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The great Chinese inequality turnaround

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Abstract

China's high income and wealth inequality has long attracted the interest of policymakers and researchers, yet surprisingly little has been done since 2010 on inequality trends. Given China's evolving economic structure and the government's adoption of new policy tools in recent years, we revisit the latest data on Chinese inequality and assess the impacts of economic and policy changes on income distribution. After a quarter century of rapid, sustained increase, we see Chinese inequality plateauing and even diminishing. To verify this finding, we draw upon a range of data sources and measures of inequality. We examine inequality trends through decomposition by income source and population subgroups, and consider possible explanations such as policy shifts and structural transformation of the Chinese economy. The findings suggest that the narrative on Chinese inequality today should focus on clarifying the factors driving this apparent inequality turnaround.

Keywords: Chinese inequality turnaround, inequality data, inequality trends, inequality and structural transformation, harmonious development and government policy

JEL Codes: D31, D63, O15, O53

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1 Introduction

Alongside the spectacular growth and extraordinary reductions in poverty, perhaps the most dramatic in human history, the evolution of Chinese income inequality since the start of the reform process in 1978 has been a focus of interest among analysts and policy makers. Table A.1 in the appendix gives a flavor of this interest by summarizing the most significant studies concentrating on the evolution of income inequality. In their study of the evolution of inequality in China focusing on spatial inequality over the long run, from 1952 to 2000, Kanbur and Zhang (2005) identified two phases of inequality change after the start of reforms in 1978. After an initial short phase of falling inequality as rural incomes rose in the wake of the liberalization of the personal responsibility system, inequality rose inexorably as China opened up to the world and explosive growth took place in the coastal regions.

This increase in inequality became an integral part of the narrative on Chinese development,[1] with some commentators arguing that this was the inevitable price to be paid for the high rates of growth, with others warning of the social consequences of rising gaps. In any event, "harmonious society" was given center stage at the 2005 National People's Congress and among rising policy concerns on inequality. As more data has accumulated, greater attention has turned to an examination of the evolution of inequality in China in the 2000s, including in the present decade—the years after 2010. A number of studies which used data from the mid-2000s onward began to argue that the rise in inequality was being mitigated, and inequality was possibly plateauing and perhaps even turning down.[2]

This paper attempts to provide a comprehensive assessment of what the data show, a deeper look into the patterns of inequality change, and preliminary explanations for the trends observed. Our basic conclusion is that there does indeed appear to be a turnaround taking place in Chinese inequality, and that the explanations lie in policy changes and in the nature of structural transformation in China.

[1] See, for example, Appleton, Song, and Xia (2014); Chi, Li, and Yu (2011); Chi (2012); Goh, Luo, and Zhu (2009); Kanbur and Zhuang (2013); Knight (2014); Knight, Li, and Wan (2016); Mendoza (2016).

[2] See Khan and Riskin (2005); Fan, Kanbur, and Zhang (2011); Li et al. (2016); Alvaredo et al. (2017); Chan et al. (2014); Li and Gibson (2013); Lee (2013); Cheong and Wu (2014); Zhang (2015); Xie and Zhou (2014); Xie et al. (2015). Even Alvaredo et al. (2017), whose argument is that China's inequality is approaching that of the United States and is higher than that of France, present data indicating that in China the top 1 percent share and the bottom 50 percent share have been plateauing since 2006. After 2010, the top 1 percent share declined slightly and the bottom 50 percent share increased slightly. In his review, Knight (2014), focused on an earlier literature, asked, but did not substantiate, whether inequality had peaked. In Xie and Zhou (2014), the Gini coefficient estimated from various data sources shows a plateauing trend from 2010 to 2012, except for the China Household Finance Survey 2011, an outlier that shows the trend increasing.

The plan of the paper is as follows. Section 2 sets out the data sources on Chinese inequality on which any assessment will have to be based. Section 3 then presents the basic trends over the 20-year period from 1995 to 2014. Section 4 examines the patterns of inequality change by looking, respectively, at decomposition by income source and by population subgroup. Section 5 presents some preliminary explanations for the observed trends. Section 6 concludes.

2 Data

In this study, we use two kinds of data: household-level data from household surveys and provincial-level data from the National Bureau of Statistics (NBS). Household-level data are from two surveys, the Chinese Household Income Project (CHIP) and the China Family Panel Studies (CFPS). CHIP was carried out as part of a collaborative research project on incomes and inequality in China organized by Chinese and international researchers and institutions, including the Institute of Economics of the Chinese Academy of Social Sciences and the School of Economics and Business Administration at Beijing Normal University, with assistance from the NBS. There are six waves of cross-sectional data from CHIP: 1988, 1995, 2002, 2007, 2008, and 2013. CFPS is a nationally representative biennial longitudinal survey of Chinese communities, families, and individuals launched in 2010 by the Institute of Social Science Survey of Peking University. It covers such topics as economic activities, education outcomes, family dynamics and relationships, migration, and health. Currently, there are three waves of panel data from CFPS: 2010, 2012, and 2014. Our provincial-level income per capita and population data are drawn from the NBS database and multiple provincial statistical yearbooks.

We use household survey data to analyze the evolution of household income inequality and the attributes of different income sources, as these data provide rich information about the various income components in each household. For the analysis of regional inequality evolution and its decomposition, we make use of the provincial-level data. Each dataset is described below in greater detail.

The household-level data we use are taken from CHIP 1995, 2002, and 2007 (NBS sample) and CFPS 2010, 2012, and 2014. We did not go back as far as 1988 because at that time most places in China were still under a command economy, and the income components in the 1988 survey were thus quite different conceptually from those in the later surveys. CHIP 2007 and 2008 are also part of the larger RUMiC (Longitudinal Survey on Rural Urban Migration in China) survey project. While the public RUMiC data are based on a different questionnaire from previous waves of CHIP and have no income component details, CHIP 2007 has a restricted nationally representative NBS

sample dataset that is consistent with the previous waves. For this reason, we eliminate CHIP 2008 from our analysis and use only the NBS sample from CHIP 2007. The detailed questions about income included in each wave of the CHIP data between 1995 and 2007 are quite consistent. There are a few differences between CFPS 2010, 2012, and 2014. However, adjusted incomes were provided in CFPS 2012 and 2014 to make them comparable with CFPS 2010.[3]

There are some differences between CHIP and CFPS in terms of the items included in each income source.[4] For example, the rental value of housing equity is included in CHIP 1995 but not in other surveys, and medical expenses paid by a collective or the government are included in transfer income in CHIP but not in CFPS, and so on. To ensure as much consistency as possible, we broke down the different sources of income in CHIP and reconstructed them with the items that are included in CFPS only. In addition, there is no "other income" category in CHIP 2007, but we constructed it following the CFPS definition. In our decomposition by income source, we present two results, one with the original household income from CHIP and CFPS, and the other with adjusted income from CHIP that is consistent with the CFPS definition.

Another data-related issue we need to address is the missing data in income sources. We assume that there exists a fixed hidden distribution for household income, for both rural and urban categories. We approximate the hidden distribution for rural and urban categories from the existing non-missing data. Then we sample new pseudo-value from this approximated distribution to fill in the missing entries. The pseudo-value is a random number drawn from the sample distribution. This approximation for distribution requires a sufficiently large sample size, which is a condition not satisfied using a county-level sample. Provincial distribution is not suitable either because the CFPS is not representative on the province level. Hence we use the national distribution.

