Widening Inter-County Inequality in Jiangsu Province, China, 1950–95

YEHUA DENNIS WEI and SUNWOONG KIM

Scholars have heatedly debated the change of regional inequality in China and policies for intervention. However, most studies on China are based on macro regions and provinces, and have paid less attention to trends and mechanisms of regional inequality within provinces. This article uses time-series county data to examine inter-county inequality in Jiangsu from 1950 to 1995. We find that inter-county inequality in Jiangsu did not change much under Mao and during the rural reform period (1978–84), but dramatically intensified in the urban-based comprehensive reform period (since 1984). Regression analysis reveals that the institutional structure, agglomeration effects, and human capital are important factors underlying the divergence of inter-county inequality in Jiangsu.

I. INTRODUCTION

Regional inequality in China has been at the centre of scholarly and policy debates, due largely to the diverse views on the nature and practice of socialism, central control and local autonomy, and resource allocation among regions.1 While socialist ideology demanded a reduction of regional inequality, studies on the Maoist period produced varied findings [Wei, 1999]. While some scholars argue that Mao reduced inequalities [e.g., Paine, 1981], other studies have found that regional inequality persisted or even increased under Mao, partially due to frequent policy change, local efforts and regionalism, and rising urban–rural gaps [Wei, 2000a]. In terms of regional inequality in rural areas, studies suggest that China’s rural inequality was at a low level [World Bank, 1990; Bramall, 1993], although some scholars argue that rural inequality actually widened and spatial concentration of poverty persisted [Riskin, 1987].

Since the launch of economic reforms in 1978, China’s dominant development policy has shifted from self-reliance to pursuing comparative advantage and opening up to the outside world. The government encouraged some regions to ‘get rich first’ and emphasised coastal development, arguing that regional specialisation and concentration of resources were necessary for speedy economic growth. The reforms have generated heated debates on income and spatial inequalities in China. Some argue that inequality across China’s provinces has declined largely because of fiscal transfers and diffusion of investment [e.g., Raiser, 1998]. This implies that China’s economic reforms have not intensified regional inequality. Others, however, have documented a widening coastal–interior gap [e.g., Chai, 1996], accompanied by criticisms of post-Mao economic and regional development policies. Widening regional inequality is widely considered a root cause of China’s regional problems, and a serious threat to China’s prosperity, stability, and unity.

Partly due to data limitations, less attention has been paid to examining inequalities across counties. As counties are the basic building blocks of the Chinese governmental administration and substantial inequality exists within provinces, this level of inequality is of great significance. More recent efforts have begun to remedy these inadequacies [e.g., Knight and Song, 1993; Rozelle, 1994; Fan, 1995; Rozelle and Jiang, 1995; Lyons, 1998; Wei and Fan, 2000]. Rozelle [1994], based on county-level units, revealed rising inter-county inequality in Jiangsu by comparing data in 1984 to 1989, while Wei and Fan [2000] have shown the widening of the gap between northern and southern Jiangsu, and the declining of inequality across cities and counties due mainly to the declining status of old cities. However, an analysis of inequality across counties based on time-series data is still lacking, and further analysis is required to reveal the factors contributing to the change of regional economies of Jiangsu.

In this article, we wish to examine the trend and underlying factors of inequality across counties (including county-level cities, excluding city districts or shiqu) in Jiangsu province.2 While acknowledging the decline of overall inter-county inequality (including city districts) in Jiangsu as revealed by Wei and Fan [2000], we in this article will show the rise of inter-county inequality in Jiangsu during the reform period, and explain the divergence by considering the transitional nature of the Chinese economy and drawing ideas from recent theories. In the next section, we will briefly introduce Jiangsu province and discuss research methods. Then, we will examine changing patterns of inter-county inequality in Jiangsu. Institutional analysis as well as regression model will be used to identify

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factors underlying uneven regional growth and to interpret the divergence. Finally, we will summarise major findings and discuss the implications of this research.

