Pouliot, Daniel A. Sumner. Traceability, food safety and industry reputation [J]. Working Paper, 2009: 1-37.
- [6] YANG QH, WU XM. The will of establishing traceability system of agricultural production and processing enterprises and its influencing factors—Based on the investigation and analysis of Sichuan Province [J]. Journal of Agrotechnical Economics, 2009(2): 69-76. (in Chinese).
- [7] ZHOU JH, WANG Y, ZHANG SD. An analysis of suppliers' behaviors in the vegetable safety traceability system [J]. Journal of Zhejiang University (Humanities and Social Sciences), 2011, 41(2): 116-126. (in Chinese).
- [8] SHAN LJ, WU LH, XU LL. Investigations on factors impacting

- corporations' invest intension and the level of investment to implement food traceability system[J]. *Journal of South China Agricultural University: Social Science Edition*, 2011, 10(4): 85–92. (in Chinese).
- [9] Resende-filho, Moises, Buhr *et al.* A principal-agent model for evaluating the economic value of a beef traceability system[J]. *American Journal of Agricultural Economics*, 2008, 90(4): 1091–1102.
- [10] Alessandro Banterle, Stefanelia Stranieri. Information, labelling, and vertical coordination; An analysis of the Italian meat supply networks[J]. *Agribusiness*, 2008, 24(3): 320–331.
- [11] Banterle A, Stranieri S. The consequences of voluntary traceability system for supply chain relationships. An application of transaction cost economics [J]. *Food Policy*, 2008, 33(6): 560–569.
- [12] Galliano D, Orozco L. The determinants of electronic traceability adoption: a firm-level analysis of French agribusiness[J]. *Agribusiness*, 2011, 27(3): 379–397.
- [13] Heyder M, Theuvsen L, Hollmann-Hespos T. Investments in tracking and tracing systems in the food industry: A PLS analysis[J]. *Food Policy*, 2012, 37(1): 102–113.
- [14] XIE JF, LU CH, LI BM, *et al.* Implementation of pork traceability system based on .NET framework[J]. *Transactions of the Chinese Society of Agricultural Engineering*, 2006, 22(6): 218–220. (in Chinese).
- [15] ZHAO YW, LI X. Study on the information collection of pig industry chain based on RFID[J]. *Hubei Agricultural Sciences*, 2012, 51(9): 1886–1889, 1894. (in Chinese).
- [16] LI LS, TIAN YM, SU YH. Study on the design of live pork traceability system using RFID[J]. *Chinese Journal of Animal Science*, 2012(10): 15–18. (in Chinese).
- [17] HU D, XIE JF. Application of short message technology in the remote control and traceability system for pork [J]. *Journal of Agricultural Mechanization Research*, 2011, 33(8): 142–145. (in Chinese).
- [18] ZENG X, YANG ZP, PAN JR. Implement the traceability system for pork safety information based on Web[J]. *Journal of Agricultural Mechanization Research*, 2008(4): 105–107. (in Chinese).
- [19] Xiong BH, Fu RT, Lin ZH, *et al.* A solution on pork quality traceability from farm to dinner table in Tianjin City, China[J]. *Agricultural Sciences in China*, 2010, 9(1): 147–156
- [20] ZAN LS, SHEN GL, DUAN JB. Research on management of traceability of beef safety system through the Internet based on JSP [J]. *Chinese Agricultural Science Bulletin*, 2006, 22(12): 13–16. (in Chinese).
- [21] SHI L, FU ZT, ZHANG LX. On rfid-based traceable system for quality insurance of beef cattle breeding[J]. *Computer Applications and Software*, 2010(1): 40–43. (in Chinese).
- [22] LU GM, ZHANG XS, MU WS, *et al.* Implementation of traceability system for beefprocessing based on web multilayer structure [J]. *Computer Applications and Software*, 2010(1): 20–22. (in Chinese).
- [23] KANG RJ, ZHANG XS, FU ZT, *et al.* Method of traceability information acquisition and transmission for beef cattle sector based on PDA and FSM [J]. *Transactions of the Chinese Society of Agricultural Engineering*, 2010(1): 227–231. (in Chinese).
- [24] FANG C, ZHAO LD. Research on meat food traceability system based on iris-recognition [J]. *China Safety Science Journal*, 2008, 18(7): 11–17. (in Chinese).
- [25] KONG Q, ZHAO LD. Research on the application of iris recognition in meat-food supply chain management [J]. *China Safety Science Journal*, 2009, 19(3): 155–160. (in Chinese).
- [26] YE CL, ZHANG B, GU SH, *et al.* Design and implement of traceable label of vegetable produce applied in vegetable quality and safety traceability system [J]. *Food Science*, 2007, 28(7): 572–574. (in Chinese).
- [27] QU XH, ZHUANG DF, QIU DS. Construction and application of GIS based greenstuff traceability logistics system [J]. *Geo-information Science*, 2008, 10(5): 615–622. (in Chinese).
