CONTEMPORARY INEQUALITY TRENDS OF CHINA: THE ANALYSIS OF THE METHODS AND PERTINENT DATA SOURCES

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http://dx.doi.org/10.26739/2573-5616-2017-8-8-2

As there exist diverse estimations of Chinese inequality, it is obvious that there are certain problems with the data source and/or methods used. Followed by this paragraph our literature review provides some information about the pertinent data sources available.

The CHIP (Chinese Household Income Project) is an international collaborative survey research project that began in the late 1980s with the aim of tracking changes in income, poverty and inequality in China (Terry Sicular 2013). There are six waves of cross-sectional data from: 1988, 1995, 2002, 2007, 2008, and 2013.

Keywords. Contemporary inequality trends, China, analysis, methods, pertinent data sources.

Introduction

There are several means to estimate income inequality, such as Theil index, Pietra index, Hoover index, Kuznets index. However, Sloman (2000) explained that the Lorenz curve and the Gini coefficient are most commonly used. Furthermore, Sen (1997) and Champernowne and Cowell (1998) considered that the Gini coefficient is the most significant index for measuring income inequality. In economics, the Gini coefficient is the measure of statistical dispersion intended to represent the income or wealth distribution of a nation's residents and is the most commonly used measure of inequality. It was developed by the Italian statistician and sociologist Corrado Gini and published in his 1912 paper "Variability and Mutability". Gini index ranges from 0 to 1 (or 0% to 100%), where 0 means perfect equality, while 1 means maximum inequality. Although Gini index is mostly used, we are going to analyze three kinds of indices: Gini index, Theil index, Pietra index to find the one showing the best fit in order to estimate the inequality in China.

There is little agreement on how to calculate the Gini coefficient for China. Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou, and Qiaobin Feng (2008) showed in their paper approximately 20 estimations on Chinese Gini ratios, whereas Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, Ming Pu, and Malin Song (2015) showed over 30 different estimations. In our literature review, there are over 20 estimations of the Chinese Gini coefficient.

There is growing literature, which denotes that the Chinese inequality trends have been diminishing recently. Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, Ming Pu, and Malin Song (2015) estimated that the Chinese Gini index declined from 2008 to 2012, while Ravi Kanbur, Yue Wang and Xiabo Zhang revealed in their study that China's Gini coefficient decreased from 2010 to 2014. Nevertheless, a study published in the PNAS (2014) estimated that China's inequality increased from 0.3 to 0.55 from 1980 to 2012. There being a number of conflicts over the estimations of the Chinese inequality, we are going to derive the Chinese inequality trends from 2013 to 2015.

The disagreements on the calculations of China's Gini index are from one angle associated with the source used. J.Chen (2010) and S.Li and C.Luo

(2007) explained that the differences in estimation methods, combined with the data insufficiency has limited research on China's income inequality. Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou, Qiaobin Feng (2008) indicated that the main problem in calculating the Gini index of China's residents' income is the shortcomings of the data sources.

As there exist a number of conflicts over the calculation of inequality in China, this paper also attempts to analyze pertinent methods and data sources used to estimate China's inequality.

The rest of this paper is organized as follows: the next section critically reviews the relevant literature. Section 3 reveals the research methodology of this paper. Section 4 provides the results and analysis. Section 5 discusses the results. Section 6 concludes and endeavors to tender some recommendations.

Literature review

Previously, there have been several estimations of Chinese Gini coefficient obtained by using different methods and/or data sources. For example, Chen and Zhou (2002) used two different methods and derived a result of 0.38392 and 0.41914 for China's inequality in 2002. Ravi Kanbur, Yue Wang and Xiaobo Zhang (2017), and Li et al (2013) used different methods, but the same data source (CHIP) and acquired 0.478 and 0.49 respectively. In 2007 Ravallion and Chen (2007) used Chinese Statistical Yearbook to estimate Chinese Gini coefficient and obtained 0.438 for 2000. However, Lin et al (2010) used CHIP data and derived 0.411, whereas Serhan Cevik and Carolina Correa-Caro (2015) derived 0.44, according to World Bank estimations for the same year. Furthermore, CHIP survey (2007) and NBS (2007) denoted somehow similar indicators for Chinese Gini coefficient in 2007, namely 0.49 and 0.484 respectively. Nevertheless, World Bank (2007) indicated completely different estimation- 0.43 for the same year. Serhan Cevik and Carolina Correa-Caro (2015) explained 'there are various methods of estimating the Gini coefficient, resulting in significant differences. For instance, CHFS (China Household Finance Survey) conducted by Texas A&M University and Southern University of Finance and Economics in Chengdu, estimated that the overall Gini coefficient was 0.61 in 2010. However, for 2010 NBS survey estimated 0.481, while Ravi Kanbur, Yue Wang and Xiaobo

