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Research and Analysis on Difference in Per Capita Net Income of Chinese Rural Residents

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Abstract The study aims to understand the variation of difference in per capita net income of rural residents during China's economic development in recent years. The writer studies and analyzes rural residents' income gap between 1997 and 2008 with relevant theories of income difference and the calculation of absolute difference index as well as relative difference index and obtains the conclusion that absolute difference of Chinese rural residents' income experienced an upward trend while relative difference generally remained constant with slight fluctuation and growth, which reflects that rural residents' income gap is increasing gradually. The writer also puts forward some related proposals and countermeasures.

Key words Rural residents, Income difference, Study

With the reform and opening-up, China's economic aggregate has experienced the dramatic growth and people's living conditions have been largely improved with personal income presenting an upward trend. While the settlement of equalitarianism income distribution has also resulted in excessive income difference which is by no means the original intention of the reform and opening-up. Appropriate income gap is certainly the inevitable result of marketing economy's encouraging competition and is regarded as reasonable as well as favorable. However, excessive income difference will exert great dreadful impact on economic and social development and will become the root of a series of social contradictions and problems. Therefore, research and governance on large income difference have become the practical issues eager to be settled during the exponential economic development and will be of great significance in promoting social harmony and stability as well as sustainable economic development[1-3]. Recent years, many scholars have further studied the difference in the income distribution of Chinese residents, among whom domestic scholars have studied the general situation, property distribution, poverty and income inequality while foreign scholars have made rewarding discovery on the causes as well as evolution of income difference among Chinese urban and rural residents[4-5]. This research analyzes and discusses the current income difference of Chinese rural residents with related theories and methods, not affecting economic growth, and puts forward corresponding policies as well as suggestions.

1 Research method

1.1 Relevant theories of income difference Economists have already made great theoretical researches on income difference from various perspectives.

1.1.1 Inverted – U theory of regional income. American economist Kuzner[1] studied and discovered in 1955 that income gap in a certain country will be enlarged during the early economic development and be narrowed during the later stage of economic development, which is the well-known inverted – U theory. And another American economist Williamson[6] applied the inverted – U theory to the analysis of regional development, proposed the inverted – U theory of regional disparity and pointed out that regional economic growth is unequal and per capita income difference is enlarged during the early period of development, while regional economic growth and per capita income will be gradually balanced in the long run.

1.1.2 Theories on personal income difference. Theories on personal income difference mainly involve theory of opportunity inequality and human capital theory. Impact of the involved problems like unequal opportunity, population quality and human capital investment on income difference are discussed mainly from the perspectives of racial discrimination, urban-rural gap, human resource and material capital.

Theories about income difference also involve related theories of studying and analyzing income gap phenomenon during the economic development from the perspective of unbalanced regional income as well as income distribution.

1.2 Calculation of income difference Regional income difference is mainly reflected on absolute income difference and relative income difference. Absolute income difference reflects the gap in income level within a region and mainly displays the representation of regional income difference, which can easily spark social attention. However, relative difference reflects the gap in income growth within a region and the internality of regional income difference. Therefore, there are differences as well as associations in absolute difference and relative difference with their variation representing the same trend on a certain income level. While, absolute difference can only reflect the absolute number of income difference, which is not beneficial to the comparison of income distribution gap[7-8]. The writer studies and analyzes per capita

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income difference of Chinese residents with absolute income difference and relative income difference.

1.2.1 Calculation of absolute income difference. Calculation of absolute income difference mainly involve range, standard deviation, weighted standard deviation and average deviation and the writer adopts standard deviation, weighted standard deviation as well as average deviation. Standard deviation can reflect the deviation of regional index value and arithmetic mean. The bigger the standard deviation is, the larger absolute difference of regional residents' per capita income. Weighted standard deviation is not affected by the perturbation of region partition methods to a large extent. Compared with standard deviation, weighted standard deviation is more stable in multi-angle analysis on regional difference[3]. Average deviation is an expected value which is built based on the relationship between income distribution and equivalence distribution and equals the deviation of all income level and average income level. And large average deviation reveals the large difference between income distribution and equivalence distribution. The calculation formulas are as follows.