In addition to the two issues addressed above, there are some observations for which the sum of all income components does not equal the household net income in CFPS. This is due to the fact that for households that did not report their annual net income, the household's net income is estimated according to its consumption. To deal with this issue, we rescale each income source using the proportion $\frac{\text{household net income}}{\text{sum of all the income sources}}$.

Although the two household surveys both include rich information about household income, their geographical coverage differs. Moreover, CFPS's sampling is not representative on the provincial level. Because of these limitations, we could not apply regional decomposition to the

[3] For details of the income component adjustment of CFPS, see Xie et al. (2015).

[4] For comparison of the two surveys, see Zhang et al. (2014).

household survey data. Therefore, in our analysis of regional inequality, we use provincial-level income and population data from the NBS.

As Li and Gibson (2013, 2016) have noted, Chinese yearbooks previously reported provincial population and per capita economic outputs based on households registered, that is, the *hukou* population rather than the residential population. This resulted in a distortion of the estimate of provincial per capita statistics in previous research papers. This distortion grew larger as the number of migrant workers increased after the 1990s. Recently, the NBS updated the provincial consumption per capita data based on residential population for all provinces from 1993 to 2014. We also obtain population based on residential status from both NBS and various provincial yearbooks for 2011 and 2005, years in which many provinces updated their historical population data based on residence. The fact that the starting year of reporting residential-based population is different across provinces brings both disadvantages and advantages to our study. On the one hand, the new NBS data though much improved, are still not perfect. On the other hand, there should be no systematic distortion on the aggregate level, as there is no cutoff year in which the statistical approach changed for all.

This is the data base for our assessment of Chinese inequality trends over the last 20 years. We proceed now to a description of the overall trends and the decomposition patterns in the data.

3 Trends

We estimate various inequality measures using household survey data from CHIP and CFPS for six points of time covering the 20-year period between 1995 and 2014. Table 3.1 presents the Gini coefficient and generalized entropy indices[5] and Table 3.2 presents income ratios. The CHIP results in Panel A of each table use original income per capita, and those in Panel B use adjusted income per capita to keep consistent with CFPS. The level of inequality is rather high compared with that of many OECD (Organization for Economic Co-operation and Development) countries, but comparable with the other BRICS (Brazil, Russia, India, China, and South Africa) economies.[6] For both income construction methods, we see that the Gini coefficient has an inverted U shape pattern with

[5] The generalized entropy indices are a popular class of measure for inequality. They are derived from information theory as a measure of redundancy in data. $GE(0) = \frac{1}{N}\sum_{i=1}^{N} * ln\left(\frac{\mu}{y_i}\right)$, $GE(1) = \frac{1}{N}\sum_{i=1}^{n}\frac{y_i}{\mu} * ln\left(\frac{y_i}{\mu}\right)$, $GE(2) = \frac{1}{2N\mu^2}\sum_{i=1}^{N}(y_i - \mu)^2$, where y_i is the income of observation i and μ is the mean of income with the distribution F(y).

[6] A few examples of Gini coefficients for OECD countries, according to the World Bank, are United States, 41.06 (2013); France 33.1 (2012); Germany 30.13 (2011); and UK, 32.57 (2012). The Gini coefficients for the other BRICS countries are Brazil, 52.67 (2012); Russia, 41.59 (2012); India, 35.15 (2011); and South Africa, 63.38 (2011).

the turning point at 0.533 in 2010. The generalized entropy indices show similar trends. For GE(0), the peak appears in 2012, while for GE(1) and GE(2) it is in 2010. The differences in the turning patterns of each index could be because that each inequality index captures different characteristics of inequality. For the generalized entropy indices GE(c), the greater c is, the more sensitive it is to the top income groups. That is to say, GE(0) is more sensitive to the bottom income groups, while GE(2) is more sensitive to the top income groups.

Table 3.1 Inequality measures from household survey data

A: Original income

Year	Data	Gini	GE(0)	GE(1)	GE(2)
1995	**CHIP**	0.435	0.347	0.320	0.420
2002	**CHIP**	0.458	0.369	0.359	0.486
2007	**CHIP**	0.459	0.409	0.359	0.459
2010	**CFPS**	0.533	0.551	0.571	1.389
2012	**CFPS**	0.504	0.590	0.496	1.319
2014	**CFPS**	0.495	0.566	0.456	0.915

B: Adjusted income

Year	Data	Gini	GE(0)	GE(1)	GE(2)
1995	**CHIP**	0.349	0.206	0.215	0.300
2002	**CHIP**	0.445	0.344	0.340	0.466
2007	**CHIP**	0.478	0.446	0.400	0.601
2010	**CFPS**	0.533	0.551	0.571	1.389
2012	**CFPS**	0.504	0.590	0.496	1.319
2014	**CFPS**	0.495	0.566	0.456	0.915

Source: Authors' calculation based on CHIP and CFPS data.

Note: Panel A uses the original income from each survey. Panel B adjusts Chinese Household Income Project (CHIP) income by excluding the components that are not in the China Family Panel Studies (CFPS) survey. CHIP 2007 uses data from the National Bureau of Statistics (NBS) survey rather than the Longitudinal Survey on Rural Urban Migration in China (RUMiC) survey, because the latter uses a different questionnaire and sample framework while the former is consistent with previous years.

Table 3.2 Income ratio from household survey data

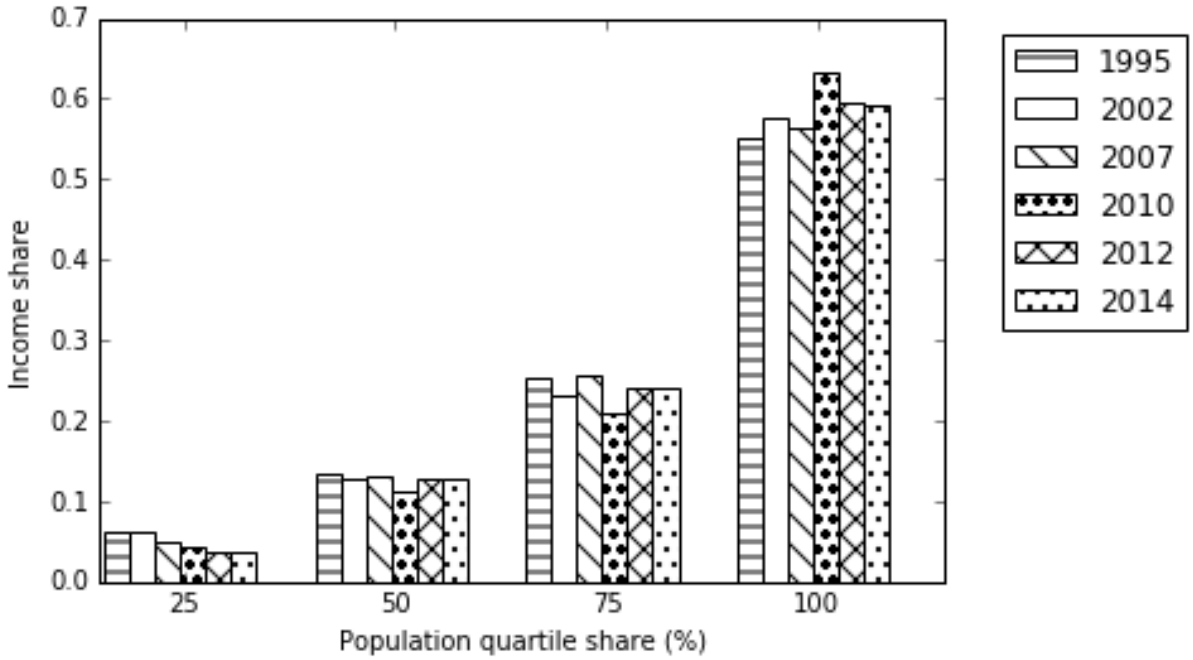
A: Original income							
Year	**Data**	**p90_p10**	**p75_p25**	**p90_p50**	**p75_p50**	**p10_p50**	**p25_p50**
1995	**CHIP**	8.719	3.489	2.876	1.880	0.330	0.539
2002	**CHIP**	9.109	3.450	3.265	1.954	0.358	0.566
2007	**CHIP**	11.968	3.980	2.815	1.805	0.235	0.453
2010	**CFPS**	13.361	3.660	3.466	1.888	0.259	0.516
2012	**CFPS**	19.873	3.895	2.846	1.755	0.143	0.451
2014	**CFPS**	19.122	3.854	2.920	1.765	0.153	0.458
B: Adjusted income							
Year	**Data**	**p90_p10**	**p75_p25**	**p90_p50**	**p75_p50**	**p10_p50**	**p25_p50**
1995	**CHIP**	4.820	2.262	2.266	1.532	0.470	0.677
2002	**CHIP**	8.319	3.296	3.099	1.907	0.372	0.579
2007	**CHIP**	13.192	4.269	2.945	1.849	0.223	0.433
2010	**CFPS**	13.361	3.660	3.466	1.888	0.259	0.516
2012	**CFPS**	19.873	3.895	2.846	1.755	0.143	0.451
2014	**CFPS**	19.122	3.854	2.920	1.765	0.153	0.458

