Chapter 8
Dynamic Rural Poverty Changes by Regions: Current Status and Prospects

Since the reform and opening up, the rural economy in China's eastern region has developed rapidly, while the rural economy in the central and western regions has developed slowly. On a national scale, the southern region economically grows faster than the northern region, and the eastern region economically grows faster than the western region. There are significant differences in economic development among the eastern, central, and western regions, which will inevitably affect the income and poverty of rural households in these regions. Based on the above economic reality, in this chapter, we divided the rural households into three types: rural households in the eastern region, rural households in the central region, and rural households in the western region to study the impact of economic growth and inequality on the poverty of rural households in these regions.

1 Stage 1: 2000–2010

1.1 Geographic Conditions and Rural Poverty

Figure 1 shows the provincial poverty distribution in 2000 and 2010. In the figure, the darker the color is, the severer the poverty situation is. On the whole, as the years went on, the dark areas decreased, indicating that the poverty across the country had been reduced. It was obtained from the dark color concentration areas that the poverty headcount ratio in developed provinces or regions was significantly lower than that of ten years ago, while provinces with backward economic development gathered more poor people. Specifically, in 2000, the poverty headcount ratio in 7 provinces including Shanghai, Beijing, Tianjin, Zhejiang, Jiangsu, Shandong, Guangdong, and Fujian was below 1%, the poverty headcount ratio in 12 provinces including Hebei, Liaoning, Jilin, Hubei, Hunan, Anhui, Jiangxi, Henan, Guangxi, Hainan, Chongqing, and Sichuan was between 1 and 5%, and the poverty headcount ratio in the remaining 11 provinces was above 5%. Especially in Heilongjiang, Shanxi, Inner Mongolia,

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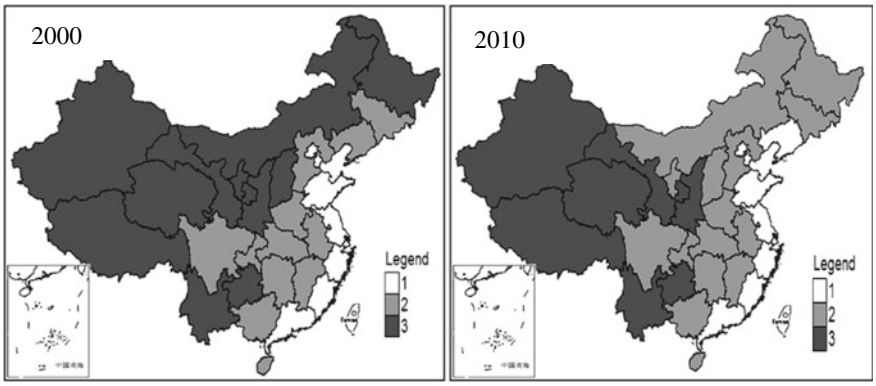

Fig. 1 Distribution of China's rural poverty: comparison of provincial distribution data in 2000 and 2010. *Data source Poverty Monitoring Report of Rural China* over the years. *Note*: ① 1 means that the poverty headcount ratio is below 1%, 2 means that the poverty headcount ratio is between 1 and 5%, and 3 means that the poverty headcount ratio is higher than 5%; ② Taiwan Province and Hong Kong Special Administrative Region are not included in the statistical samples

Shaanxi, Gansu, and Yunnan, the poverty headcount ratio was between 5 and 10%, and in Tibet, Guizhou, Qinghai, Xinjiang, and Ningxia, the poverty headcount ratio was above 10%. In 2010, there were seven provinces with a poverty headcount ratio above 5%, including Qinghai, Tibet, Shaanxi, Gansu, Guizhou, Yunnan, and Xinjiang, and three additional provinces made the list of provinces and regions with a poverty headcount ratio below 1% compared with ten years ago. People in developed areas such as Beijing and Shanghai totally got rid of poverty.

CHIPs data provide detailed locations of households, making the division of rural households by location feasible (see Table 1). In terms of the distribution of rural population and its evolutions, the eastern and central regions have more rural population than the western region. On the whole, the sample size of rural households in different regions had no significant changes. Due to the economy and geography, the eastern and central regions have a majority of population in China, and this proportion is increasing slightly. The population in the western region increased in 1995 and 2002 and then decreased. In 2007, rural households in the western region accounted for only 1/5 of the total rural population in China.

1.2 Regional Disparity of Inequality and Growth

Table 2 shows the changes in the income growth of rural households classified by region. From the perspective of income level, the eastern region represents the highest average income of rural households, followed by the central region and then the western region. However, the income of rural households in the western region grows rapidly. The data in Table 2 showed that the average income of rural households in the

Table 1 Statistics of rural household samples in different locations

	1988			1995			2002			2007		
	Province included in samples											
Eastern	Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan			Beijing, Hebei, Liaoning, Jiangsu, Zhejiang, Shandong, Guangdong			Beijing, Hebei, Liaoning, Jiangsu, Zhejiang, Shandong, Guangdong			Hebei, Jiangsu, Zhejiang, Guangdong		
Central	Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi			Shanxi, Jilin, Anhui, Jiangxi, Henan, Hubei, Hunan			Shanxi, Jilin, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi			Anhui, Henan, Hubei		
Western	Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia			Sichuan, Guizhou, Yunnan, Shaanxi, Gansu			Chongqing, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Xinjiang			Chongqing, Sichuan		
	Freq.	Percentage	Cum. %	Freq	Percentage	Cum. %	Freq	Percentage	Cum. %	Freq.	Percentage	Cum. %
Eastern	3702	36.2	36.2	2998	37.5	37.5	3100	33.7	33.7	3500	43.8	43.8
Central	4175	40.9	77.1	3002	37.5	75.0	3650	39.7	73.4	2900	36.2	80.0
Western	2340	22.9	100	1998	25.0	100	2450	26.6	100	1600	20.00	100
Total	10,217	100	–	7998	100	–	9200	100	–	8000	100	–

