CHAPTER 3   RETROSPECTIVE OF ECONOMIC GROWTH AND INEQUALITY IN POST-REFORM CHINA

As mentioned earlier, the purpose of this paper is to investigate the causal relationship between economic growth and income inequality in China.   This section describes the scenario of China's economic growth and income distribution situations after economic reform. A simple analysis on the relationship between these two variables will be presented in the last part of this section.

3.1 Economic Growth for Period of 1978~2002

China's economic growth was remarkable since the beginning of economic reforms.   According to the official data provided by ***China Statistical Yearbook*** (2003), real GDP in 2002 was as 8.49 times as it was in 1978, and the average annual growth rate of GDP and per capita GDP was about 9.32% and 8.04%, respectively. China's annual economic growth during 1979~2002 is presented in Figure 3.1.   It is shown that the growth rates of GDP and of per capita GDP have a similar pattern.

In the beginning of the reform period in China, agricultural and industrial reforms were put into practice.   In villages, a responsibility system was employed to substitute for the insufficient commune system.   Meanwhile, the rural private market was opened for exchanging surplus farm products.   This responsibility system also succeeded in small enterprises.   Therefore, China's economic growth rate started to free itself from low growth during pre-reform period.   GDP and the per capita GDP growth rate peaked during the mid-1980s, in 1984 they achieved at 15.32% and 13.71%，respectively.   Most of this achievement could be attributed to the rural responsibility system.   Another important policy was to encourage village surplus
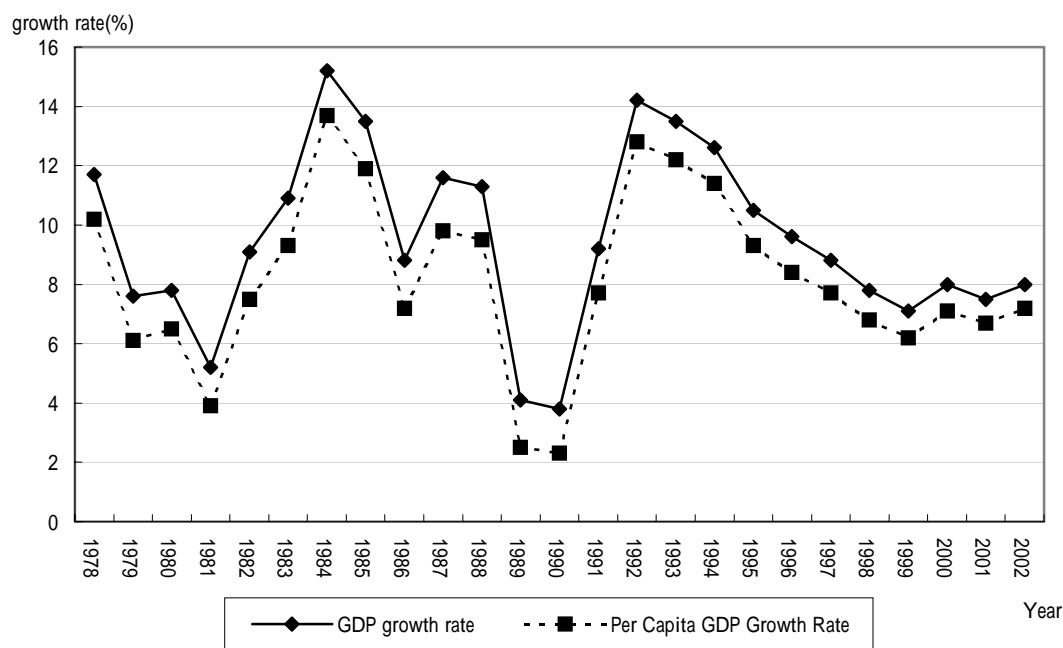
Figure 3.1 Economic Growth Rates in China during 1978~2002

Source: *China Statistical Yearbook* (2003).

labor forces to work in township village collective enterprises. The policy was helpful for growth as Li (1997) said:

" ...the nonagriculture/agriculture labor productivity ratio is between 4 and 5,... If a farmer becomes an industrial worker, his labor productivity becomes 4 to 5 times as high as before."[17]

Other policies that encouraged production incentive, such as trade liberalization and market and prices reforms, were carried out as well during the same period.