(1) Standard deviation S.

$$S=\sqrt{\frac{\sum_{j}^{n}(y_j-\bar{y})^2}{N}}$$

where S stands for the standard deviation. y_j is the per capita income of rural residents in region j. $\bar{y}$ is the average per capita income of rural residents in all regions and N means the number of regions.

(2) Weighted standard deviation S_w.

$$S_w=\sqrt{[\sum_{j}^{n}(y_j-\bar{y})^2]\frac{p_j}{p}}$$

where y_j is the per capita income of rural residents in region j. $\bar{y}$ is the average per capita income of rural residents in all regions. p_j is the population of region j. p is the population of all regions and n means the number of regions.

(3) Average deviation D.

$$D=\frac{\sum_{j}^{n}|y_j-\bar{y}|}{n}$$

where D stands for the average deviation. y_j is the per capita income of rural residents in region j. $\bar{y}$ is the average per capita income of rural residents in all regions and n means the number of regions.

1.2.2 Calculation of relative income difference. The present widely used calculation of relative income difference involves variation coefficient, weighted variation coefficient, logarithmic variation coefficient and Gini coefficient[9-12].

(1) Variation coefficient CV is a statistical value explaining the variability of a variable. It can be calculated with standard deviation dividing average and is used to demonstrate the sample dispersion.

$$CV=\frac{\sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_j-\bar{y})^2}}{\bar{y}}$$

where CV is the variation coefficient. y_j is the per capita income of rural residents in region j. $\bar{y}$ is the average per capita income of rural residents in all regions and n means the number of regions.

(2) Weighted variation coefficient CV_w.

$$CV_w=\frac{\sqrt{\sum_{i=1}^{n}\left((y_j-\bar{y})^2\frac{p_i}{p}\right)}}{\bar{y}}$$

In the formula, CV_w is weighted variation coefficient. y_j is the per capita income of rural residents in region j. $\bar{y}$ is the average per capita income of rural residents in all regions. p_j is the population of region j. p is the population of all regions and n means the number of regions.

(3) Gini coefficient G

$$G=\sum_{i=1}^{n-1}(M_iQ_i-M_{i+1}Q_i)^i$$

Gini coefficient can be applied to measure income inequality, consumption inequality as well as all other unbalanced distributions. It is the index calculating unbalanced income distribution based on the Lorentz curve. The relatively practical calculation method is the formula deducted from triangle area method in which total population is sorted by income in descending order and divided into n groups (sorted by population proportion is unnecessary). Given population of number i group accounts for P_i in total population and income accounts for $I_i(i=1,2,\cdots,n)$, marking $M_i=P_1+\cdots+P_i$. M_i is the proportion of accumulated population from the first group to number i group. $Q_i=I_1+\cdots+I_i$, Q_i is the proportion of accumulated income from the first group to number i group. Since Gini coefficient is calculated according to the area of Lorentz curve, its biggest advantage is to intuitively reflect the inequality.

2 Calculation result and analysis

Related date in the research are from *China Statistical Yearbook* and *China Agriculture Statistical Materials*. Table 1 reveals the result of absolute income difference and relative income difference calculation method and reflects the variation of absolute difference and relative difference of Chinese farmers'per capita net income (Fig. 1 – Fig. 3).

(1) Absolute difference of Chinese rural residents' per capita income increased and represented a dramatic upward trend. Standard deviation and weighted standard deviation increased from 884.437 6 yuan and 723.391 9 yuan in 1996 to 2 150.523 0 yuan and 1 757.130 0 yuan respectively in 2008. Standard deviation in 2008 was 2.432 times larger than that in 1996 with a yearly increasing rate of 0.187 1 times and weighted standard deviation in 2008 was 2.429 times larger than that in 1996 with a yearly increasing rate of 0.186 8 times. Variation of average deviation, standard deviation and weighted deviation basically represented the same trend. Average deviation increased from 952.594 4 yuan to 1 586.862 0 yuan between 2003 and 2008 with a yearly increasing rate of 0.277 6 times.