Data source CHIPs, collated by the author

Table 2 Income growth of rural households in different regions

	Per capita net income (RMB yuan)				Average annual growth rate of income (%)			
	1988	1995	2002	2007	1988–1995	1995–2002	2002–2007	1988–2007
Eastern	701	1101	1808	2697	6.65	7.35	8.33	7.35
Central	464	709	1067	1664	6.24	6.02	9.29	6.95
Western	396	558	893	1574	5.02	6.96	11.99	7.54
Total	533	818	1270	2098	6.30	6.49	10.55	7.47

Data source CHIPs, collated by the author.
Note The per capita net income of rural households was calculated at constant prices in 1980

western region increased from RMB533 in 1988 to RMB1573 in 2007 at an annual rate of 7.54%, higher than that of the eastern and central regions. In particular, from 2002 to 2007, thanks to the Western Development strategy, the average annual income growth of rural households in the western region reached 12%. The eastern region is a cluster of developed provinces in China. It not only has relatively high per capita income, but also has maintained a high growth rate of 7–8% since the mid to late twentieth century. The absolute income level of rural households in the central area is lower than that in the eastern region but higher than that in the western region, with the lowest income growth rate among these regions. From 1988 to 2007, the average annual income growth rate in the central region was only 6.95%, while that in the eastern and western regions was 7.35% and 7.54%, respectively.

Figure 2 shows the changes in the Gini coefficient of rural households in different regions. On the whole, the income inequality among rural households in the eastern

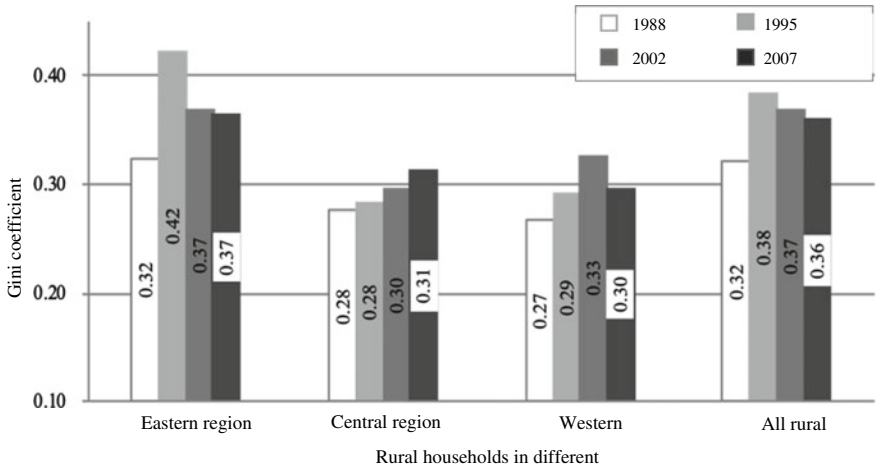

Fig. 2 Gini coefficient of rural households in different regions. *Data source* CHIPs, collated by the author

region is relatively high, while that in the central and western regions is relatively low. In 1988, the Gini coefficient of rural households in the eastern region was 0.32, which was the same as the national level. However, in 1995, there was a large-scale income polarization among rural households in this region, and the Gini coefficient suddenly increased to 0.42, much higher than the national level. As of 2002, the Gini coefficient in the eastern region fell back. In 2002 and 2007, it remained at about 0.37. The income inequality among rural households in the central region shows a steady and slow upward trend within a reasonable range, with the Gini coefficient rising slightly from 0.28 in 1988 to 0.31 in 2007. The income inequality among rural households in the western region was the smallest. Its Gini coefficient was only 0.27 in 1988 but rose slightly to exceed the eastern region after 1995.

In summary, the economic indicators of the eastern, central, and western regions differ significantly. The average income level of rural households in the western region is relatively low, but it rises very fast, and the income inequality within the group has always been within a reasonable range. This indicates that the growth in the western region has benefited all classes. However, given the poverty index calculations below and the pro-poor growth in Chapter 4, the growth during this period did not significantly benefit the poor in the rural households in the western region. The average income of rural households in the eastern region is the highest and maintains a rapid growth rate among the three regions. But its income inequality within the group is relatively high. Since the twenty-first century, the Gini coefficient has reached 0.37, indicating that behind the high growth rate, the gap between the rich and the poor among the eastern rural households has expanded. Before 2007, the income level of rural households in the central region was higher than that in the western region, but due to its slower growth rate, the per capita income of rural households in the western region was catching up, and the gap between the two regions was gradually narrowing. In 2007, the absolute difference in the income of rural households in the central and western regions was only RMB90. If the national representativeness of samples is excluded, the eastern region should take this trend seriously.

1.3 Regional Poverty Analysis

The internal poverty status of each group of rural households is shown in Table 3. First of all, changes in various poverty indexes are examined. The poverty level of rural households in various regions is steadily decreasing as a whole. However, during 1988 to 1995, the incidence of poverty among rural households in the eastern and western regions increased sharply, and then declined again. For example, the incidence of poverty in the eastern and western regions below the absolute poverty line increased from 4 and 19% in 1988 to 14% and 41% in 1995, respectively. This data is unusual. After data backtracking, we found that this is likely to be a problem

Table 3 Poverty index of rural households in different regions

	α=0				α=1				α=2			
	1988	1995	2002	2007	1988	1995	2002	2007	1988	1995	2002	2007
	Official absolute poverty line											
Rural households in the eastern region	0.042	0.142	0.020	0.014	0.012	0.056	0.007	0.027	0.006	0.029	0.004	0.195
Rural households in the central region	0.075	0.074	0.028	0.016	0.021	0.023	0.007	0.007	0.010	0.012	0.004	0.014
Rural households in the western region	0.113	0.141	0.046	0.014	0.023	0.040	0.011	0.008	0.008	0.018	0.004[1]	0.011
All rural households	0.059	0.116	0.028	0.015	0.017	0.039	0.008	0.016	0.008	0.020	0.004	0.093

	α=0				α=1				α= 2			
	1988	1995	2002	2007	1988	1995	2002	2007	1988	1995	2002	2007
	Low-income line											
Rural households in the eastern region	0.263	0.223	0.044	0.019	0.074	0.099	0.013	0.024	0.033	0.058	0.007	0.127
Rural households in the central region	0.500	0.205	0.081	0.029	0.152	0.061	0.019	0.010	0.067	0.028	0.008	0.012
Rural households in the western region	0.191	0.405	0.139	0.030	0.030	0.116	0.033	0.011	0.008	0.052	0.013	0.010
All rural households	0.390	0.263	0.076	0.025	0.116	0.089	0.019	0.017	0.051	0.045	0.008	0.062

(continued)

[1] 0.004 in this column is rounded off. The original values from top to bottom are 0.004139, 0.003589, 0.004311, and 0.003905, respectively.