Zhang (2017) derived 0.533 based on CHIP and CFPS data sources for the same year. Moreover, CIA World Factbook indicated that the Chinese Gini index was 0.473, while NBS estimated that it was 0.469 in 2014.

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CFPS (The China Family Panel Studies) is a nationally representative, annual longitudinal general social survey project designed to document changes in Chinese society, economy, population, education and health. The CFPS was launched in 2010 by the Institute of Social Science Survey (ISSS) of Peking University, China (2015). There are three waves of panel data from CFPS: 2010, 2012, 2014.

CHNS (China health and Nutrition Survey), an ongoing cohort, international collaborative project between the Carolina Population Centre at the University of North Institute for Nutrition and Health at the Chinese Centre for Control and Prevention was designed to examine the effects of the health, nutrition, and family planning policies and programs implemented by national and nutritional status of its population. CHNS conducted a-seven-day survey, which constituted 7,200 households with over 30,000 individuals in 15 provinces and municipal cities that vary substantially in geography, economic development, public resources, and healthy indicators.

According to Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou and Qiaobin Feng (2008) 'China Statistical Yearbook is the most important data resource for calculating the Chinese Gini ratio, especially when no household survey data were available. Zongsheng Chen and Yunbo Zhou (2002), Zongsheng Chen (1999) calculated the Gini coefficient based on this Yearbook. However, Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, Ming Pu and Malin Song (2015) summed that 'the Chinese Statistics Yearbook has several issues, while NBS has a large number of samples that have wide coverage and can be traced back to the beginning of China's reform and opening up, thus NBS would be an ideal data source to analyse residents' income distribution in China. Furthermore, Yixiao Zhou and Ligang Song (2014), Terry Sicular (2013), S.Nazrul Islam (2015), Fuzhi Cheng (2007), Cai Fang, Du Yang and Wang Meiyan (2009) used NBS data. Based on afore-mentioned statements, we hypothesize that NBS provides more reliable data than the other ones.

'Various distribution functions were employed in examining the income distribution to determine the distribution function with the highest goodness of fit (Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, Ming Pu and Malin Song (2015))'. Souma (2000), Holzmann (2007) and Wang (2009) found *log-normal distribution* function the highest goodness of fit. Mao et al (2009) used *gamma distribution* to fit the income of Chinese urban households. Wang (2012) adopted the *nonparametric* method to estimate the income distribution from 1985 to 2009. Nonetheless, Zhang et al (2013) pointed out that the error in the parametric estimation is far smaller than that in the nonparametric estimation to fit income distribution. Zhang et al (2013), and Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, and Malin Song (2015) showed that a three-parameter distribution function is superior to a two-parameter distribution function. Hu (2012) hypothesized that *GB2 (Generalized beta distribution of the second kind)* had the best fitting effect, whereas Yuan Ye, Broderich O.Oluyede and Mavis Pararai (2012) found that *WGB2 (Weighted Generalized Beta distribution of the second kind)* provided a better fit than GB2 in estimating the US family income. However, Kleiber and Kotz (2003) explained that family income distributions are typically best fitted by GB2. 'Furthermore, McDonald and Xu (1995) embedded the *GB1* and GB2 into five parameter distribution, which is GB, but did not drive the Gini index in this case. Their empirical study denoted that the GB2 fit was competitive with regard to the *GB*. Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, and Malin Song (2015) attached more importance to the fitting effect of GB2 to measure Chinese inequality.

Hypothesis. GB2 has the best fitting effect of all other distribution functions.