However, after a flourish in 1987 and 1988, the economic growth rate declined sharply in 1989 and 1990. One primary reason is that the inflation rate increased

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[17] The labor migration rules in China are still strict, especially migrating from rural to urban. Some authors thought that labor migration was also helpful for easing the inequality level. More details can be seen in Kanbur and Zhang (1999).

with a high growth rate, and the Chinese government exerted several macroeconomic control mechanisms to mitigate the high inflation rate. Another reason is that the "Tiananmen crush" depressed foreign investors and made society become unstable. In 1992, Deng Xiaoping's southern trip reconfirmed the reform direction. Since political factors that negatively affected economic development were mostly eliminated, domestic and foreign investors were invigorated. For that reason, in early 1990s, economic growth rates rose again. Another business cycle happened again during 1992-1994. Since the mid-1990s, China's growth rate has presented a decreasing trend, although it still remained at a high level. Two possible explanations of this result are that China's economic development was in a more normal situation and that the process of reforming state-owned enterprises and increasing international competition would generate high unemployment and a stagnate economic growth. Moreover, it implies that policies unleashed in the early 1980s have lost their influential power on economic growth.

If discussing China's spatial economic growth further, it can be found that it was distributed unevenly. Figure 3.2 presents a growth rate of "rich" and "poor" provinces during 1979~2002. Rich provinces cluster in east or coastal regions and poor ones allocate in central and west regions.[18] Poor provinces enjoyed higher growth rate only in eight out of 24 years. Although rich provinces in most periods of time had a higher growth rate, their business cycles were more violent. Furthermore, the most interesting feature of Figure 3.2 is that rich and poor provinces' growth rate had a reverse moving direction since 1995. Growth rate of rich provinces dwindled in 1996, 2000 and 2002, but growth rate of rich provinces increased at the same time.

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[18] There are some exceptions. Xinjiang is in west region but is categorized into the rich group. Some coastal provinces, such as Hebei, Guangxi and Hainan, are not as wealthy as their costal partners. Therefore, they are categorized into the poor group.
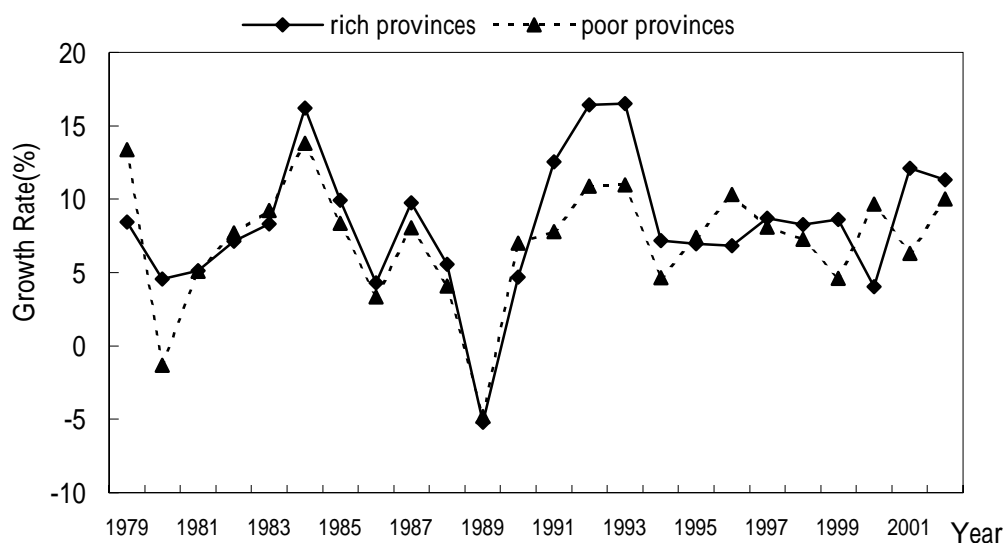
Figure 3.2 Growth Difference between "Rich" and "Poor" Provinces

Source: *China Statistical Yearbook* (Various Year).

Note: 1.The deflator used here is CPI, not comparative price used in official data.

2. "Rich" provinces are those have higher per capita GDP than national average per capita GDP. Those provinces include Liaoning, Heilongjiang, Xinjiang, Beijing, Tianjin, Shandong, Fujian, Guangdong, Shanghai, Jiangsu, and Zhejiang; others are categorized into "poor" provinces.

Reverse situations also occurred in 1997, 1999 and 2001.