Table 3 (continued)

	α=0				α=1				α= 2			
	1988	1995	2002	2007	1988	1995	2002	2007	1988	1995	2002	2007
	"USD1 per person per day"											
Rural households in the eastern region	0.636	0.403	0.135	0.053	0.229	0.185	0.042	0.028	0.111	0.113	0.020	0.062
Rural households in the central region	0.873	0.567	0.283	0.112	0.379	0.190	0.080	0.033	0.202	0.091	0.034	0.018
Rural households in the western region	0.800	0.775	0.426	0.129	0.235	0.318	0.132	0.034	0.086	0.163	0.057	0.017
All rural households	0.765	0.562	0.250	0.089	0.310	0.221	0.074	0.031	0.160	0.118	0.033	0.037

Data source CHIPs, collated by the author.
Note All the calculated results have passed the hypothesis testing at the 5% level of significance

in the survey sample itself, rather than representing a national trend.[2] In addition, according to Table 3, the SPG index in 2007 was higher than in previous years (except for some areas where the SPG index declined). This phenomenon is worth noting. Since the SPG index gives more weight to the poorer population, the SPG index continues to increase while the absolute number of poor people declines, indicating that the income level of the poorest people within rural households has deteriorated, and the eastern region is the most serious.

We focus on comparing the poverty status of rural households in various economic regions below. To our surprise, in the sample statistical results, the poverty situation of rural households in the western region is not always at the highest level as we thought. For example, even though the H-indexes of rural household in the eastern, central, and western regions below the absolute poverty line in 1988 were 0.042, 0.075, and 0.113, respectively, by 2007, the H-indexes of the three types of rural households under the same poverty measurement indicators were 0.014, 0.016 and 0.014 respectively. Among them, the incidence of poverty among rural households in the central region is even higher than that of rural households in the western region. The poverty indexes of three types of rural households are 0.195, 0.014 and 0.011 respectively if we use the 2007 SPG index as the evaluation standard. The poverty level of rural households in the eastern and central regions is higher than that of rural households in the western regions. This shows that there are also a large number of poor people in the eastern and central regions at this stage. And from the perspective of the distribution of the poor, the vast majority of the poor lives in other regions. For example, in 2007, the poverty incidence of rural households in the eastern, central and western regions based on the low-income line was 1.9%, 2.9% and 3.0%, respectively. Taking into account the population proportions of the three regions (43.8%, 36.3%, and 20.0% in turn, see Table 1), the poor in the western region only accounts for 24% of the total poor, while the proportion of the poor in the eastern and central regions is as high as 34% and 42%. The proportion of the poor in the western region is even lower if calculated with a higher poverty index.

Another equally surprising fact contained in the data is that higher income levels of rural households in the eastern and central regions do not mean that the poverty situation in the group is not serious. Similarly, the low-income level of rural households in the western region does not necessarily mean that the extremely poor in the group occupies an absolute high proportion. Figures 3 and 4 are the diagrams of the poverty incidence (proportion of the poor) of various types of rural households under different poverty lines. The core concept of the diagram is to show the poverty distribution and poverty level of rural households in various regions under different poverty lines. We set “USD1 per person per day” and the overall poverty population

[2] The sharp changes in the data are related to the decline in the absolute income level of extremely poor rural households within the survey sample. Taking the western region as an example, the income levels of rural households in the lowest 1% and lowest 5% of the sample in 1995 were as low as RMB107 and RMB194 respectively, while they were RMB223 and RMB349 respectively in 1988. We believe that it mainly because the number of provinces covered by the survey sample in the western region decreased in 1995, and many provinces with higher incomes for low-income residents were excluded.

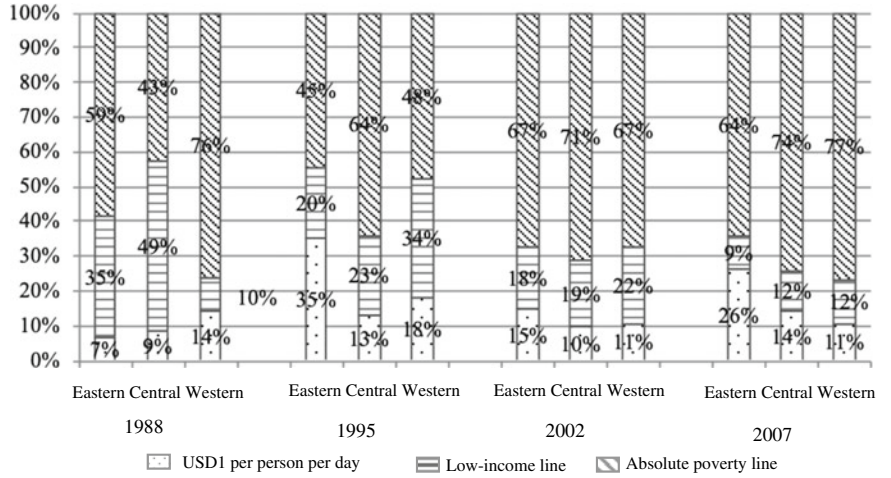

Fig. 3 Proportion of rural poor among regions: 1988–2007 (below USD1 per day)