Several methods have been used in order to derive income inequality trends. 'Xiang Hong (2008) used the *method of decomposition* of the Gini index to solve the problem- the overlap of high rural and low urban income residents. This method decomposed the income inequality of the whole country into four sectors: rural areas, urban areas, rural subgroups and urban subgroups. However, this method does not consider the importance of income disparity between the urban and rural areas (Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou and Qiaobin Feng (2008))'. Similarly, Ravi Kanbur, Yue Wang and Xiaobo Zhang (2017) decomposed the Gini index into two parts- rural and urban. They explained that 'the national income distribution is weighted sum of the rural income distribution, with the weights being the the population shares of the two parts'. Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou, Qiaobin Feng (2008), and Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, Ming Pu, and Malin Song (2015) also used the method of decomposition. They decomposed the national Gini into four parts: intra-rural, intra-urban, The inequality coefficient between the urban and rural area, and the cross term of resident income in urban and rural areas. Muxammedov A and Kutsenko E (---), Qingchuan Li and C.-Y. Cynthia Lin Lawell (2015) attempted to find identical functions to Lorenz curve employing quadratic functions.

Research methodology

Our literature review reveals that NBS is considered a far superior source of data. In fact, in 2011 NBS conducted a survey on 66,000 urban households and 75,000 rural households in 7,100 villages (China Statistical Yearbook (2012)), while the sample of CHNS for the same year overall accounts for 7,200 households. Furthermore, in 2011 CHFS (the Chinese Household Finance Survey) also conducted a survey on 8,438 households. As can be seen from the above-figures, NBS provides relatively high and comprehensive sample. Accordingly, we are on the point of utilizing NBS as our primary data source.

We are going to employ two kinds of decomposition methods in order to derive national inequality:

(1) We decompose it into four sectors expressed below:

$G_n = G_0+G_{ur}+\beta \cdot G_r+\delta \cdot G_u,$

where (G_u), (G_r), (G_{ur}), (G_0) denote intra-urban (G_u), intra-rural (G_r), inequality between the urban and rural area (G_{ur}), and the cross term of resident income in urban and rural areas (G_0), whereas β and δ denote the ratio of rural and urban population multiplied by the income proportion of the rural and urban areas respectively. (Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou and Qiobin Feng (2008))

(2) We decompose it into two sectors expressed below:

$L=x \cdot L_1+(1-x) \cdot L_2+log(x \cdot k+1-x)-x \cdot log(k),$

where L_1 and L_2 denote urban and rural inequality coefficient respectively, *x* is the population share of urban residents and *k* is the ratio of urban average income to rural average income. (Ravi Kanbur, Yue Wang,and Xiaobo Zhang (2017)).

Appropriately, we should employ a distribution function in order to derive intra-rural (G_r or L_2) and intra-urban (G_u or L_1) inequality ratios. With regard to our literature review, one can see that GB2 distribution is highly considered to have the best fitting effect amongst all the distribution functions. Correspondingly, we are on the verge of calculating China's *Gini, Theil and Pietra indices* using *GB2 distribution*.

GB2 distribution function:

$$F_{GB2}(x) = \frac{a \cdot x^{a \cdot p - 1}}{b^{a \cdot p} \cdot B(p,q) \cdot \left[\left(\frac{x}{b}\right)^a + 1\right]^{p+q}},$$

where B(p, q) is the beta function: $B(p, q) = \frac{(\Gamma(p) \cdot \Gamma(q))}{\Gamma(p+q)}$, where $\Gamma(x)$ is the gamma function: $\Gamma(x) = \int_0^\infty t^{x-1} \cdot e^{-t}\, dt$.

Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, Ming Pu, and Malin Song (2015) explained that 'the GB2 has four parameters, of which three (a, p, q) are shape parameters and the other (b) scale parameter.

Therefore, GB2 has a stronger ability to adjust and control shape than two and three parameter distribution functions'.