3.2 The Evolution of Inequality Level

Although Figure 3.2 shows that rich provinces grew more quickly than poor provinces did, it cannot confirm China's inequality level and development trends. Therefore, the next section uses more formal indicators to estimate China's inequality. The Gini Coefficient and Generalized Entropy are the most common indicators to measure the inequality level of China (Tsui, 1991; Tsui, 1996; Kanbur and Zhang, 1999; Lee, 2000; Huang et al., 2003). According to Mookherjee and Shorrocks (1982), the formulae of the weighted Gini Coefficient (*GINI*) and Generalized

Entropy (*GE*) can be respectively written as:

$$\text{Gini coefficient: } GINI = \frac{1}{\mu}\sum_i \sum_j f_i f_j \left| y_i - y_j \right| \quad \text{as } i \neq j \tag{3.1}$$

$$\text{Generalized Entropy: } GE = \ln \sum_i f_i \left(\frac{\mu}{y_i}\right) \quad c = 0, \tag{3.2}$$

where μ represents the income mean of total population; i and j represent two different economic unit, such as province or household ; y_i and represents the ith unit's average income; c represents the degree of inequality aversion;[19] and f_i represents the ratio of population in the ith unit (province) to the total population.   Actually, the formula for GE has three types corresponding to different values of c, such as $c=0$, $c=1$, and c 1,0.[20]   This paper adopts the form as $c=0$, because Shorrocks (1980) proved it could be used to explain the inequality level without any ambiguity.

However, Tsui (1991) also used the coefficient of variation *(CV)* to measure China's inequality level.   Accordingly, this study will use them also to conduct an empirical analysis.   The coefficient of variation is the ratio of standard deviation to the mean.   Its weighted formula can be presented as:

$$\text{Coefficient of Variation: } CV = \frac{\sqrt{\sum_{i=1}^{N} f_i (y_i - \mu)^2}}{\mu} \tag{3.3}$$

In statistics, coefficient of variation can be used to measure deviated level of a group

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[19] The degree of inequality aversion means that the lower the value of c is, the higher the value will be of the Generalized Entropy with the same data.

[20] As $c=1$, and c 1,0, the formulae of Generalized entropy can be written as follows:

$$I_c = \frac{1}{C(C-1)}\sum_{I=1}^{N} f_i \left[\left(\frac{y_i}{\mu}\right)^c - 1\right], \quad c \quad 1,0$$

$$I_c = \sum_{I=1}^{N} f_i \frac{y_i}{\mu}\ln\left(\frac{y_i}{\mu}\right) \quad c=1,$$

of numbers, but Tsui (1991) indicated there was no sound theoretical reason that it should be selected over other measures.[21]   Even so, some literatures adopted it to compare with other indicators (Tsui, 1996; Herrmann-Pillath et al., 2002; Chang, 2002; Cai et al., 2002).   Besides, this study shows the ratio of GDP per capita of richest province to poorest province (Max/Min, MM).

Before calculating the inequality level, it is worthy to note that GDP data is more or less incomplete, particularly in China's immature statistical system.   Ravallion and Chen (1999) argued that the inequality level was overestimated because the official survey ignored the existence of imputed rent and grain-income and understated the value of farm products from own production.   This study has to assume overestimation would be mean changes in provincial data because these problems argued by Ravallion and Chen (1999) could have occurred in any province.

Figure 3.3 presents levels of China's provincial per capita GDP inequality from 1978 to 2002 using four measurements, including GINI, GE, CV, and MM. Although the last two indicators are not as formal as the first two indicators, they can somehow reveal part of income distribution situation.   The moving trends of inequality in figure 3 are very similar to figure in Cai et al. (2002).

In Figure 3.3, some characteristics of income inequality level can be found: (i). Inequality level in 1978   the eve of economic reform, was relatively serious to other years during the overall period in this study, especially when it was measured by CV and MM.   The values of CV and MM were 0.76 and 14.31 in 1978, respectively. (ii). During the period of starting reforms to mid-1980, inequality levels declined gradually. GINI increased slightly in mid-1980, but similar to other measures,