Table 1 Calculation result of absolute income difference and relative income difference of per capita annual net income of Chinese rural residents between 1996 and 2008

Year	Standard coefficient S	Weighted standard coefficient S_w	Average deviation D	Variation coefficient CV	Weighted variation coefficient CV_w	Gini coefficient G
1996	884.437 6	723.391 9	643.846 1	0.459 0	0.375 4	0.401 7
1997	910.820 1	752.437 3	677.491 3	0.416 1	0.343 8	0.401 0
1998	928.965 0	762.432 3	700.705 1	0.404 2	0.331 8	0.402 6
1999	958.356 0	792.007 0	728.784 9	0.409 4	0.338 4	0.406 1
2000	1 024.027 0	859.906 9	779.983 5	0.426 6	0.358 2	0.410 9
2001	1 096.050 0	903.211 0	837.178 8	0.432 3	0.356 3	0.407 2
2002	1 179.814 0	967.116 3	897.306 8	0.441 1	0.361 6	0.399 5
2003	1 252.357 0	1 045.738 0	952.594 4	0.440 8	0.368 1	0.392 4
2004	1 341.886 0	1 124.247 0	1 018.1100	0.424 5	0.355 6	0.396 6
2005	1 575.314 0	1 304.541 0	1 178.5710	0.448 6	0.371 5	0.395 4
2006	1 758.564 0	1 451.907 0	1 311.2240	0.454 3	0.375 1	0.400 5
2007	1 940.000 0	1 593.220 0	1 437.3250	0.436 6	0.358 5	0.405 5
2008	2 150.523 0	1 757.130 0	1 586.8620	0.422 2	0.344 9	0.409 7

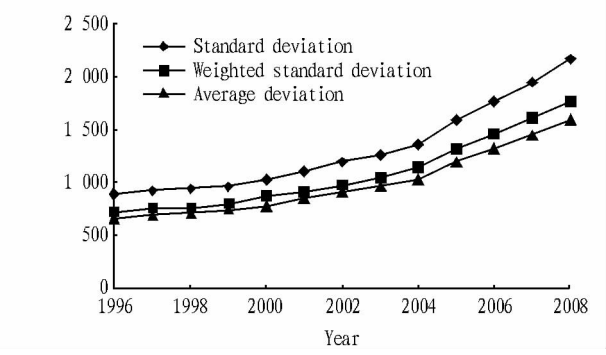

Fig. 1 Variation of absolute difference of per capita annual net income of Chinese rural residents between 1996 and 2008

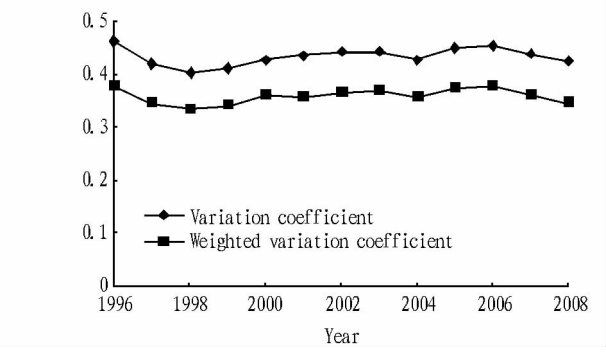

Fig. 2 Fluctuation of variation coefficient and weighted variation coefficient of per capita annual net income of Chinese rural residents between 1996 and 2008

(2) Relative difference of rural residents' per capita income remained constant between 1996 and 2008. Variation coefficient decreased from 0.459 0 in 1996 to 0.422 2 in 2008 and weighted variation coefficient decreased from 0.375 4 in 1996 to 0.344 9 in 2008, which was mainly caused by the fact that the average per capita income of rural residents increased markedly in recent years. However, Gini coefficient slightly climbed from 0.401 7 in 1996 to 0.4097 in 2008 and relative difference represented a marginal increase.