In order to estimate these parameters (a, p, q, b), one may take logarithms on both sides of GB2, in other words, use the log-likelihood function which is expressed as:

$$LogF_{GB2}(x) = n\cdot log\ \Gamma(p+q)+n\cdot log\ a +(a\cdot p\text{-}1)\cdot\sum_{i=1}^{n} log\ x_i - n\cdot a\cdot p\cdot log\ b - n\cdot log\ \Gamma(p)\text{-}n \cdot log\ \Gamma(q) -(p+q)\cdot\sum_{i=1}^{n} log\left(\left(\frac{x}{b}\right)^{a}+1\right)$$

,

where a, b, p and q are the partial derivatives, and thus the following four equations can be obtained:

(1) $p\sum_{i=1}^{n}\log\left(\frac{x_i}{n}\right)+\frac{n}{a}=(p+q)\cdot\sum_{i=1}^{n}\log\left(\frac{x_i}{b}\right)\cdot\left[1+\left(\frac{b}{x_i}\right)^{a}\right]^{-1}$

(2) $n\cdot p=(p+q)\cdot\sum_{i=1}^{n}\left[\left(\frac{b}{x_i}\right)^{a}+1\right]^{-1}$

(3) $n\cdot\Psi(p+q)+a\cdot\sum_{i=1}^{n}\log\left(\frac{x_i}{b}\right)=n\cdot\Psi(p)+\sum_{i=1}^{n}\log\left[1+\left(\frac{x_i}{b}\right)^{a}\right]$

(4) $n\cdot\Psi(p+q)=n\cdot\Psi(q)+\sum_{i=1}^{n}\log\left[1+\left(\frac{x_i}{b}\right)^{a}\right]$

where $\Psi(x)$ is the derivative of the natural logarithm of the gamma function. Setting each of the four functions to zero, one can determine the parameters. However, it is possible if the likelihood function is simple. Solving these four equations for zeros may be too formidable a task. Therefore, we employ Dagum's (1997) method, which minimizes the following function:

$\sum w_i[F(x)\text{-}F_{GB2}(x_i;a;b;p)]^2$,

where w_i is the sampling weight of x_i. The parameters 'a' and 'b' can be estimated using the following formulae (Graf (2007)).

(5) $M=\sum w_i\cdot ln(x_i)/\sum w_i$

(6) $V=\sum w_i\cdot(ln(x_i)\text{-}M_l)^2/\sum w_i$

(7) $a=\frac{\pi}{\sqrt{3\cdot V}}$

(8) $b=e^M$

After we derive parameters 'a' and 'b', we set (1) and (2) functions in the log-likelihood method to zeros in order to estimate the parameters p and q.

In order to find Chinese urban and rural (G_u and G_r) Gini, Theil and Pietra coefficient, we are going to use the following three formulae respectively:

$$Gini_{GB2}=\frac{B\left(2\cdot q-\frac{1}{a},2\cdot p+\frac{1}{a}\right)}{B(p,q)\cdot B\left(p+\frac{1}{a},q-\frac{1}{a}\right)}\cdot\left\{\frac{1}{p}\cdot {}_3F_2\begin{bmatrix}1 & p+q & 2\cdot p+\frac{1}{a} & 1\\ & p+1 & 2\cdot(p+q) & \end{bmatrix}-\left(\frac{1}{p+\frac{1}{a}}\right)\cdot {}_3F_2\begin{bmatrix}1 & p+q & 2\cdot p+\frac{1}{a} & 1\\ & p+\frac{1}{a} & 2\cdot(p+q) & \end{bmatrix}\right.$$

$$Theil_{GB2}=\frac{\left[\Psi\left(p+\frac{1}{a}\right)-\Psi\left(q-\frac{1}{a}\right)\right]}{a}+\ln\left(\frac{b}{\mu}\right)$$

$$Pietra_{GB2}=\left(\frac{z^{a\cdot p}}{B(p,q)}\right)\left\{\frac{1}{p}\cdot {}_2F_1\begin{bmatrix}p & 1-q & z\\ p+q & & \end{bmatrix}-\left(\frac{1}{p+\frac{1}{a}}\right)\cdot {}_3F_2\begin{bmatrix}p+\frac{1}{a} & 1+\frac{1}{a}-q & z\\ p+1+\frac{1}{a} & & \end{bmatrix}\right.$$

where $${}_3F_2\begin{bmatrix}a_1 & \ldots & a_n & x\\ b_1 & \ldots & b_n & \end{bmatrix}=\sum_{i=0}^{\infty}\frac{\left((a_1)_i\ldots(a_n)_i\cdot x^i\right)}{(b_1)_i\ldots(b_n)\cdot i!}$$

and $z=\left(\frac{\left(\frac{I}{b}\right)^a}{1+\left(\frac{I}{b}\right)^a}\right)$, (I indicates national per capita income). (James B. McDonald, Michael Ransom (2007))