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[21] Dislike Gini Coefficient and Generalized Entropy whose values are confined to 0~1, the range of coefficient of variation is not constant.   Besides, coefficient of variation is very sensitive to the ways of data treatment.
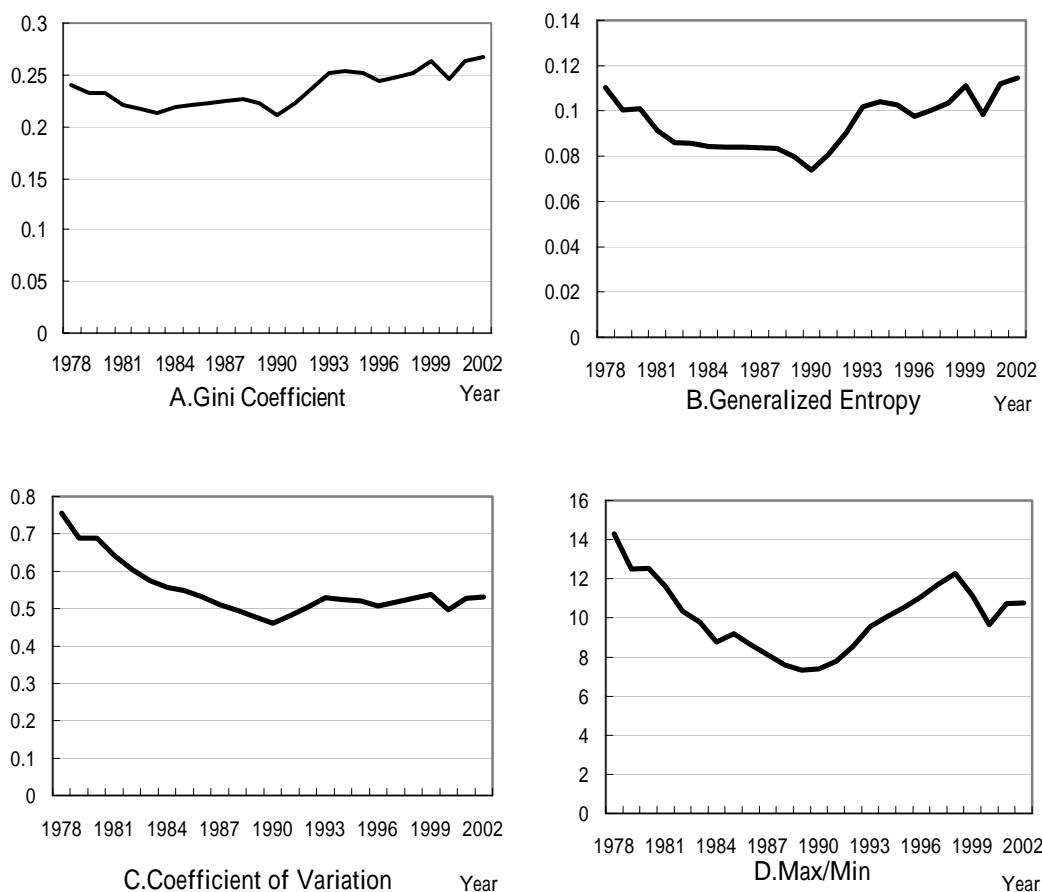
Figure 3.3 The Level of China's Income Inequality during 1978~2002

Source: *China Statistical Yearbook* (2003) and *Comprehensive Statistical Data and materials on 50 Years of New China.*

Note: Max/Min is the ratio of the richest province's per capita GDP to the poorest province's per capita GDP.

declined again until 1990.   In 1990, all indicators achieved their lowest point in overall study period except for MM.[22]   (iii). The year of 1990 is a turning point. Inequality level presented an upward trend after 1990, although it declined temporally in 1996 and 2000.   An exception is that max/min showed a reverse direction in 1996. GINI in 1993 was even higher than in 1978.[23]   (iv). Both GINI and GE in 2002 have achieved their record highs since 1978 with value of 0.2668 and 0.1145, respectively.

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[22] The lowest value of MMR is 7.34 in 1989 and in 1990 its value is 7.40.
[23] Chen and Fleisher (1996) contributed this situation to a widening of the gap between coastal and inland provinces.

One shortcoming of total inequality is that it is hard to explain what influences its moving trend.[24] In order to understand the source of inequality, this study decomposes Generalized Entropy into four parts- inequalities of within east, within central, within west and between these three regions.[25] Figure 3.4 shows that intraregional inequality had narrowed. In 1978, intra-regional inequality accounted for more 70% of inequality, but it decreased to 40% in 2002. The significance of intra-regional inequality was heavily determined by within eastern inequality. The contribution share of within eastern inequality accounted for 40% of total inequality. It decreased quickly before early 1990s and has kept stable ever since. Cai et al. (2002) thought poorer eastern provinces benefited from both technical and allocating efficiency had rapidly converged toward their steady-state growth rates during the reform period.[26] Therefore, within the eastern region inequality decreased gradually and its significance was substituted by interregional inequality. The contribution shares of within central and within western inequality were relatively insignificant and stable.

3.3 Correlation Coefficient between Growth and Inequality

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[24] Researchers can attribute total inequality to urban-rural or regional or income source inequality. It depends on research purposes. This study focuses on regional inequality.