II. JIANGSU PROVINCE AND RESEARCH METHOD

Jiangsu is one of the richest provinces in China and has recorded rapid growth since the launch of reforms in the late 1970s (Figure 1). Its growth trajectory well reflects that of many other coastal provinces, such as Zhejiang and Shandong. From 1978 to 1995, its average annual growth rate of per capita gross value of industrial and agricultural output (GVIAO) reached 13.5 per cent—among the fastest in China. In 1995, its per capita GVIAO was 11,129 yuan, which was among the highest in China [JSB, 1996].

We have selected the province of Jiangsu as a case study for three reasons. First, the province has always been sensitive to state policy change, partly because it is one of the most developed provinces and partly because of its geographic proximity and close ties to Shanghai, which has long been an epicenter of political and economic change. Second, large regional disparities, especially between poorer northern Jiangsu (Subei) and richer southern Jiangsu (Sunan), have existed historically. With the growth of counties close to Sunan, a notion of a threefold division of the province into the south (Sunan), the central (Suzhong) and the north (Subei) has now gained favour (Figure 1). Large regional gaps and rising regional conflicts have prompted the consideration of ‘regional co-development’ one of the top three priorities of the Ninth Five-Year Plan of Jiangsu (1995–2000) [People’s Government, 1997]. Lastly, the Jiangsu Statistical Bureau (JSB) has published detailed county-level statistics that are hardly matched by any other provinces of China [e.g., JSB, 1991–96; 1994b]. We have also conducted several rounds of fieldwork in Jiangsu to understand institutions, geography, and uneven development.

Our analysis of inter-county inequality in Jiangsu is based on county-level units (counties and county-level cities, excluding city districts or shiqu) (see also note 2). A set of time-series data (1950 to 1995) based on county statistics is used for documenting temporal change of inequality across counties. Our data set starts with 1950, as the People’s Republic of China (PRC) was established in 1949 and data for that year were incomplete.

Gross value of industrial and agricultural output (GVIAO) per capita, which is widely considered an effective indicator of the level of economic development especially in China for counties, is used as a measure of inter-county inequality in Jiangsu. For temporal change, data in comparable prices (real GVIAO per capita), calculated from growth indices (see Chen and Fleisher [1996] for the transformation) will be used. Since JSB did not release the GVIAO per capita for 1993, we took the geometric mean for 1992 and 1994 to estimate their respective levels for 1993. We selected four of the most commonly used indices of inequality, including the coefficient of variation (CV), Theil’s entropy index (with the parameter equal to 1), Atkinson index (with the parameter equal to 1), and Gini index. CV is the most often used index in measuring regional inequality [e.g., Barro and Sala-i-Martin 1991; Wei 2000a]. We also used Theil’s entropy index to decompose inter-county inequality into within- and between-region (Sunan, Suzhong, and Subei) inequalities. Then, we conducted Lorenz dominance test suggested by Bishop et al. [1994] for the four selected years (1953, 1978, 1984, and 1995) in order to test statistically whether or not the generalised Lorenz curve has shifted over time. In order to examine the effect of industrialisation on inequality, we also decomposed Gini coefficients into agricultural sector and industrial sector, following the procedure suggested by Lerman and Yitzhaki [1985]. This procedure enables us to determine the marginal impact of the two major sector outputs on inequality.

The broad patterns of change from 1950 to 1995 as revealed by the four inequality indexes are astonishingly similar. Such similarity is further
proved by correlation analysis, which shows that CV, the most commonly used index measuring regional inequality, has correlation coefficients of 0.991 with Atkinson index, 0.987 with Theil's index, and 0.926 with Gini index (Table 1). Since the Theil index and the Atkinson index are so highly correlated with each other ($r = 0.997$), we shall not discuss the latter separately. Interestingly, the Gini coefficient - most commonly used in measuring household income inequality - has the lowest correlation coefficient with the other three indexes.

We have identified a set of variables that are potentially important in determining uneven regional development, and tested whether they are significant in determining the growth rate by using regression analysis. We would also like to see whether higher income counties grow more slowly by running regression analysis in which the average annual growth rate was used as the dependent variable and the initial level of output as an independent variable along with other control variables. Further elaboration of variable selection and results of the regression model will be presented in section V.