Xiao Ma, Feiran Wang, Jiandong Chen, and Yang Zhang (2017) suggested that inequality between urban and rural residents (G_{ur}) can be expressed as:

$$G_{ur}=\frac{P_u \cdot R}{P_r + P_u \cdot R} - P_u$$

where R represents the ratio of per capita income between urban and rural areas; P_u denotes the proportion of the population in urban areas, whereas P_r denotes the proportion of the population in the rural areas. Wan et al (2014), Zhu and Wan (2012) utilized this model to derive the G_{ur} in China.

Lambert and Decoster (2005) showed the mathematical expression of G_0 (the cross term of resident income in urban and rural areas) as follows:

$$G_0=2 \cdot P_u P_r \cdot \int \frac{[1 - F_u(x)] \cdot F_r(x)}{\mu} dx$$

where $F_u(x)$ and $F_r(x)$ are the income distribution functions of urban and rural residents, respectively. μ is the national average income. Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou and Qiobin Feng (2008) summarized that the question of how to accurately calculate the G_0 is the key element in estimating the Chinese Gini coefficient. They also explained that the calculation of overlapping income between rural and urban residents (G_0) has not been determined in the relevant literatures. Appropriately, we are on the point of suggesting the following model to estimate G_0:

1) $Q_1 = \frac{1}{R} \cdot \frac{N_1}{U} \cdot \sum_{i=1}^{N_1} \frac{(X_1 - Y_i)}{N_i}$, $X_1>Y_i$

2) $Q_2 = \frac{1}{R} \cdot \frac{N_2}{U} \cdot \sum_{i=1}^{N_2} \frac{(X_2 - Y_i)}{N_i}$, $X_2>Y_i$

…

k) $Q_k = \frac{1}{R} \cdot \frac{N_k}{U} \cdot \sum_{i=1}^{N_k} \frac{(X_k - Y_i)}{N_i}$, $X_k>Y_i$

$G_0=\sum_{j=1}^{k} Q_j$,

Where R and U indicate the number of rural and urban population, respectively. X_1 denotes the income of the richest person in rural areas, X_2 denotes the income of the second richest person in rural areas … X_k denotes the income of the k^{th} richest person in rural areas. N_k is the number of people in urban areas possessing less money than the ones in rural areas possessing X_k income. Y indicates the income a person in urban areas.

Analysis and Results

Analysis of the above methods are given as follows:

Table 1. Parameters of GB2 distribution function for the following three years.

	Year	A	B	P	Q
GB2 urban	2013	3.0643	23988.7	0.9014	0.8985
	2014	3.1772	26430.9	0.9003	0.8959
	2015	3.235	28603.0	0.9028	0.8917

Source: Authors calculations according to the data provided by NBS.

Table 2. Parameters of GB2 distribution function for the following three years.

	Year	A	B	P	Q
GB2 Rural	2013	2.7054	8174.5	0.9162	0.8893
	2014	2.5103	8903.7	0.9667	0.8804
	2015	2.5437	9722.5	0.9561	0.8830

Source: Authors calculations based on NBS data source.

First column on table 1-2 indicates the years. Third column denotes the scale parameter, while the other three columns denote the shape parameters in urban and rural areas.