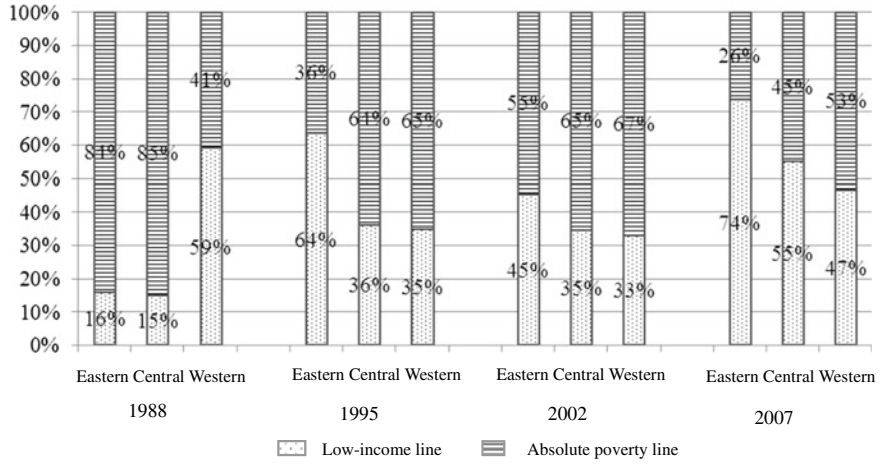

Fig. 4 Proportion of rural poor among regions: 1988–2007 (below low-income line)

below the low-income line as 100% respectively. The column chart of each group of rural households in different years is divided into three sections (or two sections). Each section from bottom to top represents the proportion of the poor whose income is less than or equal to the absolute poverty line, whose income is less than or equal to the low-income line and higher than the absolute poverty line, and whose income is less than or equal to "USD1 per person per day" and higher than the low-income line. It can be seen from Fig. 3 that in 1988, the proportion of rural households with income levels below the absolute poverty line was the highest, accounting for 14% of all the poor under the "USD1 per person per day" standard, followed by the central

region, where the absolute poor accounted for 9% of the total poor in the group. The proportion of absolute poverty is the lowest in rural households of the eastern developed regions, with a value of 7%. Among the proportions of income above the absolute poverty line but lower than the low-income line, the proportion of rural household in the central regions higher, accounting for nearly 50% of the total poor population in the group, followed by the central region, with a value of 35%. The rural household in the western region accounts for only 10%. As the poverty line of "USD1 per person per day" was too high in 1988, we re-examined the poor below the low-income line as the overall survey object. According to Fig. 4, we found that in 1988, the proportion of the poor whose incomes were below the absolute poverty line in western regions was even higher (accounting for 59%). The income of the poor in the eastern and central regions is mostly concentrated in the range above the absolute poverty line but below the low-income line. In general, according to the information in Figs. 3 and 4, during 1988, the income level of the poor in the eastern and central regions is relatively higher than that of the poor in the rural households in the western region.

However, according to CHIP data, the trend of the highest proportion of rural household with incomes below the absolute poverty line in western regions began to reverse in 1995. Figures 3 and 4 both show that after 1995, the proportion of absolute poverty population of rural household in the eastern region was the highest, while the proportion of absolute poverty population among rural households in the central and western regions was significantly lower than that in the eastern region. According to the standard of "USD1 per person per day", the proportion of rural households in poverty in the western region under the absolute poverty line was slightly higher than that in the central region between 1995 and 2002 (see Fig. 3).

The above-mentioned data show that it is not the western region that has the largest number of people in absolute poverty. On the contrary, there are still a large proportion of poor people in those areas where the economy is more developed.

Of course, the living standards of the extremely poor people in the west are still the lowest if we compare the income of the poorest people in each group. In addition, the above situation is contrary to our intuitive impression, and he 2007 CHIP data sample is relatively poorly represented in the country. Especially for the samples from the western region, only Chongqing and Sichuan were selected. Not only was the sample size small, but it also failed to cover the poorest provinces such as Gansu and Guizhou. Therefore, we have reservations about the data conclusions of 2007. We will re-analyze when more detailed data is available. Moreover, the above analysis also brings us another important revelation: Although the total number of poor people has been greatly reduced, the population distribution is becoming more and more scattered. In the future, it is necessary to shift the targeting mechanism of poverty alleviation from the whole village to the individual household in some regions.

2 Stage 2: 2000–2010

The Shapley value decomposition result of the poverty index of rural households in each region is shown in Table 4. Similar to the discussion in the previous two chapters, the positive sign before the coefficient indicates that the poverty level (or poverty reduction factor) is conducive to the reduction of poverty in the group, and the negative sign expresses the opposite meaning. On the whole, income growth helps eliminate poverty, and widening the gap is not conducive to poverty reduction.

Through the analysis in Chaps. 6 and 7, we have concluded a "general" rule, that is, the lower the income, the greater the reduction in poverty. However, this rule is not suitable for the decomposition results of the poverty index of rural households in the western regions from 1988 to 1995. According to Table 4, the poverty level of the rural households in the western regions increased during this period, and the corresponding H index, PG index and SPG index increased by 0.212, 0.086 and 0.044 respectively.[3] Moreover, the poverty level of rural households in the eastern region measured by the PG and SPG indexes also increased during the same period, with the two indexes rising by 0.027 and 0.025 respectively. In the subsequent stage, various poverty indexes of rural households in the western region fell the most, and the poverty index of rural households in the eastern region fell the least.

The differences between the changes in poverty of different types of rural households were compared. On the whole (after 1995), the poverty reduction of rural households in the western region was even higher, while that of rural households in the eastern and central regions was lower. For example, during 1995–2002, the H index of rural households below the low-income line in the eastern, central and western regions decreased by 0.179, 0.124 and 0.266, respectively. During 2002 to 2007, the H index of the three regions below the same poverty line decreased by 0.026, 0.052, and 0.110, respectively. The data all show that the poverty index of rural households in western regions has decreased the most. Specifically, the poverty reduction effectiveness diminishes with the increase of the year for rural households in the eastern region. However, due to the pro-poor effect of the gap factor between 1995–2002 and 2002–2007 (for example, the three types of poverty indexes ΔD from 1995 to 2002 were -0.087 and -0.046 and -0.027 respectively), the poverty index of rural households in the eastern region continued to decline. However, since ΔD calculated with the PG and SPG index appears negative no longer, and with the reduction of ΔE, ΔPG and ΔSPG of rural households in the eastern region of the low-income line expand.