(3) Analysis of absolute difference and relative difference reveals that regional income difference of Chinese rural residents

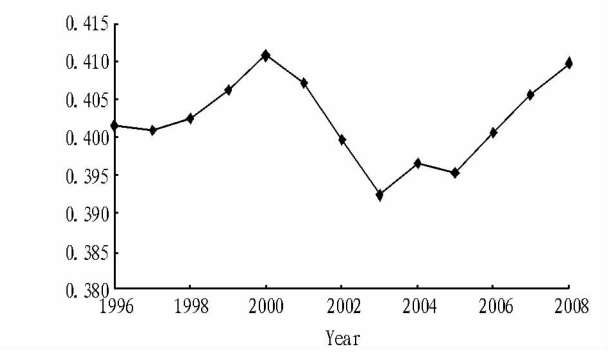

Fig. 3 Variation of Gini coefficient of per capita annual net income of Chinese rural residents between 1996 and 2008

showed an upward trend with relative difference increasing less significantly than absolute difference. Although the general variation was stable, index of relative difference revealed that there has always been income difference. According to the international common method of analyzing residents' income difference with Gini coefficient, Gini coefficient ranging from 0.4 to 0.5 displays relatively large income difference. Therefore, there has been relatively large income difference among Chinese rural residents except for the time period between 2002 and 2005 and the income difference represents a rising trend in recent years.

3 Countermeasures and proposals

Income difference is used to be an outstanding problem in various countries in the world, not only in China. However, most countries properly and promptly decreased the regional income difference among rural residents and coordinated the economic and social development with government intervention as well as overall strategy during the industrialization process, carrying out a series of measures, such as actively transferring rural labor force, promoting rural industrialization, supporting agriculture with various measures, increasing farmers' income and assisting the backward areas[13-16]. Based on the above research results, the writer puts forward some proposals in view of the growing income difference among Chinese rural residents.

(1) Economic development should be maintained. Income

difference can be alleviated and eliminated fundamentally only by ensuring the sustained and stable economic development. Economic development can lay solid material foundation for equal income distribution and decreasing income difference.

(2) Reasonable macro-control policies should be implemented. Relevant political preference on supporting agriculture, increasing agricultural funds, improving basic education, supporting rural infrastructure construction and social undertakings, establishing scientific strategy for rural industrialization development and promoting rural industrialization as well as urbanization should be emphasized.

(3) Difference in education background is to be decreased to improve population qualities. It is proved that education has positive correlation with income. Therefore, government policies should be beneficial to equal education for more rural residents and children from poor families should be given special consideration. Besides, in regions with low income, farmers' income should be promoted and intellectual work as well as intellectual investment should be encouraged with macro-control at an attempt to increase the income of professional technicians as well as administrators, prevent outflow of talents and resources and ensure the development potential there. Furthermore, preferential policies should be provided to attract more labor force, technology as well as capital funds.

(4) Distribution principles should be standardized and illegal income be punished. Taxation system is to be adjusted. Income distribution system should be adjusted and perfected to protect reasonable income. Different supporting policies should be formulated and implemented in different areas to reduce farmers' burden.

(5) Opportunity equality of rural residents' income should be ensured. Government should make sure that each social member can enjoy a basic and equal starting point before entering the society. Every social member should have equal basic rights including equal right of existence, employment opportunity, education opportunity as well as migration opportunity.

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to guide farmers to set up modern money management idea.

4.4 Improving farmers' quality and specialized technical ability Since Zhejiang Province's farmers are not simple farmers, it requires that they should have high personal overall quality and specialized technical ability to satisfy demands of jobs of industrial workers. Government should increase input into scientific, technological, and cultural training and education to improve farmers' labor skills. (1) Government may provide funds to encourage individuals to set up specialized training organizations or bring into play functions of vocational technical schools. Apart from arranging agricultural courses, it should set up corresponding technical courses according to characteristics of industrial clusters in Zhejiang Province, to satisfy talent demands of enterprises. (2) It is proposed to provide multi – channel, multi-level and multi-form training for farmers, such as sending training teachers to villages, media resources to villages, talent cultivation to villages, and town cadres to villages. (3) It should bring into full play functions of mass media (including television, radio, newspaper and network), propagate basic theory of market economy and successful cases of market competition, and make effort to cultivate farmers' idea of market economy, to stimulate their enthusiasm for participating in market competition and improving their market competitive ability.

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