<table>
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<th>TABLE 1</th>
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<tr>
<td>PEARSON CORRELATION MATRIX BASED ON INEQUALITY INDEXES</td>
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<tr>
<td>Coefficient of Variation</td>
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<td>Theil Index</td>
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<td>Atkinson Index</td>
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<td>Gini Index</td>
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III. INTER-COUNTY INEQUALITY DURING MAO'S PERIOD

When the PRC was founded in 1949, Jiangsu already had established numerous modern industries and was one of the most developed provinces in China. In 1950, with one per cent of China's total land area, Jiangsu produced 9.9 per cent of China's industrial output. However, economic development was uneven among counties in Jiangsu. Sunan was much more developed than Subei, stimulated by the development of modern transportation and industries, and the emergence of Shanghai.

Under the influence of socialist ideology and egalitarian ideas, the new leaders of China emphasised the recovery of traditional industrial bases (coastal cities) and the development of new industrial centers in the interior for the consideration of industrialisation, national defence, and equity [Ma and Wei, 1997]. However, during certain periods, Mao promoted decentralisation and rural industrialisation, which laid the foundation for the growth of township and village enterprises (TVEs) in Sunan. During the early 1970s, China began to reduce its isolation from the outside world, and a pragmatic leadership gradually emerged. Such changes in policy and local development resulted in the overall increase of inter-county inequality under Mao (Figure 2).

During the early and mid-1950s, Jiangsu was de-emphasised in China's national development planning and resource allocation due to its coastal location and lacking energy and raw materials. Less state investment was committed to the rich counties in Sunan, and few new state-owned enterprises (SOEs) were established in Jiangsu. Moreover, Jiangsu had to submit a substantial amount of revenue that was mainly contributed from Sunan to the central government [Wei, 2000b]. Consequently, inter-county inequality did not change much during the 1950s (Figure 2).

During the Great Leap Forward period (1958–60), Jiangsu experienced chaos and economic crisis. Decentralisation gave Jiangsu some decision-making powers in developing local economies. After Mao's calling for rural industrialisation, and with the support of the provincial government, some small-scale rural industries were established, particularly in Sunan. Most of these were food processing and agricultural machinery factories. Counties in Sunan, with better industrial bases, recorded faster growth than Subei, which was still dominated by agriculture. However, due to the failure of the Great Leap Forward, and intensified by bad weather and flooding in Subei in the early 1960s, the poorest agricultural counties, such as Suqian, Pixian,
Binhai, and Guannan, were hit the hardest. Their per capita GVIAO declined dramatically during 1961–63. As a result, inter-county inequality rose sharply in 1962 and 1963.

The rise in inequality during this period is very evident when we decompose Theil's entropy index into within- and between- the three regions: Sunan, Suzhong and Subei. The inequality between regions accounts for about 50–60 per cent of the inequality. Inequalities within regions, particularly in Sunan and Suzhong, are relatively insignificant. The inequality within Subei region typically accounts for only about 20 per cent during the 1950s. However, in 1963, its contribution rose sharply to about 50 per cent of the total inequality.

China attempted during the Recovery Period (1963–65) to solve problems arising from the Great Leap Forward and the great famine. The provincial government provided preferential policies especially to the poorest counties, including Binhai, Funing, Lianshui, and Guangnan, which greatly helped their recoveries [Editorial Committee, 1989]. With the improvement of irrigation and agricultural production, the conditions of the poorest counties in Subei were improved. For example, per capita GVIAO in Binhai declined from 218 yuan in 1961 to 150 yuan in 1962 and 152 yuan in 1963, but increased to 236 yuan in 1964. Other poor counties also experienced such turn around. Hence, within-region inequality in Subei and

**Figure 3**

**BETWEEN-REGION AND WITHIN-REGION INEQUALITIES (THEIL INDEX) IN JIANGSU, 1950–95**

![Theil Index Graph](image)

between-region inequality decreased substantially (Figure 3). Meanwhile, the Cultural Revolution was initiated in 1966, which more seriously damaged the economies of the cities and counties in Sunan. These changes led to the decline of inter-county inequality in Jiangsu from 1963 to 1967/68, as evident in Figure 2.