For rural households in the central regions, the growth and disparity elements have shown stable effects of benefiting the poor and hurting the poor respectively. Moreover, the former has significantly greater power than the latter, which has contributed to a steady decline in the poverty level of rural households in the central region. It is worth noting that the income gap within rural household groups in the central region increased on a small scale from 1995 to 2002 (Fig. 9.2). However, the gap factor is

[3] This once again supports our conclusion in Chapter 4 that the development of the western region shows non-pro-poverty growth.

Table 4 Decomposition results of H-index of rural households in different regions

	Low-income line				"USD1 per day"			
	1988–1995	1995–2002	2002–2007	1988–2007	1988–1995	1995–2002	2002–2007	1988–2007
	Rural households in the eastern region							
ΔH	−0.037	−0.179	−0.026	−0.244	−0.229	−0.268	−0.082	−0.581
ΔE	−0.168	−0.092	−0.023	−0.277	−0.257	−0.199	−0.075	−0.588
ΔD	0.131	−0.087	−0.003	0.034	0.069	−0.070	−0.007	0.007
ΔPG	0.027	−0.086	0.011	−0.049	−0.042	−0.142	−0.015	−0.200
ΔE	−0.061	−0.040	−0.004	−0.078	−0.130	−0.081	−0.021	−0.224
ΔD	0.087	−0.046	0.015	0.029	0.088	−0.061	0.007	0.023
ΔSPG	0.025	−0.051	0.120	0.098	0.004	−0.093	0.042	−0.047
ΔE	−0.035	−0.023	0.025	0.016	−0.076	−0.047	0.001	−0.094
ΔD	0.060	−0.027	0.095	0.082	0.080	−0.046	0.041	0.047
	Rural households in the central region							
ΔH	−0.296	−0.124	−0.052	−0.471	−0.307	−0.284	−0.171	−0.760
ΔE	−0.298	−0.133	−0.065	−0.494	−0.300	−0.304	−0.189	−0.771
ΔD	0.001	0.009	0.013	0.024	−0.007	0.019	0.018	0.011
ΔPG	−0.092	−0.042	−0.009	−0.141	−0.189	−0.110	−0.047	−0.345
ΔE	−0.100	−0.039	−0.015	−0.157	−0.192	−0.115	−0.057	−0.360
ΔD	0.008	−0.003	0.007	0.016	0.003	0.005	0.010	0.015
ΔSPG	−0.039	−0.020	0.004	−0.055	−0.112	−0.057	−0.016	−0.184
ΔE	−0.046	−0.016	−0.004	−0.069	−0.118	−0.056	−0.025	−0.199
ΔD	0.007	−0.004	0.008	0.014	0.006	−0.001	0.008	0.015

(continued)

Table 4 (continued)

	Low-income line				"USD1 per day"			
	1988–1995	1995–2002	2002–2007	1988–2007	1988–1995	1995–2002	2002–2007	1988–2007
	Rural households in the western region							
ΔH	0.212	−0.266	−0.110	−0.160	−0.026	−0.349	−0.297	−0.668
ΔE	−0.072	−0.261	−0.116	−0.397	−0.116	−0.328	−0.295	−0.719
ΔD	0.284	−0.005	0.006	0.237	0.091	−0.021	−0.003	0.051
ΔPG	0.086	−0.083	−0.023	−0.019	0.082	−0.186	−0.097	−0.199
ΔE	−0.008	−0.090	−0.025	−0.116	−0.051	−0.193	−0.095	−0.306
ΔD	0.094	0.007	0.003	0.097	0.133	0.007	−0.002	0.107
ΔSPG	0.044	−0.039	−0.003	0.003	0.077	−0.106	−0.040	−0.068
ΔE	−0.004	−0.040	−0.009	−0.051	−0.022	−0.112	−0.043	−0.159
ΔD	0.048	0.001	0.006	0.053	0.099	0.005	0.003	0.091

Data source CHIPs, collated by the author

Note All the calculated results have passed the hypothesis testing at the 5% level of significance

conducive to the reduction of PG and SPG indexes of rural households in the central region. According to Table 4, the ΔD of the PG and SPG indexes over the same period was -0.003 and -0.004 respectively. This is very interesting. This shows that if the amount of poverty alleviation funds or the gap within the poor population is the focus of attention, the widening of the gap between rural households in the central region during this period can play a role in reducing the two indicators below the low-income line. However, the specific reasons need to be further investigated. In addition, during 2002–2007, ΔSPG below the low-income line has positive value. The decomposition results show that this is mainly caused by low levels of ΔE, indicating that economic growth during this period is less effective in alleviating the poorest people in the group.

Different from rural households in the eastern and central regions, the poverty level of rural households in the western region increased from 1988 to 1995 (except for ΔH under "USD1 per day"). This is mainly due to the low effectiveness of growth in reducing poverty and its failure to resist the effects of widening the gap and hurting the poor. In the later period, the poverty situation of rural households in the western region began to decline, and the decline was significant. For example, during 1995–2002 and 2007–2007, ΔH below the low-income line was -0.226 and -0.110 respectively. During the same period, ΔH of rural households in the eastern and western regions below the same poverty line was only -0.179 and -0.026 as well as -0.124 and -0.052 respectively. During this period, ΔD of some years are even negative. Taking into account the continuously widening gap within the group during the same period, it shows that for rural households in the western regions with low-income levels in the group, a moderate income gap will not affect the reduction of poverty within the group, but is conducive to poverty reduction.