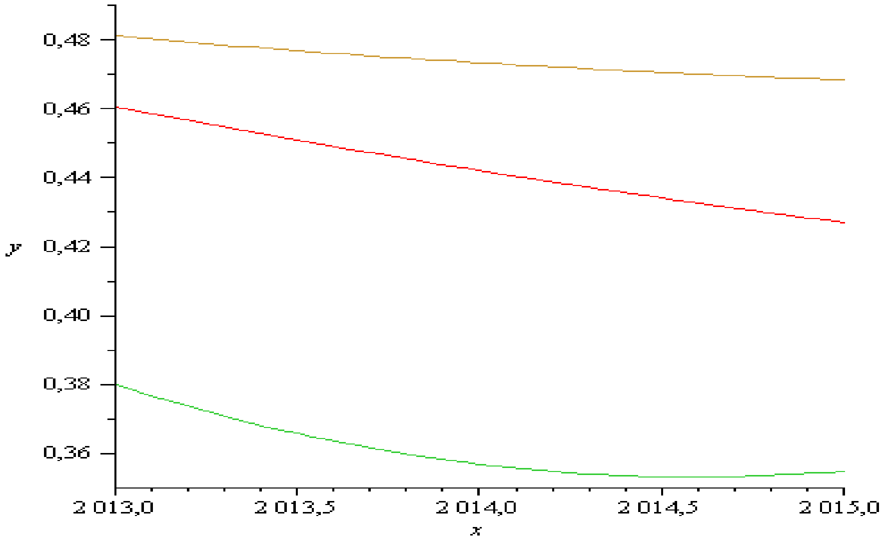
Table 3. Estimations of G_0, G_u, G_r, G_{ur} and their share in national Gini coefficient.

Year	***The ratio of the urban population***	G_r	G_u	G_{ur}	G_0	G_N	G_0/G	G_r/G	G_u/G	G_{ur}/G	***NBS***
2013	0,53	0,33	0,25	0,24	0,01	0,46	3,47	16,92	22,00	57,60	0,47
2014	0,54	0,69	0,23	0,24	0,01	0,44	3,84	18,83	21,20	56,00	0,46
2015	0,56	0,56	0,23	0,26	0,01	0,42	4,42	15,46	22,60	57,40	0,46

Source: Authors calculations based on NBS data source.

Table 3 reveals the indicators of G_n, G_u, G_r, G_{ur}, G_0 as well as their percentage over the national inequality (G_n). As can be seen that Theil index denotes the highest results, whereas Pietra index denotes the lowest results. All the indices denote diminution year by year (see also figure 1). Even though our results are marginally different from those revealed by NBS, they show the same trend. In addition, G_{ur} in all the indices (Theil, Gini, Pietra) comprises the largest share of the national inequality, accounting for higher than 52%, while G_0 constitutes the smallest share. Furthermore, G_u denotes lower indicators than G_r in all the three years. However, G_r makes up lower percentage of national inequality because of its mode income and population share. According to Chinese Statistical Yearbook 2006, the proportion of urban population comprised 43% in 2005; the urban-rural average income ratio was 3.2237; and the corresponding G_o accounted for 4.1 percent of the national inequality indicating 0.0189, which is the same as our estimation for 2015. Jiandong Chen, Dai Dai, Ming Pu, Wenxuan Hou and Qiobin Feng (2008) showed that the ratio of urban population and the urban-rural average income ratio are proportional. Although the urban population ratio is much higher than that in 2005, the urban-rural average income ratio is far lower indicating 2.7311 in 2015. Therefore, we can consider our model to be efficient. In our estimations G_o composes higher than 3% of national inequality in all the three years. What is more, it is important to mention that the Gini coefficient denotes relatively similar results to those derived by NBS.

Figure 1. Inequality trends from 2013 to 2015 years derived with the method of decomposition into four sectors.



_______-Pietra, _______-Gini, _______-Theil

Let's now calculate the attributes of the model of decomposition into two sectors.

Table 4. Attributes of the model of decomposition into two sectors.

INDEX	*Year*	*X*	*k*	L_1	L_2	*L*	*NBS*
Gini index	2013	0.5373	2.7311	0.2557	0.3350	0.51361	0.473
	2014	0.5477	2.7499	0.2343	0.6902	0.5076	0.463
	2015	0.561	2.8067	0.2324	0.5615	0.4581	0.462
Theil index	2013	0.5373	2.7311	0.3557	0.4796	0.4947	0.473
	2014	0.5477	2.7499	0.3345	0.6155	0.5287	0.463
	2015	0.561	2.8067	0.3250	0.5855	0.5144	0.462
Pietra index	2013	0.5373	2.7311	0.1753	0.2377	0.2848	0.473
	2014	0.5477	2.7499	0.1573	0.2398	0.2617	0.463
	2015	0.561	2.8067	0.1497	0.2414	0.2782	0.462

Source: Authors calculations according to NBS data source.