Source: Authors' calculation based on CHIP and CFPS data.

Note: Panel A uses the original income from each survey. Panel B adjusts Chinese Household Income Project (CHIP) income by excluding the components that are not in the China Family Panel Studies CFPS survey. CHIP 2007 uses data from the NBS survey rather than the Longitudinal Survey on Rural Urban Migration in China (RUMiC) survey, because the latter uses a different questionnaire and sample framework while the former is consistent with previous years. Income ratio is the ratio of the incomes at the top versus the bottom. For example, the p90_p10 ratio is the upper bound value of the 90th percentile to that of the 10th percentile.

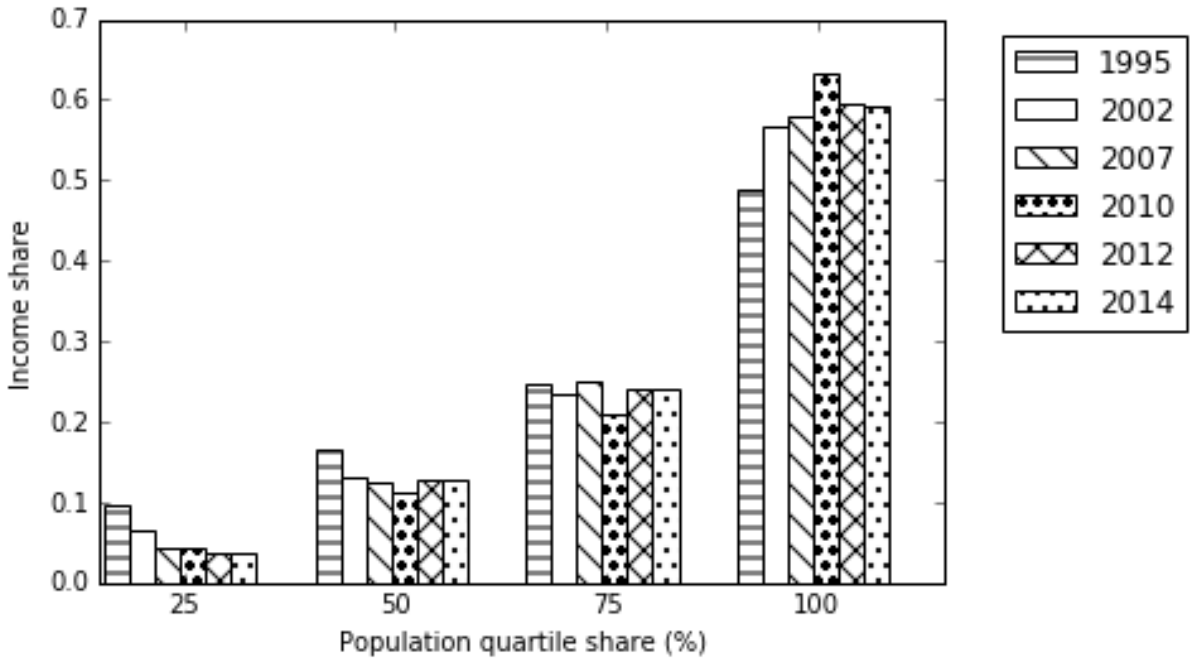
To provide a more detailed picture of income distribution, quartile and decile income shares are presented in Figures 3.1a, 3.1b, 3.2a and 3.2b. The income share of the top group reached the highest point in 2010, which is above 0.4 for the top 10 percent and above 0.6 for the top 25 percent, and then declined ever since. 2010 is also the year when the share of the middle group was the lowest. The narrowing inequality measured by the Gini coefficient, GE(1), and GE(2) since 2010 could be attributed to the rising income share of the middle group and the falling income share of the top group. While the top group's income share was not increasing, the bottom group's share seemed to decrease. We notice that the income share of the very bottom group (25 percent in Figures 3.1a, and 3.1b and 10 percent in Figures3.2a and 3.2b) went down over the years, which could increase income inequality. As a matter of fact, the top-bottom income ratio went up from 1995 to 2012 and declined slightly afterward. As shown in Table 3.2, the 90-10 ratio was as high as 19.87 in 2012 and then fell to 19.12 in 2014. Meanwhile, the bottom-middle income ratio behaves like a U shape, with a small jump in 2010 and the lowest point in 2012. The 10-50 ratio fell from 0.259 in 2010 to 0.143 in 2012, and the 25-50 ratio fell from 0.516 in 2010 to 0.451 in 2012. This trend is possibly captured by the turning behavior of GE(0), which peaked in 2012.

Figure 3.1a Quartile income share (original income)



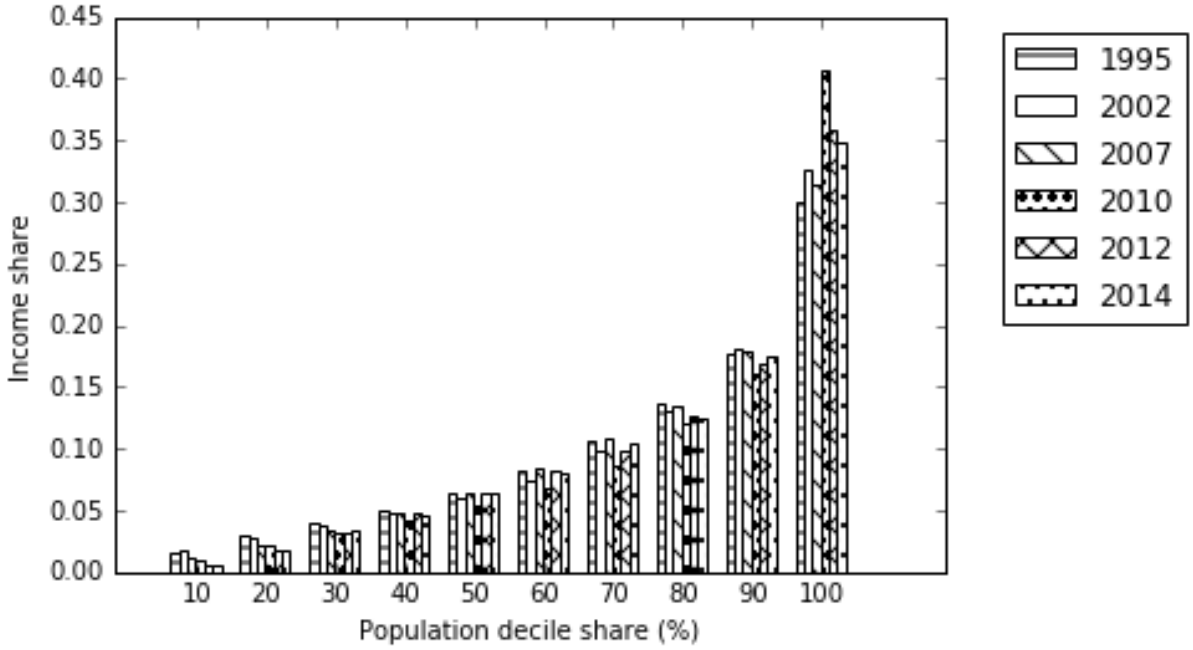
Source: Authors' calculation based on CFPS and CHIP data.