In the following, we will have a look at the impact of economic growth or widening gaps on each group of rural households under the existing economic development conditions using a flexible method. Table 5 shows the income growth elasticity of rural households in poverty in various regions. On the whole, as time progresses, the elasticity (absolute value) of each FGT index is increasing, indicating that the poverty reduction effect of income growth is gradually increasing. However, 2007 was an exception. It may be that due to the increase in the extremely poor population in the group, the 1% income increase is difficult to significantly increase the PG index and SPG index that give the poor more weight. The elasticity value (absolute level) of some indexes has dropped significantly, especially the elasticity measurement results of the PG index and the SPG index. Now we will have a look at the impact of growth on the poverty level of rural households in different regions. We take the H index as an example for analysis. It can be seen that there is little difference in poverty reduction effect of economic support for rural households in different regions during this stage. In 1988, for every 1% increase in income, the H index of rural household in the eastern, central and western regions reduced by 1.34%, 1.91% and 1.72% respectively. In 1995, the same 1% increase in income reduced the corresponding poverty index of rural households in the three regions by 0.97%, 1.78% and 3.08% respectively. At this time, the poverty reduction effects of economic growth in different locations are significant and differentiated. In 2002, this trend

Table 5 Income growth elasticity of rural households in different regions

	H				PG				SPG			
	1988	1995	2002	2007	1988	1995	2002	2007	1988	1995	2002	2007
	Official low-income line											
Eastern region	−1.343	−0.968	−1.059	−1.433	−1.345	−1.388	−1.224	0.344	−1.317	−1.858	−1.111	3.294
Central region	−1.911	−1.775	−2.326	−3.372	−2.488	−1.615	−2.433	−1.134	−2.726	−1.451	−1.960	0.040
Western region	−1.719	−3.079	−4.350	−3.405	−3.040	−3.235	−4.990	−1.122	−3.782	−2.882	−4.647	−0.017
	"USD1 per day"											
Eastern region	−0.857	−0.756	−0.967	−1.475	−1.172	−0.991	−1.029	−0.810	−1.273	−1.210	−1.080	1.840
Central region	−0.604	−1.448	−2.235	−2.959	−1.429	−1.707	−2.254	−2.539	−1.914	−1.687	−2.258	−0.836
Western region	−0.300	−0.987	−2.223	−3.944	−1.386	−2.069	−3.453	−3.054	−2.129	−2.620	−4.087	−0.926

Data source CHIPs, collated by the author
Note All the calculated results have passed the hypothesis testing at the 5% level of significance

remained the same. A 1% increase in income reduced the H index of rural households in the three regions by 1.06, 2.33 and 4.35%. Among them, the effect of growth on poverty alleviation of rural households in the western region was more significant. In contrast, the effect of growth on the poverty reduction of rural households in the eastern region was relatively small, and the absolute value of its elasticity was only 1/4 of that of rural households in the western region. The PG index and the SPG index have similar growth elasticity trends. The difference is that the effects of economic growth on the poverty alleviation of the three types of rural households diverged as early as the beginning of reform and opening up (1988).

Moreover, it is worth noting that the income growth of rural households in the eastern region in 2007 calculated with the SPG index is not even conducive to poverty reduction. After testing the significance of the calculation results, we checked the income distribution of rural households in the central and eastern regions of CHIP2007, and found that there was a significant income differentiation within the group. The growth under this condition will be more beneficial to the wealthy population in the group, and it will worsen the income disparity within the group and adversely affect the rural households in poverty. On the whole, income growth has a greater effect on poverty reduction for households in the western region, which has become increasingly stronger. Therefore, more attention should be paid to financial support for rural households in poverty in the western region during the process of the government's poverty alleviation and assistance actions, to increase their income levels, which will play a significant role in helping them in the region to get rid of poverty and become rich.

Now let's have a look at the impact of income differentiation on the poverty status of rural households in each region (Table 6). In most cases, the positive elasticity coefficient indicates that income polarization within the group of rural households is not conducive to the reduction of the poverty of each group. In general, it is found that widening the gap is most detrimental to reducing poverty among rural households in the central and western regions. Specifically speaking: (1) In 1988, the inequality elasticity value of poverty among rural households in various regions was very small, indicating that polarization would not have a significant impact on poverty. The elasticity value of H index of rural households in western region measured under the low-income line and "USD1 per day" is even negative, indicating that the moderate income differentiation during this period helped reduce the number of poor people and indirectly supported the correctness of the regional priority development strategy implemented in the early stage of the reform and opening up in China. (2) During 1995–2007, the elasticity of each group's inequality index was increasing year by year. Take the measurement results of rural households in the eastern region under the low-income line as an example: 1% income polarization would increase the H index, PG index and SPG index of rural households in the eastern region by 1.02%, 4.11% and 6.34% respectively, which was 0.75%, 1.5% and 2.25% respectively in 1988. In 2002, 1% income polarization would further increase the three types of indexes of rural households in the eastern region by 2.88%, 5.74% and 7.37%, indicating that the same degree of inequality within the group has become increasingly unfavorable to the reduction of poverty among rural households in the region in the recent period.

Table 6 Income inequality elasticity of rural households in different regions

			Low-income line						"USD1 per day"					
			H-index		PG index		SPG index		H-index		PG index		SPG index	
1988	Pop Share	MII	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS
Eastern region	36.20%	0.0013	0.0013	0.75	0.0008	1.5	0.0006	2.25	0	0	0.0008	0.56	0.0007	1.02
Central region	40.90%	0.0009	0.0004	0.29	0.0008	2.03	0.0007	3.72	−0.0007	−0.28	0.0004	0.35	0.0006	1.13
Western region	22.90%	0.0004	−0.0001	−0.17	0.0004	2.15	0.0004	4.54	−0.0002	−0.22	0.0001	0.25	0.0003	1.14
Within the group	–	0.0026	0.0016	0.44	0.0021	1.82	0.0016	3.19	−0.0009	−0.14	0.0012	0.44	0.0016	1.09
Between the groups	–	0.0005	0.0006	0.8	0.0004	1.63	0.0002	2.09	−0.0001	−0.09	0.0003	0.56	0.0003	1.03
Overall	100.00%	0.0032	0.0019	0.43	0.0025	1.83	0.0019	3.15	−0.0012	−0.15	0.0014	0.43	0.0019	1.08
1995	Pop share	MII	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS
Eastern region	37.50%	0.0021	0.0015	1.02	0.0016	4.11	0.0012	6.34	0.0009	0.28	0.0013	1.41	0.0012	2.42
Central region	37.50%	0.0008	0.0006	2.2	0.0007	4.87	0.0004	5.61	0.0001	0.05	0.0006	1.64	0.0006	2.86
Western region	25.00%	0.0004	0.0006	2	0.0005	6.68	0.0003	8.45	−0.0003	−0.49	0.0002	0.96	0.0004	3.49
Within the group	–	0.0034	0.0033	1.43	0.0028	4.63	0.002	6.44	0.0006	0.12	0.0021	1.41	0.0021	2.67
Between the groups	–	0.0007	0.001	2.1	0.0003	2.63	0.0001	1.41	0.0007	0.68	0.0006	1.98	0.0003	1.63
Overall	100.00%	0.0038	0.0043	1.63	0.0031	4.47	0.002	5.64	0.0009	0.16	0.0026	1.49	0.0024	2.57
2002	Pop Share	MII	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS
Eastern region	33.70%	0.0014	0.0011	2.88	0.0005	5.74	0.0003	7.37	0.0014	1.26	0.0008	2.57	0.0005	3.52