Table 4 provides the attributes of the following model:

$L = x \cdot L_1 + (1-x) \cdot L_2 + \log(x \cdot k + 1 - x) - x \cdot \log(k),$

where L is the national inequality, L_1 and L_2 denote urban and rural inequality, respectively. k indicates the urban-to-rural average income ratio, while x indicates the ratio of urban population. Similarly, the Gini indices derived with this model diminish as those derived with the preceding model. However, the results calculated with this method are relatively high except for the Pietra indices (see also figure 1).

Discussion

The results of our study show that when we estimate China's inequality by decomposing it into four sectors ($G_n=G_u+G_r+G_{ur}+G_0$), all the indices (table 3) denote diminution consecutively from 2013 to 2015. In stark contrast, when we estimate China's inequality by decomposing into two sectors ($L=x\cdot L_1+(1-x)\cdot L_2+log(x\cdot k+1-x)-x\cdot log(k)$) only Gini coefficient (in table 4) proves to monotonically decline from 2013 to 2015, whereas Theil and Pietra indices first ascend then descend. However, NBS survey indicates that the national inequality was on a downward trend from 2013 to 2015. Furthermore, the latter method ignores the inequality between urban and rural residents (G_{ur}), in other words, the former method presents better results.

Moreover, Wan (2007) found that income gap between urban and rural areas (G_{ur}) accounted for 70-80% of the national income gap. Chen et al (2015) estimated that this gap accounted for 58% of the national income gap. In our calculations, G_{ur} comprises approximately 69% of each national Pietra index from 2013 to 2015, maximally.

What is more, our estimations on Theil and Gini coefficients are comparatively similar to those derived by NBS data source, particularly Gini coefficient. By contrast, Pietra indices indicate considerably lower results.

Jiandong Chen, Fuqian Fang, Wenxuan Hou, Fengying Li, Ming Pu, and Malin Song (2015) explains that urbanization is the main reason for the current decreases. Kanbur and Zhuang (2013) explained that further urbanization would reduce inequality as Chinese urbanization has crossed the Kuznets turning point. Potentially, if urbanization process continues, and the ratio of urban population equals 0.7, then the national Gini coefficient will be approximately 0.36.

Conclusion and Recommendations

Based on our study, we have three concluding remarks and two recommendations.

First, the method of decomposition into four is a better fit than the method of decomposition into two. Because the letter does not consider the importance of the inequality between urban and rural residents (G_{ur}) and the overlap between the income of urban areas and rural areas (G_0). For example, if the incomes of urban and rural residents, G_0 will be equal to 0.5. If the reverse is right, that is G_0 equals to 0, G_{ur} will equal to the ratio of urban population. Furthermore, the former method clearly shows the ratios of each sector. The former method, in sum, is more reliable and comprehensive than the latter one.

Next, admittedly, NBS data source is reliable. However, it vouchsafes too aggregate data to accurately calculate G_0, G_r, G_u coefficients. Actually, the sampling units provided by NBS are very few.

After all, in accordance with the results of our study, China's inequality trends reduced from 2013 to 2015. Additionally, as urbanization increased, simultaneously, inequality indices dropped from 2013 to 2015, we summarize that urbanization is the significant factor narrowing the income inequality in China.

Our recommendations include:

C. R. Kothari (1990) explains the significance of research as follows '*All progress is born of inquiry*. Doubt is often better than overconfidence for it leads to inquiry and *inquiry leads to invention*'. Therefore, research is very important as it helps to be more innovative. In order to conduct a research, reliable, comprehensive data sources are necessary. Therefore, in Uzbekistan, such data sources as NBS, China Statistics Yearbook should be arranged in order to maximize the research potential.

Moreover, the Chinese respondents are required to record their expenditure throughout the year, whereas in several other countries, a survey is administered to the respondents on income and expenditure on a weekly, biweekly or monthly basis. (J. Gibson, J. Huang and S. Rozelle 2001). We should also employ pertinent respondents in order to collect the data in Uzbekistan. If the respondents record their expenditure and income weekly, or biweekly or even monthly, there is bound to arise volatility of income and expenditure. For instance, a sudden income diminution for merely one week can cause underestimation. On the other hand, if they record their expenditure and income annually, there might be some problems in keeping the same attitude towards the task. Thus, we suggest that respondents should be required to record their expenditure and income every quarter of a year.

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