Figure 3.1b Quartile income share (adjusted income)



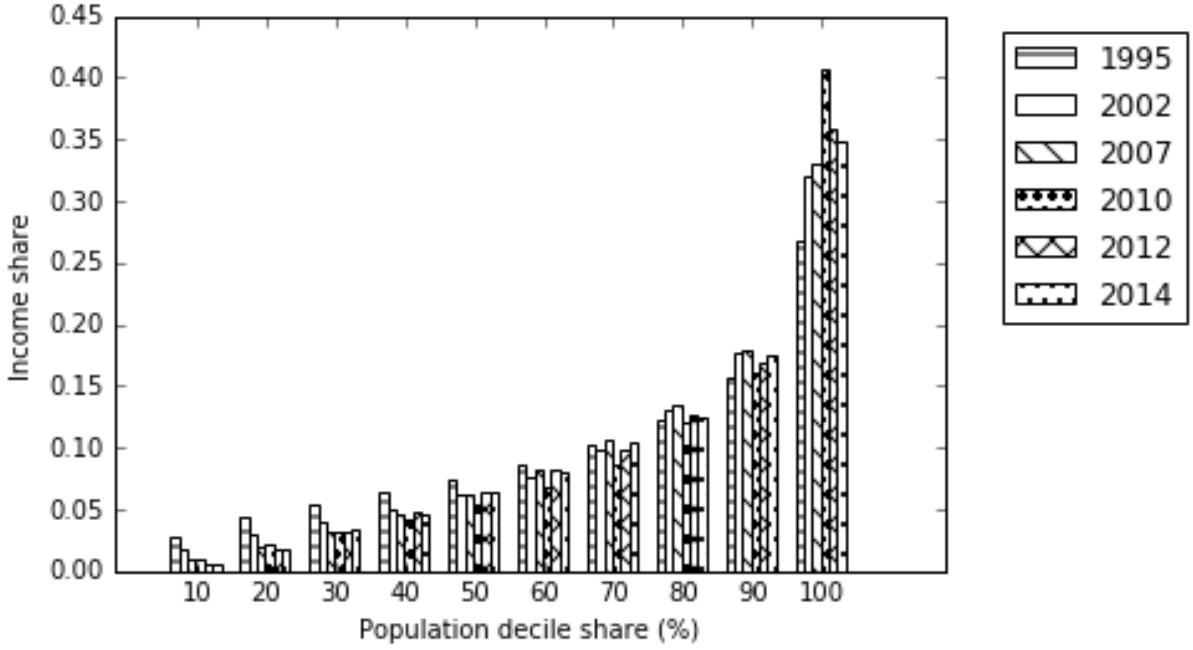
Source: Authors' calculation based on CFPS and CHIP data.

Figure 3.2a Decile income share (original income)



Source: Authors' calculation based on CFPS and CHIP data.

Figure 3.2 b Decile income share (adjusted income)



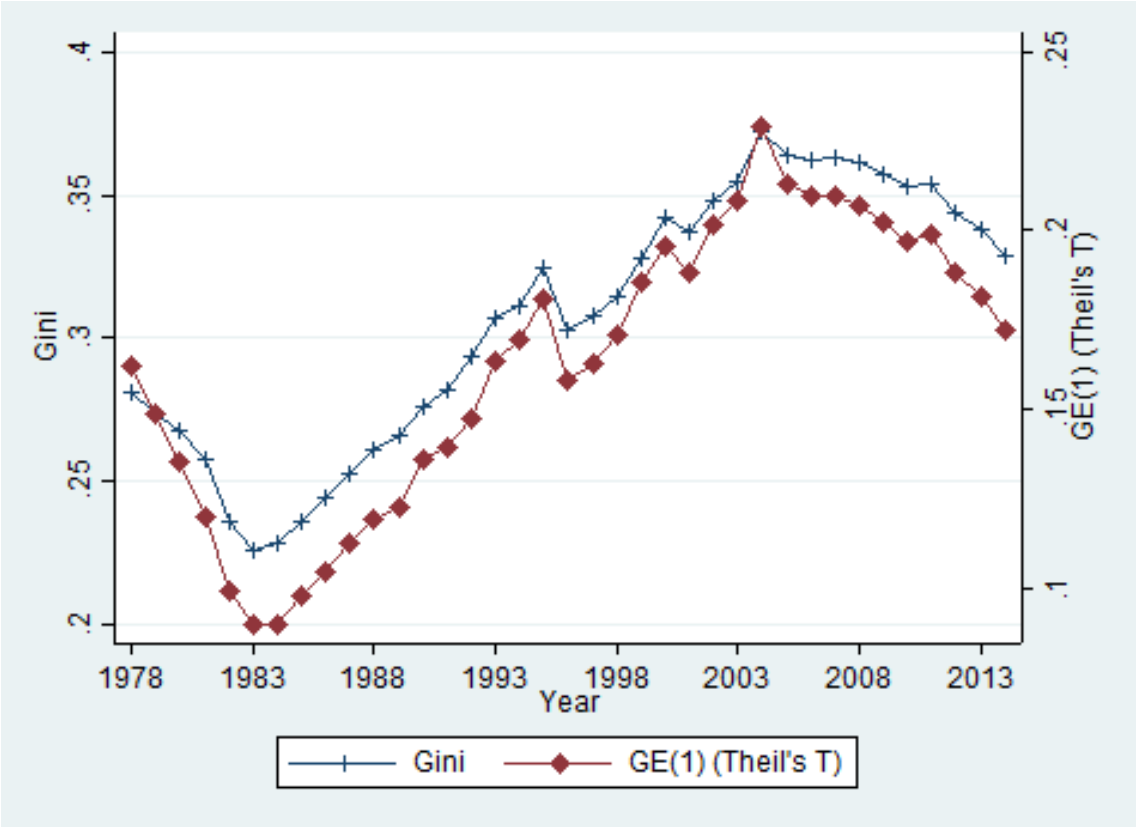
Source: Authors' calculation based on CFPS and CHIP data.

The combination of CHIP and CFPS data gives us six observations spanning the period from 1995 to 2014 based on household surveys. An alternative data perspective, useful for capturing long-term annual trends, was introduced in Kanbur and Zhang (1999, 2005). This method uses NBS data on

provincial consumption per capita, broken down by rural and urban areas for each province. Combining this with rural-urban population data for each province (see the discussion on population data in Section 2), we can construct a synthetic national consumption distribution which suppresses inequality within the rural areas and urban areas of each province. Clearly, this is an understatement of the level of inequality, but the trend over time may nevertheless convey information on the evolution of inequality.