(continued)

Table 6 (continued)

2002	Pop Share	MII	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS
Central region	39.70%	0.0009	0.0014	5.7	0.0006	9.92	0.0003	10.44	0.0013	1.85	0.0009	4.34	0.0005	5.92
Western region	26.60%	0.0006	0.0013	7.69	0.0006	16.67	0.0004	21.03	0.0004	0.9	0.0007	5.24	0.0006	9.1
Within the group	–	0.0029	0.0037	4.78	0.0017	9.36	0.0009	11.23	0.0032	1.37	0.0024	3.69	0.0016	5.45
Between the groups	–	0.0007	0.0005	2.86	0.0002	3.69	0.0001	2.88	0.0009	1.62	0.0004	2.71	0.0002	2.67
Overall	100.00%	0.0037	0.0046	4.77	0.0021	9.2	0.0011	10.68	0.0041	1.42	0.003	3.77	0.0019	5.41
2007	Pop Share	MII	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS	MIP	ELS
Eastern region	43.80%	0.0019	0.0008	6.34	0.0005	7.64	0.0018	6.94	0.0016	3.42	0.0007	5.82	0.0009	6.3
Central region	36.20%	0.0009	0.0009	14.81	0.0003	10.86	0.0002	2.03	0.0013	6	0.0006	11.03	0.0004	5.09
Western region	20.00%	0.0004	0.0004	15.69	0.0002	11.54	0.0001	2.14	0.0008	8.1	0.0003	12.95	0.0002	5.46
Within the group	–	0.0031	0.0021	9.84	0.001	9.01	0.0021	4.99	0.0036	4.71	0.0017	8.14	0.0015	5.86
Between the groups	–	0.0005	0.0001	2.65	0	1.73	0.0002	2.08	0.0004	2.6	0.0001	3.21	0.0001	2.09
Overall	100.00%	0.0036	0.0024	9.64	0.0011	8.27	0.002	4.04	0.0042	4.71	0.0019	8.01	0.0015	5.18

Data source CHIPs, collated by the author

Note: ① All the calculated results have passed the hypothesis testing at the 5% level of significance. ② MII: the marginal effect of income polarization on inequality, MIP: the marginal effect of income polarization on poverty, ELS: the elasticity of poverty on inequality

In addition, after comparing the poverty elasticity of rural households in each group, we found that the elasticity of rural households in the western region is the largest, followed by the central region, indicating that it is more difficult for the western region with the relatively backward economic development to withstand the impact of the widening income gap. Conversely, it is especially necessary to control the income disparity within the rural households in the western region, so as to avoid the income disparity having a more adverse effect on the poverty within the group. (3) At last, we will have a look at the impact of income polarization on poverty within and between groups. The positive ELS within and between groups indicates that the expansion of the difference is not conducive to the reduction of poverty within and between groups. Inequality within the group is the core element that affects the poverty elasticity of the overall rural households, and changes in poverty between groups will not significantly affect the poverty status of the overall rural households.

3 Stage 3: Identification of Poor Regions in the New Era

China will enter a new stage of rural revitalization after 2020. Consolidating and expanding the effective connection between the achievements of poverty alleviation and rural revitalization remains to be explored. Poverty-stricken county was first identified in 1986, and subsequently undergone three adjustments. In 1986, the identification of poverty-stricken county was based on a single income dimension. 331 key poverty-stricken counties at the national level have been designated based on the per capita net income of rural residents in the county. Since then, the living standards of rural residents have been improved with continuous development of China's economy and society. In order to speed up the resolution of the persistent poverty in rural areas, the state promulgated the *National Eight-Seven Poverty Alleviation Plan (1994–2000)* in 1994, making the first adjustment to the key poverty-stricken counties in China. The identification scheme based on the per capita net income of rural residents in the county was still used at this stage. However, in order to better adapt to the material living standards at that time, China raised the identification standards for poverty-stricken counties. Counties with rural residents' per capita net income of less than RMB400 (based on the 1992 standard) have been included in the scope of key support in China. Meanwhile, a batch of key counties with rapid development and good poverty alleviation effects in the previous period whose per capita net income of rural residents exceeded RMB700, withdrew from the ranks of key support. As a result, China identified national-level 592 key poverty-stricken counties during this period. At the beginning of the new century, in view of the still serious poverty problem in the old revolutionary base areas, areas with concentrations of ethnic minorities, border areas, and areas with relatively high incidences of poverty, China issued the *Outline of China's Rural Poverty Alleviation and Development (2001–2010)*, making the second adjustment to key poverty-stricken counties. Firstly, after this adjustment, the "key poverty-stricken counties" was renamed "key counties for poverty alleviation and development". Secondly, the old revolutionary