With the normalisation of Sino-US relations and the emergence of a pragmatic leadership in the early 1970s, the emphasis of China's regional development began to shift to the coastal region [Ma and Wei, 1997]. Meanwhile, the central government encouraged the development of small-scale rural enterprises. Sunan, which had more experiences in industrial growth and was eager to improve local economies through rural industrialisation, established hundreds of TVEs. Counties in Sunan were also benefited from its location of being close to Shanghai and metropolises in Sunan that provided materials, markets, and technical supports to Sunan's rural industrialisation. From 1970 to 1975, rural industrial output in Jiangsu increased from 0.96 billion yuan to 2.33 billion yuan, and industrial output surpassed agricultural output for the first time. Subei, however, still focused on agriculture that grew much slower than the TVEs in Sunan. SOEs were also more important in the industrial economies of Sunan. It is interesting to note that while within-region inequality in Subei and Sunan decreased, in Suzhong it increased steadily during the early 1970s.

Examining CV, we see a steady, though small, increase of inter-county inequality in Jiangsu during Mao's period as a whole, which contrasts somewhat with the normal expectation that regional inequality declined. It was 0.45 in 1978, higher than that in 1950 (0.33). Also, Gini increased from 0.198 in 1953 to 0.206 in 1978. The Lorenz curves were not significantly different from each other at five per cent level according to the Lorenz dominance test suggested by Bishop et al. [1994]. The apparent discrepancy seems to be attributed to the fact that CV is more sensitive to the extreme values. Two major periods recorded rising inequality: from late 1950s to early 1960s (especially between 1961 and 1963), and during the 1970s. Local efforts and Mao's policy of decentralisation and rural industrialisation in the late 1950s and early 1970s improved the conditions of rich counties in Sunan, contributing greatly to the rise of inter-county inequality. Policies of decentralisation and rural industrialisation helped the development of a group of richer counties in Sunan, while poorer Subei lagged behind.

The change of inter-county inequality under Mao can be further examined by decomposing inter-county inequality by the two major income sources – industry and agriculture. Following Lerman and Yitzhaki [1985], we have decomposed the Gini coefficient (Table 3). In the second column (G) in the table, the Gini coefficients for various years are presented. The number in the row labeled agriculture conveys the Gini coefficient for
output generated only from the agricultural sector. Similarly, the digits in the industrial row correspond to the output from the industrial sector. The number in the row marked total conveys the Gini coefficient for the two sources combined. Although the aggregated Gini coefficient shows an increase in inter-country inequality, both Gini coefficients for agricultural sector and for industrial sector decreased from 1953 to 1978 respectively. In other words, although inter-country inequality of output derived either from agriculture or from industry decreased, the aggregated inequality slightly increased during Mao’s era.

**IV. INTER-COUNTRY INEQUALITY DURING THE REFORM PERIOD**

China has launched a series of reforms during the post-Mao period. While earlier reforms stressed rural reforms specifically, the emphasis quickly moved to urban-based comprehensive reforms and open door policies. Decentralisation has provided considerable power to localities, starting with local responsibility and incentives in Suhan, and then spreading to Suzhong and Subei. Counties in Suhan have received considerable preferences in reform policies, and have been more aggressive in initiating local policies for economic growth [e.g., Ho, 1994; Wei, 2000a]. Reforms have also created an environment for the growth of the non-state sector and the infusion of foreign investment. Suhan, with well-positioned TVEs and better conditions for foreign investment, has benefited greatly from those reform policies. Reform policies and local factors are expected to reinforce uneven economic landscape in Jiangsu, especially the gap between counties in Suhan and Subei.

Rural reforms (decollectivisation) were introduced in the late 1970s in Jiangsu, and by summer 1983, 98.6 per cent of villages implemented the rural responsibility system [Editorial Committee, 1989]. In the mid-1980s, the emphasis of reforms was shifted to urban reforms and open door policies, including fiscal reform, investment reform, and industrial reform. Like other coastal provinces, Jiangsu received more decentralised and more open policies from the central government. The reform defined a climate that promotes development of non-state enterprises, especially TVEs (which were more efficient in production than SOEs [Priene, 1992]), through policies of low tax rates, budget bonus, flexible production, and new labour policies. Counties in Suhan were also benefited from agglomeration effects, especially industrial networks established with Shanghai and cities in Suhan, promoted by provincial and local officials [Wei, 2000a]. Reforms stimulated the growth of TVEs in Suhan, well known to the nation as the Suhan model.