Figure 3.3 presents the Gini coefficient and GE(1), or Theil's T, measure of inequality over time for the synthetic distribution so constructed for every year from 1978 to 2014.[7] The patterns of the two indices are quite similar. They went down slightly after 1978 and began to increase slowly after 1985. In 1996, regional inequality fell slightly and showed a climbing trend until 2004. Of course, the values of the Gini and GE(1) in Figure 3.3 and Table 4.9 are not comparable to the corresponding values in Tables 3.1 and 3.2—income is used in one and consumption in another, within-rural and within-urban inequality is suppressed in one and not in the other, and the data sources are quite different. However, the broad trends after the mid-1990s are similar from the two very different perspectives: there appears to be an inequality turnaround sometime toward the end of the first decade of the 2000s.

Figure 3.3 Reginal inequality in consumption per capita



[7] For the exact value of the indices, please see columns 1 and 2 in Table 4.9.

Overall, then, a careful assessment of the best data sources seems to suggest a plateauing of inequality, with a possible turning point around or just before 2010. To begin building an explanation of the trend, we decompose inequality by income sources and population groups.

4 Decompositions

To unpack the patterns of inequality change, we proceed to decompose inequality, first by income source and then by population subgroup.

Decomposition by income source

To understand the role of different income sources in the evolution of overall inequality, we decompose the Gini coefficient by income source following Lerman and Yitzhaki's (1985) rule.

$$G = \sum_k S_k \sum_i \frac{2}{n^2 \mu_k}\left(i - \frac{n+1}{2}\right) Y_{ki} = \sum_k S_k \bar{G}_k = \sum_k S_k R_k G_k \,, \tag{1}$$

where $S_k = \mu_k/\mu$ is the share of kth income component in total income, $\overline{G_k}$ is the "pseudo-Gini,"[8] R_k is the Gini correlation of component k with total income, and G_k is the Gini of income component k. The absolute contribution of income source k to total income inequality is

$$v_k(G) = S_k R_k G_k. \tag{2}$$

Its proportion of the total inequality is

$$\tilde{v}_k(G) = \frac{S_k R_k G_k}{G} = \frac{\sum_i \left(i - \frac{n+1}{2}\right) Y_{ki}}{\sum_i \left(i - \frac{n+1}{2}\right) Y_i}\,, \tag{3}$$

where Y_i is the income of household i and Y_{ki} is the income from source k of household i.[9]

The marginal effect of income source k is

$$\eta_k(G) = S_k \left(\frac{\overline{G_k}}{G} - 1\right). \tag{4}$$

Table 4.1 shows the share of income by source and Table 4.2 presents the Gini coefficient of each income source. Wage income represents the largest share, while its Gini coefficient is the smallest. The share of property income was small, at less than 10 percent, throughout the period under study, while its Gini coefficient was very high and remained above 0.96. The proportionate contribution

[8] The pseudo-Gini is different from the conventional Gini because the weight attached to Y_{ki} corresponds to the rank of individual i in the total income distribution, which is, in general, not the same as his or her rank in the distribution of income source k.

[9] We weighted household income by family size in all calculations.

to the total Gini coefficient of each income source, $\tilde{v}_k(G)$, and its marginal effects, $\eta_k(G)$, are reported in Tables 4.3 and 4.4, respectively. The largest contribution is from wage income, which ranged between 0.7 and 0.8 over the years, followed by transfer income, which ranged between 0.13 and 0.19. The contributions of other income source are less than 0.1. In addition to its high contribution to the overall Gini coefficient, wage income also has the largest marginal effect.

Table 4.1 Share of income by source

Year	Wage income	Operational income	Property income	Transfer income	Other income
1995	0.503	0.381	0.008	0.080	0.030
2002	0.580	0.242	0.005	0.122	0.050
2007	0.639	0.137	0.032	0.172	0.020
2010	0.680	0.142	0.022	0.111	0.045
2012	0.693	0.106	0.031	0.132	0.038
2014	0.710	0.086	0.025	0.153	0.025

Source: Authors' calculation based on CHIP and CFPS data.

Note: To be as consistent as possible across the two datasets, we excluded some components from the Chinese Household Income Project (CHIP) that are not in the China Family Panel Studies (CFPS) survey. In addition, the income sources are recalculated in CHIP according to CFPS definitions. Wage income is labor income including bonuses, allowances and subsidies, and remittances from migrant worker family members. Operational income includes net income from the sale of farm products, net income from private enterprises, and gross value of self-consumption of farm products. Property income is income from rental or sales of properties. Transfer income includes social security, pension, subsidies, etc. Other income is mainly money and gifts from relatives or friends.

Table 4.2 Gini coefficient of income by source

Year	Wage income	Operational income	Property income	Transfer income	Other income
1995	0.675	0.570	0.964	0.911	0.813
2002	0.659	0.628	0.992	0.900	0.885
2007	0.618	0.806	0.977	0.834	1.128
2010	0.602	0.784	0.981	0.916	0.914
2012	0.609	0.798	0.969	0.886	0.950
2014	0.583	0.834	0.960	0.853	0.963

Source: Authors' calculation based on CHIP and CFPS data.

Note: Each income source follow the same definition as in Table 4.1.The Gini of other income is greater than 1 in 2007 because of negative values of other income in the data.

Table 4.3 Contribution to total Gini coefficient by source

Year	Wage income	Operational income	Property income	Transfer income	Other income
1995	78.18	3.91	1.5	12.57	3.84
2002	73.83	1.65	0.86	18.15	5.51
2007	70.08	4.62	4.85	17.81	2.64
2010	69.51	8.01	3.24	14.35	4.88
2012	72.69	4.7	3.88	14.89	3.73
2014	73.11	3.86	3.07	17.43	2.54

Source: Authors' calculation based on CHIP and CFPS data.

Note: Each income source follow the same definition as in Table 4.1.

Table 4.4 Marginal effects on the Gini coefficient

Year	Wage Income	Operational Income	Property Income	Transfer Income	Other Income
1995	0.279	-0.341	0.007	0.046	0.009
2002	0.158	-0.223	0.003	0.060	0.005
2007	0.062	-0.0091	0.017	0.006	0.006
2010	0.015	-0.062	0.010	0.032	0.004
2012	0.034	-0.059	0.008	0.017	-0.001
2014	0.021	-0.048	0.006	0.021	-0.000

Source: Authors' calculation based on CHIP and CFPS data.

Note: Each income source follow the same definition as in Table 4.1. Marginal Effect is the impact that a 1% change in the respective income source will have on inequality.

Given the importance of wage income, the trends shown in Table 4.2 are central in understanding the forces underlying the overall inequality trend. Inequality of wage income has fallen sharply, as has inequality of transfers. These are the dominant factors in total income, and thus their declining inequality is the dominant factor in inequality change and accounts for the decrease in inequality.

To see the sensitivity of the results, we follow Paul's (2004) extension of the Gini decomposition to decompose the Theil's T index,[10] that is, GE(1), by income sources.

$$T = \sum_k \sum_i \frac{1}{n\mu} ln(\frac{Y_i}{\mu}) Y_{ki}, \tag{5}$$

where μ is the mean of population income.