base areas, areas with concentrations of ethnic minorities, border areas, and areas with relatively high incidences of poverty as well as extremely poor areas will be the key areas for assistance at this stage. In terms of specific operations, all the 33 key counties in the eastern region have been adjusted to the central and western regions. As a special support area, the Tibet Autonomous Region enjoys the treatment of key counties as a whole, and does not occupy the indicators of key counties. A total of 592 key counties for national poverty alleviation and development have been identified. Since 2011, the imbalance of regional development in China has become increasingly prominent. The development of the deeply impoverished areas, especially the contiguous poor areas as a whole, was still lagging behind, and the poverty problem was still serious. At this critical time, the state promulgated and implemented the Outline of China's Rural Poverty Alleviation and Development (2011–2020), making the third adjustment to the poverty-stricken counties. The biggest change between this adjustment and previous adjustments was that the right to determine poverty-stricken counties is transferred from the central government to the provinces. Provinces were allowed to make adjustments within the province based on their actual conditions. However, it was not allowed to transfer the indicators of key counties in contiguous poor areas as a whole to other regions. After this adjustment with strict inclusion standard and loose exclusion standard, the total number of key counties for poverty alleviation and development was still controlled at 592 in China. Secondly, in this round of adjustments, 14 contiguous poor areas as a whole were identified based on economic growth, development capabilities, natural environment and other multidimensional considerations rather than the single income dimension. A total of 680 counties have entered the contiguous poor areas as a whole and have received key support and assistance from the central and local governments. So far, a total of 592 key counties for poverty alleviation and development and 680 contiguous poor areas as a whole (containing 440 key counties for poverty alleviation and development) have been identified in China.

It can be said that the poverty reduction policy that focuses on regions has played a huge role in the process of poverty alleviation. From the initial low standard to today's high standard, from a single income dimension to today's multi-dimension, from the initial nationwide identification to the current identification of areas in need of assistance step-by-step, the identification of poverty-stricken areas in China is gradually comprehensive and accurate, which has become one of the important means for targeting poverty alleviation and development of the region. With the overall victory in the fight against poverty in China, all the poverty-stricken counties and villages established in the past 30 years have all got rid of poverty and the poor people have been lifted out of extreme poverty. However, we must also focus on consolidating the achievements of poverty alleviation and be vigilant to prevent returning to poverty. As General Secretary Xi Jinping requested, after poverty-stricken counties got rid of poverty, the policy would not change. Preventing a return to poverty is a top priority. The research topics of how to focus on identifying relatively poor areas and provide references for the prevention of poverty return and the realization of balanced regional development after 2020 based on the development needs of the new era are worthy of in-depth discussion.

Below we are talk a bit on the main challenges on sustainable development of relatively rural poor areas.

Firstly, relatively poor areas are faced with the problem that the comparative advantages of resources have not yet been fully developed and are mostly distributed in the main functional areas where development is restricted and prohibited. The main function zone plan is the first medium and long-term master plan of national land development issued and implemented in China with the purpose of building a blueprint for long-term and sustainable development of China. It can be seen from the distribution of areas where development is prohibited by the state, ecological function areas and key ecological function areas where industrialization and urbanization are forbidden that most of them are concentrated in relatively poor areas, making it more difficult for relatively poor areas to develop on an industrial basis in the future. Based on this, it is necessary fully consider local conditions and conduct investment and development guidance based on local actual conditions in the future.

Secondly, relatively poor areas are faced with the problems of low financial self-sufficiency and high pressure on the "three guarantees and three supports"[4] The sudden outbreak of COVID-19 in 2020 had a huge impact on the Chinese economy and the global economy. In this critical period, the demand for ensuring the recovery of social demand driven by fiscal spending increases accordingly, which indirectly increases the difficulty of financial support for the future governance of relatively poor areas. From the perspective of supply and demand, relatively poor areas often fall into the vicious circle of poverty of "low income → low savings, low education → low material and human capital accumulation → low output → low income" and "low income → low purchasing power → insufficient investment inducement → low private and public capital formation → low output → low income". The above-mentioned vicious cycle is hard to break because local governments lack adequate financial resources. Therefore, it is necessary to increase the intensity of central transfer payments.

Thirdly, the relatively poor areas are faced with the problem of "land finance" for future development. After the reform of the tax distribution system, the income from land transfer is basically allocated to local governments, allowing some local governments rely on "land finance" to quickly obtain a large amount of fiscal revenue. From a broad perspective, China's land finance has expanded rapidly. Land transfer income accounted for a huge proportion of national fund income during the same period, and it has been increasing year by year. In 2019, the revenue of the central fund accounted for only 4.5% of the revenue of the central government. The income of local funds accounted for 80.7% of local fiscal revenue). It was inferred that the dependence of local governments on land transfer revenue is increasing, and the unity and dependence of local fiscal revenue is gradually increasing. In the future, we must be wary of over-relying on land finance in the development of relatively poor areas.

[4] "Three guarantees and three supports" refers to guaranteeing wages, stability and growth, and supporting stable and rapid economic development and basic price stability, the transformation of economic development mode and people's livelihood.

Fourthly, relatively poor areas are facing the problem of outflow of capital and talent in high-efficiency enterprises. A lot of evidences show that the effect of poverty alleviation policies in continuing to strengthen the mitigation effect of high transaction costs on the capital loss of high-efficiency enterprises in poverty-stricken areas is not obvious. The above theory also applies to the problem of talent outflow. The reason is that the larger the market, the easier it is to attract high-efficiency enterprises to gather here. Therefore, high-efficiency companies are more sensitive to the decline in transaction costs, and their motivation to leave poor areas is also stronger. With the implementation of poverty alleviation and development policies, transaction costs have gradually decreased. As a result, the capital of high-efficiency enterprises may show a tendency to move out of poverty-stricken areas. This gives an important warning that with the deepening of poverty alleviation and development policies, the transaction costs between poor areas and neighboring developed regions are gradually decreasing, which may increase the motivation for the capital of high-efficiency enterprises to flow from poor regions to neighboring developed regions. Now it is the critical stage of consolidating and expanding the achievements of poverty alleviation. It is necessary to be vigilant about whether there will be capital outflows from enterprises in poor areas, especially high-efficiency enterprises, in the process of decreasing inter-regional transaction costs. It may bring hidden dangers of returning to poverty if this happens.