[25] The general form of decomposed Generalized Entropy can be presented as:

$$I_c = \sum_g^G w_g I_g + I(\mu_1 e_1, \mu_2 e_2, \ldots, \mu_G e_G), \ w_g = \frac{n_g}{n}$$

where G is the number of the sample subgroup. The first term on the right-hand side of the equation is the weighted sum of specific regional inequality level and the second term is the inequality level between regions. In this case, there are three subgroup- eastern, central and western regions. w_g is the ratio of population of gth region to total population; I_g is inequality level within gth region; μ_g is average GDP within gth region; n_g is population of gth region; e_g is an n_g vector of ones. See Shorrocks (1980) and Mookherjee and Shorrocks (1982) for more details.

[26] Cai et al. (2002) also found the conditional convergence occurred in China. That is, the per capita income of poorer eastern and western provinces caught up that of richer eastern and western provinces, respectively.
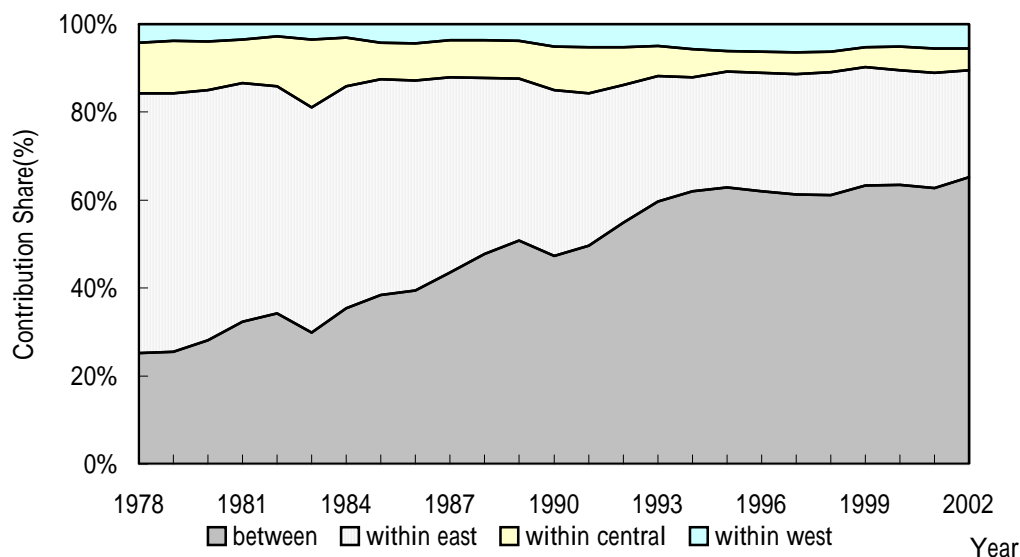
Figure 3.4 The Contribution of Interregional and Intraregional Inequality during
1979~2002

Source: *China Statistical Yearbook* (Various Year).

For the purpose of understanding the relationship between economic growth and income inequality in the post-reform China, this study uses correlation coefficient to show their positive or negative relation.　However, it is worth noting that correlation coefficient can only indicate whether or not these two variables have a linear relation.

The values of correlation coefficients between income inequality including 4 indicators and economic growth including 2 indicators are shown in Table 3.1.[27]　It seems that the linear relationship between those two variables doesn't exist.　When GDP growth rate is employed to represent economic growth, the values of correlation

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[27] The formula of correlation coefficients can be written as follows:

$$r_{XY} = \frac{\sum xy}{\sqrt{\sum x^2}\sqrt{\sum y^2}}$$

where x and y denote sequence variables growth and inequality level, respectively.

Table 3.1 The Correlation Coefficient of Economic Growth and Inequality in China during 1979~2002

	Real GDP growth rate	Real GDP per capita growth rate
GINI	0.0113	0.0968
GE	0.0021	0.0813
CV	0.0334	-0.0238
MM	-0.0927	-0.0491

Source: *China Statistical Yearbook* (Various Year).

coefficients are very small. As using GDP per capita growth rate to replace GDP growth rate, the values of correlation coefficients increase slightly but are still small. However, by dividing the whole period into two sub-periods: 1978-1989 and 1990~2002, it is revealed that these two variables are negatively related during the early period and positively during the later period.

Since correlation coefficients displayed different signs during different periods and it ignores others variables that could influence growth and inequality, it is very hard to conclude any relationship between income inequality and economic growth. In order to explore the issue of whether or not the causality between economic growth and income inequality exists in China, a more accurate and appropriate methodology has to be adopted in this study.