The absolute contribution to income inequality of income source k is

$$v_k(T) = \sum_i (\ln Y_i - \ln \mu) Y_{ki} \, . \tag{6}$$

When expressed as a proportion of total inequality, it can be written as

$$\tilde{v}_k(T) = v_k(T)/T = (\sum_i (lnY_i - ln\mu)Y_{ki}) / \sum_i (lnY_i - ln\mu)Y_i \, . \tag{7}$$

The marginal effect of income source k on the Theil's T index is

$$\eta_k(T) = \frac{1}{T\mu n} \sum_i Y_i (S_{ki} - S_k) lnY_i, \tag{8}$$

where S_{ki} is the share of income source k in the total income of i-th household. The decomposition results for the Theil's T index are presented in Tables 4.5 and 4.6. The results are quite consistent with what we find in the Gini decomposition.

[10] We choose to decompose the Theil's T index here because for the generalized entropy class inequality measures GE(c), only when $0 < c < 2$ is the negativity requirement met as shown in Paul (2004).

Table 4.5 Contribution to Theil's T by source

Year	Wage Income	Operational Income	Property Income	Transfer Income	Other Income
1995	101.35	-22.77	2.44	14.38	4.61
2002	88.75	-20.02	1.43	23.34	6.50
2007	71.99	-2.56	11.26	16.06	3.25
2010	66.45	7.82	6.24	14.33	5.17
2012	77.86	0.05	4.84	13.70	3.44
2014	76.99	-0.81	3.77	17.43	2.63

Source: Authors' calculation based on CHIP and CFPS data.
Note: Each income source follow the same definition as in Table 4.1

Table 4.6 Marginal Effects on Theil's T

Year	Wage Income	Operational Income	Property Income	Transfer Income	Other Income
1995	0.511	-0.608	0.017	0.064	0.016
2002	0.307	-0.442	0.009	0.112	0.015
2007	0.081	-0.163	0.081	-0.011	0.012
2010	-0.015	-0.063	0.040	0.032	0.007
2012	0.086	-0.105	0.018	0.005	-0.003
2014	0.060	-0.094	0.013	0.021	0.001

Source: Authors' calculation based on CHIP and CFPS data.
Note: Each income source follow the same definition as in Table 4.1

In addition to the level of inequality, the change in inequality over time can also be expressed as a weighted average of over time changes in each income source, as stated in Paul, Chen, and Lu (2017). Denote $\dot{G_{t,t+1}} = (G_{t+1} - G_t)/G_t$, which is the proportionate change in household income inequality between year t and year t + 1. It could be written as

$$\dot{G}_{t,t+1} = \sum_k \tilde{v}_k\,(G_t)\dot{v}_k\big(G_{t,t+1}\big), \tag{9}$$

where $\tilde{v}_k(G_t)$ serves as a weight, and $\dot{v}_k\big(G_{t,t+1}\big) = \frac{v_k(G_{t+1}) - v_k(G_t)}{v_k(G_t)}$. Then the contribution of income source k to the change in the Gini coefficient is $\tilde{v}_k(G_t)\dot{v}_k(G_{t,t+1})$. Similarly, the contribution of income source k to the change in the Theil's T index is $\tilde{v}_k(T_t)\dot{v}_k\big(T_{t,t+1}\big)$.

The results for decomposition of the change in inequality are presented in Tables 4.7 and 4.8. The greatest contribution to the proportionate increase of the Gini coefficient and the Theil's T index from 1995 to 2002 was wage income, followed by transfer income. And from 2002 to 2007, property income and operational income were the top two drivers for the proportionate increase of the Gini coefficient and Theil's T index. Wage income became the most important contributor to the dynamic change in inequality again in the period between 2007 and 2010 for both inequality measures. When inequality began to turn downward from 2010 to 2012, operational income played the most important role. Later, from 2012 to 2014, the contributions to the proportionate change in

the Gini coefficient from wage income, operational income, and property income were quite comparable. However, for the Theil's T index, wage income served as the top inequality-reducing component.

Table 4.7 Contribution to the change in Gini coefficient by source (%)

Year	Change	Wage income	Operational income	Property income	Transfer income	Other income
1995–2002	27.3	15.8	-1.8	-0.4	10.5	3.2
2002–2007	7.5	1.5	3.3	4.4	1.0	-2.7
2007–2010	11.6	7.5	4.3	-1.2	-1.8	2.8
2010–2012	-5.6	-0.9	-3.6	0.4	-0.3	-1.4
2012–2014	-1.7	-0.8	-0.9	-0.9	2.2	-1.2

Source: Authors' calculation based on CHIP and CFPS data.
Note: Each income source follow the same definition as in Table 4.1

Table 4.8 Contribution to the change in Theil's T by source (%)

Year	Change	Wage income	Operational income	Property income	Transfer income	Other income
1995–2002	57.6	38.5	-8.8	-0.2	22.4	5.6
2002–2007	17.8	-3.9	17.0	11.8	-4.4	-2.7
2007–2010	42.7	22.9	13.7	-2.4	4.4	4.1
2010–2012	-13.2	1.2	-7.8	-2.0	-2.4	-2.2
2012–2014	-8.1	-7.1	-0.8	-1.4	2.3	-1.0

Source: Authors' calculation based on CHIP and CFPS data.
Note: Each income source follow the same definition as in Table 4.1

Overall, then, these accounting exercises are consistent with the hypothesis that it is the narrowing of the wage distribution and the role of transfers that are important in beginning an understanding of the Chinese inequality turnaround.

Decomposition by subgroups

An alternative perspective on patterns of inequality change is provided by decomposition by population subgroup. Unequal income distribution between urban and rural sectors is a common feature in developing countries, and China is no exception. In addition to the unequal development between rural and urban regions, the disparity between the coastal areas in the east and inland areas in the middle and west is also enormous (Fan, Kanbur, and Zhang 2011). To understand these components of inequality, we use the data underlying Table 4.9, the synthetic distribution constructed from rural and urban per capita consumption and population.

Table 4.9 Regional inequality and inequality between components based on consumption

Year	Gini	GE(1) (Theil's T)	Rural-Urban	Coastal-Inland
1978	0.281	0.162	14.657	0.250
1979	0.273	0.149	13.144	0.258
1980	0.268	0.136	11.556	0.406
1981	0.258	0.120	9.835	0.484
1982	0.236	0.100	7.941	0.436
1983	0.226	0.090	6.920	0.468
1984	0.228	0.090	6.810	0.496
1985	0.236	0.098	7.283	0.538
1986	0.245	0.105	7.549	0.645
1987	0.253	0.113	7.907	0.717
1988	0.261	0.120	8.126	0.843
1989	0.266	0.123	7.703	0.888
1990	0.277	0.136	8.713	0.742
1991	0.282	0.140	9.242	0.547
1992	0.294	0.148	9.638	0.662
1993	0.307	0.164	10.689	0.819
1994	0.311	0.170	10.989	1.141
1995	0.324	0.181	12.037	1.762
1996	0.303	0.158	9.917	1.274
1997	0.308	0.163	10.369	1.341
1998	0.314	0.171	10.925	1.476
1999	0.328	0.186	11.931	1.508
2000	0.342	0.196	12.694	2.000
2001	0.337	0.188	11.618	1.282
2002	0.348	0.202	12.606	1.347
2003	0.354	0.208	13.530	1.358
2004	0.372	0.229	14.575	1.268
2005	0.364	0.213	13.957	2.306
2006	0.362	0.210	13.695	2.328
2007	0.363	0.210	13.619	2.293
2008	0.361	0.207	13.187	2.307
2009	0.357	0.202	12.923	2.400
2010	0.353	0.197	12.359	2.316
2011	0.354	0.199	11.516	2.276
2012	0.344	0.188	10.345	2.163
2013	0.338	0.182	9.548	2.197
2014	0.329	0.172	8.419	2.142

Source: Authors' calculations based on data from the National Bureau of Statistics and various provincial statistical yearbooks.