- [28] FU X, FU ZT, ZHANG LX. Vegetable traceability system based on web [J]. *Computer Engineering and Design*, 2009(1): 85–87. (in Chinese).
- [29] M. Bevilacqua, F. E. Ciarapica, G. Giacchetta. Information, labelling, and vertical coordination: An analysis of the Italian meat supply networks [J]. *Journal of Food Engineering*, 2009(93): 13–22.
- [30] ZHOU YH, WANG XQ, GENG XH. Analysis on purchasing behavior of consumers for the traceability label beef labeled with information[J]. *Chinese Rural Economy*, 2008(5): 22–32. (in Chinese).
- [31] WANG F, ZHANG XS, MU WS, *et al.* Analysis on consumers' cognition to traceability agricultural products and willingness-to-pay[J]. *Chinese Rural Economy*, 2009(3): 68–74. (in Chinese).
- [32] ZHAO R, QIAO J, CHEN YS. Empirical study on purchase behavior of consumer to traceable food: A survey from Haidian District in Beijing[J]. *Technology Economics*, 2009, 28(1): 53–56. (in Chinese).
- [33] XU LL, WU LH, SHAN LJ. Analysis of urban consumer purchasing intension for certified traceable food in Jiangsu Province[J]. *East China Economic Management*, 2012(1): 7–11. (in Chinese).
- [34] WU LH, XU LL, WANG XL. Main factors influencing consumers' willingness-to-pay and pay level of extra price of traceable food[J]. *Chinese Rural Economy*, 2010(4): 77–86. (in Chinese).
- [35] QI SM, DU L, JIANG NH, *et al.* Analysis on consumers' cognition to traceable pig and purchasing behavior [J]. *Journal of Anhui Agricultural Sciences*, 2011, 39(15): 9317–9320. (in Chinese).
- [36] SHANG XD, QIAO J, LI BL. Market prospect of traceability food—Based on empirical analysis on cognition and purchase intention of consumers[J]. *Resource Development & Market*, 2012(7): 589–592. (in Chinese).
- [37] SHANG XD, QIAO J, LI BL. A study on purchase intention and influencing factors of consumers to traceability food; Based on the empirical analysis from 730 consumers[J]. *Ecological Economy*, 2012(7): 28–32. (in Chinese).
- [38] HOU XG. Analysis of consumers' willingness to pay for traceable fresh fruits in Shanghai City and countermeasures[J]. *Journal of Anhui Agricultural Sciences*, 2012, 40(5): 3112–3114. (in Chinese).
- [39] CHEN YS, YANG XC, ZHOU HL. An empirical analysis of influencing factors of consumers' purchasing behavior of traceable aquatic products [J]. *Journal of Ocean University of China*, 2012(6): 49–54. (in Chinese).
- [40] YANG BB, WU XM. Research on the willingness of the consumer to purchase the traceability agricultural food [J]. *Rural Economy*, 2009(8): 57–59. (in Chinese).
- [41] HAN Y, QIAO J. Influence factors on consumers' attitude and willingness to buy traceable foods in China: A test and analysis on the survey from Beijing[J]. *Technology Economics*, 2009, 28(4): 37–43, 53. (in Chinese).
- [42] Gracia A, Zeballos G. Attitudes of retailers and consumers toward the EU traceability and labeling system for beef[J]. *Journal of Food Distribution Research*, 2005, 36(3): 45.
- [43] David L. Dickinson, Jill E. Hobbs, DeeVon Bailey. A comparison of US and Canadian consumers' willingness to pay for red-meat traceability[N]. *Economics Research Institute Study Paper*, 2006(10): 1–30.
- [44] Jill E. Hobbs, DeeVon Bailey, David L. Dickinson *et al.* Traceability in the Canadian red meat sector: Do consumers care[J]. *Canadian Journal of Agricultural Economics*, 2005, 53(1): 47–65.
- [45] Verbeke W, Ward R W. Consumer interest in information cues denoting quality, traceability and origin: An application of ordered probit models to beef labels[J]. *Food Quality and Preference*, 2006, 17(6): 453–467.
- [46] Cicia G, Colantuoni F. Willingness to pay for traceable meat attributes: a meta-analysis[J]. *International Journal on Food System Dynamics*, 2010, 1(3): 252–263.
- [47] Van Rijswijk W, Frewer L J. Consumer needs and requirements for food and ingredient traceability information [J]. *International Journal of Consumer Studies*, 2012, 36(3): 282–290.
- [48] Loureiro M L, Umberger W J. A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability[J]. *Food Policy*, 2007, 32(4): 496–514.
- [49] CHEN HH, TIAN ZH. Comparative study on traceability system of agricultural products at home and abroad[J]. *Market Modernization*, 2007(7): 5–6. (in Chinese).