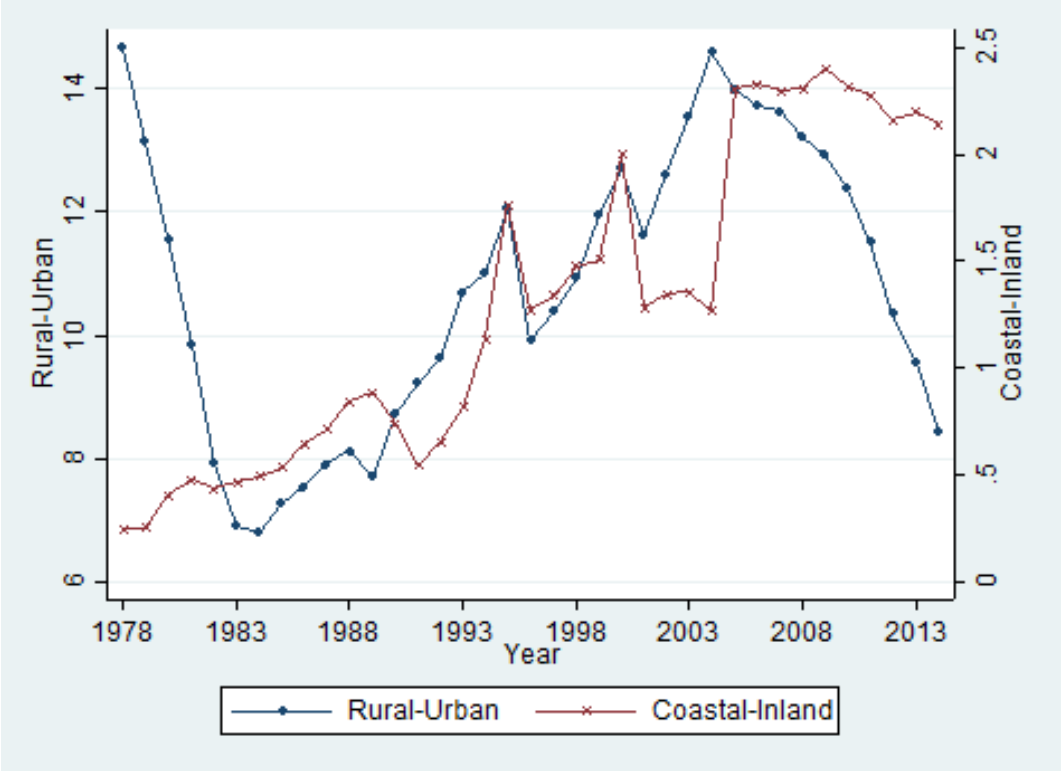
We further decompose the Theil's T index by rural-urban subgroups and coastal-inland subgroups, respectively, as in equation (10).

$$T = T_w + T_b = \sum_k \left(\frac{N_k}{N}\right)\frac{\mu_k}{\mu}T_k + \sum_k \frac{N_k}{N}\frac{\mu_k}{\mu} ln\left(\frac{\mu_k}{\mu}\right) = \sum_k \frac{Y_k}{Y}T_k + \sum_k \frac{Y_k}{Y} ln\left(\frac{Y_k}{Y}/\frac{N_k}{N}\right), \quad (10)$$

where N is the total number of individuals and k is an indicator for groups, for example, rural or urban. The first term is the within-group component of the Theil's T index and the second term is the between-group component.

The rural-urban between component and the coastal-inland between component are reported in Table 4.9 and graphed in Figure 4.1. There are three peaks for the rural-urban between component, in 1995, 2000, and 2004. After the third peak, the rural-urban between component maintained a declining trend. Notice that 2005 is the year when regional inequality and rural-urban between components turned downward. That is the year when, it has been argued, China passed the "Lewis turning point" (Zhang, Yang, and Wang 2011). That is also the year when the agriculture tax was abolished and the New Countryside Project was initiated. The coastal-inland between component fell in 2001 after a high peak in 2000 and then jumped again in 2005. It remained at a relatively high level until 2009 and then showed a steady decline, contributing to the narrative of tightening labor markets in inland provinces and government policy to encourage development in the western regions. These explanations are taken up in the next section.

Figure 4.1 Between component of GE(1)



Source: Authors' calculations based on data from the National Bureau of Statistics and various provincial statistical yearbooks.

5 Some explanations

Our main task in this paper has been to establish the key trends in Chinese inequality over the past 20 years. Based on a number of perspectives, it does seem as though there was a turnaround in Chinese inequality about 10 years ago, with inequality plateauing and even declining after a long period of sharp increase. Explanations for this evolution will have to await detailed investigation from researchers focusing on a range of factors in depth. However, in this section we present a broad framework for such explanations.

A simple way to think of the evolution of national income distribution is to divide the economy up into key sectors and to look at inequality within and between sectors. Given the importance of the structural transformation which is under way in China just now, we can begin our discussion in terms of two sectors—rural and urban. The national income distribution is a weighted sum of the rural income distribution and the urban income distribution, with the weights being the population shares of the two sectors. Overall inequality will then depend on (1) the inequality within each of the two sectors, (2) the gap between the means of the two sectoral distributions, and (3) the population share of each sector.

As an illustration, for the GE(0) index, also known as the mean log deviation, denoted L, national inequality can be decomposed as follows:

$$L = x\,L_1 + (1-x)L_2 + log\,[x\,k + (1-x)] - [x\,log\,(k)], \qquad (11)$$

where subscripts 1 and 2 denote rural and urban, respectively; *x* is the population share of the urban sector; and k is the ratio of the urban mean to the rural mean. The evolution of national inequality is then composed of (i) the evolution of L_1 and L_2, (ii) the evolution of *k*, and (iii) evolution of x.

With this framework, we can relate the inequality turnaround to basic economic forces and to policy. First, as Zhang, Yang, and Wang (2011) have argued, China has now reached the Lewis turning point, where rural-to-urban migration begins to tighten rural labor markets and hereby mitigate the rural-urban wage differential. In addition, heavy government investment in infrastructure in the rural sector and in lagging regions, a feature of Chinese policy from the 2000s onward (Fan, Kanbur, and Zhang 2011), will also raise economic activity and incomes in these areas. This will surely lower *k* in equation (11) and hence, ceteris paribus, overall inequality. This is consistent with the evolution of the rural-urban component of inequality shown in Table 4.9, and it is further consistent with the observed reduction in inequality in the national wage distribution as shown in Table 4.2.

The narrowing of the wage distribution and the increasing equality of the transfer distribution shown in Table 4.2 can also be associated with policy changes. For example, in 2004 the Ministry of Labor and Social Security issued a "Minimum Wage Regulations" law and the next decade saw rising minimum wage standards coupled with substantial improvements in compliance (Kanbur, Li, and Lin 2016). Further, a number of social programs were introduced and strengthened from the 2000s onward. Since 2004, for example, China has introduced new rural cooperative medical insurance, currently covering more than 95 percent of the rural population. Rural social security has also been rolled out since 2009. Although the benefits for rural medical insurance and social security are still much lower than their urban counterparts, the programs have provided some cushion to rural residents against health risk and elderly care. Tightening labor markets in rural areas, combined with inequality-mitigating transfer and regulation regimes in urban and rural areas, acted through channels (i) and (ii) to reduce inequality.

The impact of x on L, as seen through equation (11), is quite complex. With all other factors constant, it can be shown (Kanbur and Zhuang 2013) that under certain conditions the behavior of L as a function of x has an inverse-U shape, as hypothesized by Kuznets (1955). Up to a certain point, urbanization increases inequality, and beyond this point further urbanization will decrease inequality. This "Kuznets turning point" sets out the effect of urbanization pure and simple on inequality. The turning point itself depends on the other inequality parameters, but it is shown by Kanbur and Zhuang (2013) that Chinese urbanization has now crossed the Kuznets turning point—and further urbanization will reduce inequality through channel (iii) above.

Of course, each of these potential explanations needs to be investigated more fully and in greater depth. But they appear to us to be consistent with underlying economic and policy forces which can explain the inequality turnaround we see in the data.

6 Conclusion

We have argued in this paper that the long period of inequality increase in China is coming to an end. The data, seen from different perspectives, seem to indicate a turnaround towards the latter part of the 2000s. The explanations for this turnaround need to be explored further, but there is prima facie evidence of economic forces and government policy tightening labor markets in rural areas, together with government transfers and social policy mitigating inequality in urban and rural areas, which may explain the observed trends. This of course, raises the further question of why government policy changed over a 20-year period from allowing inequality to increase to mitigating it. The political economy of the Chinese state (Wong, 2011) may provide an explanation, but that takes us beyond our present remit. Although China's inequality has come to a turnaround, the level is still rather high compared with many countries. More efforts are still needed to keep the momentum.

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Appendix Supplementary table

Table A.1 Summary of studies on China's inequality trends

Author and year	Years covered	Data source	Income concept	Inequality measure	Population coverage	Inequality trend established
Alvaredo et al. 2017	1978–2014	World Wealth and Income Database	Pretax national income	Top 1% income share and bottom 50% income share	National	Increased significantly since 1978 and plateaued after 2006
Knight, Li, and Wan 2016	2002, 2013	CHIP	Household wealth and household income	Gini	21 provinces in 2002 and 14 in 2013	Increased
Li et al. 2016	1984–2012	Ravallion and Chen 2007 and NBS 2003–2012	Income per capita	Gini, urban-rural income ratio	27 provinces	Increased from 1984 to 1994, then decreased until 1997, then increased until 2005 and decreased afterward
Mendoza, 2016	1988, 1995, 2002	CHIP	Household disposable income per capita	Gini	12–16 provinces	Increased from 1988 to 2002
Xie et al. 2015	2000, 2003–2012	CFPS, CGSS, CHFS, CHIP, NBS (from Xie et al. 2013)	Family income per capita	Gini	25 provinces	Plateaued after 2003 and declined from 2010 to 2012
Zhang 2015	2002–2009	Chinese urban household survey data from NBS	Household disposable income per capita	Gini	186 cities in 16 provinces	Peaked in 2005 and 2008, then decreased slightly in 2009
Appleton, Song, and Xia 2014	1988, 1995, 2002, 2008	CHIP	Household income per capita	Gini, generalized entropy index, Atkinson index, income ratio	12–16 provinces, urban	Sharp increases in inequality, largely due to changes in the wage structure
Cheong and Wu 2014	1997–2010	Provincial statistical yearbooks 1998–2011, China Statistical Yearbook for Regional Economy 2004–2008, and China Industrial Economy Statistical Yearbook 1994–2008	Gross regional product (GRP) per capita for regional decomposition; value-added per capita for industrial decomposition	Gini	22 provinces	County-level GRP per capita Gini increased from 1997 to 2003 and then decreased until 2010; value-added per capita Gini increased from 1993 to 2003 and then declined slowly until 2007

Author and year	Years covered	Data source	Income concept	Inequality measure	Population coverage	Inequality trend established
Xie and Zhou 2014	2010, 2011, 2012	NBS Mini-Census 2005, CGSSS, CFPS, CHFS, CLDS, UNU-WIDER, official Gini, Li et al. 2013	Family income and family income per capita	Gini	National	Increased after 1985 and then plateaued in 2010–2012, based on official estimates
Kanbur and Zhuang 2013	1990, 2008	World Bank's PovcalNet	Per capita household consumption expenditure	Gini, GE(0)	National	Increased from 1990 to 2008
Lee 2013	2000–2010	Statistical Yearbook of China's Prices, Income and Expenditure Survey in the Urban Households	Grouped provincial disposable per capita income of urban households	Gini, L (GE(0))	National, urban	Increased after 2000, peaked in 2005 and 2008, and then decreased from 2008 to 2010
Li and Gibson 2013	1990–2010	Provincial statistical yearbooks	Provincial GDP per capita	Gini, T	National	Small peak in 1993 and large peak in 2005
Chi 2012	1988–2009	Chinese Urban household survey data from NBS	Individual income	Gini	9 provinces, urban	Peaks in 1998, 2005, and 2008
Chan, Zhou, and Pan 2014	1995–2011	China Statistical Yearbook for Regional Economy	Grouped income per person from each decile	Average adjusted Gini	26 provinces	Large peak in 2002, decreasing 2009–2011
Fan, Kanbur, and Zhang 2011	1952–2007	Comprehensive Statistical Data and Materials on 50 Years of New China, China Statistical Yearbook	Provincial per capita consumption	Gini, GE(1)	National	Peaks in 1960, 1975, and 2005 and troughs in 1952 and 1967
Chi, Li, and Yu 2011	1987, 1996, 2004	Chinese urban household survey data from NBS	Total individual income	Gini, GE(1)	National, urban	Increasing
Goh, Luo, and Zhu 2009	1989, 2004	CHNS	Per capita household income	Gini	8 provinces	Increasing
Wang, Smyth, and Ng 2009	1980, 1985, 1990, 1995–2006	China Rural Household Survey Yearbook	Grouped average annual income per capita	Kakwani index, Chakravarty index, Gini	National	Peak in 2003 and slight reduction afterward
Shen and Yao 2008	1987–2002	National Fixed-point Survey (NFS)	Household per capita income	Gini	National, rural	Relatively steady before 1994, then increased significantly after a trough in 1996, peaking in 2001

Author and year	Years covered	Data source	Income concept	Inequality measure	Population coverage	Inequality trend established
Ravallion and Chen 2007	1980–2001	Rural Household Surveys (RHS) and the Urban Household Surveys (UHS) of NBS	Tabulation of distribution of income per capita	Gini	National	Decreasing 1980–1982, increasing 1982–1994, decreasing 1994–1996, and increasing 1996–2001
Démurger, Fournier, and Li 2006	1988, 1995, 2002	CHIP	Household total disposable income	Gini, GE(1), GE(0)	Urban	Increased 1988–1995 and decreased 1995–2002
Khan and Riskin 2005	1995, 2002	CASS survey of households	Household per capita income	Gini	11 provinces in the urban sample and 19 provinces in the rural sample for 1995; 21 provinces in the rural sample for 2002	Both rural and urban inequality decreased, but national inequality remained unchanged
Kanbur and Zhang 2005	1952–2000	Statistical yearbooks	Real per capita consumption in rural and urban areas	Gini, GE(0)	28 provinces	Peaks in 1960 and 1976 and troughs in 1967 and 1984; inequality increased 1984–2000
Meng, Gregory, and Wong 2005	1986–2000	NBS Urban Household Income and Expenditure Survey (UHIES)	Real income and real net expenditure	Gini	National, urban	Increased

Source: Authors.

Note: CFPS = China Family Panel Studies; CHFS = China Household Finance Survey; CHIP = Chinese Household Income Project; CGSS= Chinese General Social Survey; CLDS= China Labor Force Dynamic Survey; NBS = National Bureau of Statistics.

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