Although opened up to the outside world later than Guangdong and Fujian, Jiangsu has been vigorous in attracting foreign direct investment (FDI), and has captured the interest of foreign investors. In 1996, FDI in Jiangsu reached $5.2 billion, only behind Guangdong. With favourable open door policies and locational advantages, Suhan dominated foreign investment in Jiangsu, and FDI has become a major factor of production in Suhan. In 1995, 72.1 per cent of FDI in Jiangsu concentrated in Suhan.
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leading counties of FDI were all in Sunan, such as Zhangjiagang (US$600 million), Kunshan (US$505 million), Jiangyin (US$252 million), and Wuxian (US$251 million) [Wei and Fan, 2000]. Consequently, the economy of Jiangsu, especially that of Sunan, is much less controlled by the government and state planning. In 1995, SOEs only produced 19.8 per cent of industrial output, much lower than the national average (34 per cent). TVEs and foreign-invested enterprises were important sectors in Jiangsu, especially in Sunan, although TVEs have been under restructuring.

Rural reforms were relatively egalitarian in nature and helped rural development in Subei. Consequently, from 1978 to 1984, inter-county inequality did not change much. However, the urban reform favoured more industrialised counties and resulted in a great deal of increase in inter-county inequality. CVs changed little from 1978 to 1984, but increased dramatically thereafter. In 1984, CV was 0.46, which was only slightly higher than that in 1978 (0.45). However, in 1995, it rose to 1.04, more than twice higher than its level in 1984 and the highest level during the study period (1950–95). Similarly, the Gini coefficient increased from 0.206 in 1978 to 0.218 in 1984, and to 0.495 in 1995. Lorenz curves show an almost identical distribution of regional GVIAO per capita in 1978 and 1984 (Figure 4), and they are not statistically different from each other (Table 3). Still they are significantly different between 1984 and 1995 at one per cent level. This finding that earlier years of reforms did not intensify regional and rural inequalities is consistent with the findings of other scholars [e.g., World Bank, 1990].

During the reform period, counties in Sunan experienced much faster growth than Subei, as shown in Figure 5. Among the counties with the highest growth rates, none is located in Subei, while the counties experiencing the slowest growth are all located in Subei. As a result of the faster growth of counties in Sunan, large gaps exist between the rich and poor counties (Figure 6). In 1995, all of the 12 counties in Sunan became among the richest counties of China. Counties in Subei, such as Binhai and Guanyun, are still among the poorest. Some counties in Sunan even have higher GVIAO per capita than cities in Subei. The rapid growth of counties in Sunan has contributed to the intensification of inter-county inequality.

A closer examination of output shares gave better understanding of the changes in inequality. Between 1978 and 1984 the poor half of the counties show stable status in inequality. However, since 1984 the output distribution has become heavily skewed for a handful of rich industrial counties. For example, the six richest counties (out of 64 counties) in Jiangsu accounted for about 20 per cent of GVIAO in 1980. In the next ten years their share increased to more than 35 per cent. These counties are all located in Sunan.
As we can see in Figure 3, within-region inequality for all regions rose substantially during this period. In percentage terms, Sunan experienced the fastest growth in inequality, while in absolute measures, the inequality in Suzhong grew most rapidly. At the same time, between-region inequality grew quite substantially. This fact contrasts sharply to the pattern in the rural reform period during which between-region inequality virtually remained stagnant. Overall, the rise in inequality during the urban reform period occurred within regions as well as between regions.

The decomposition of Gini coefficients uncovers the significant changes during the period: industrialisation (Table 3). The share of industrial output steadily increased even during Mao's period. In the column 'S' in Table 3, the share of industrial output increased from 0.096 in 1953, to 0.377 in 1978, to 0.488 in 1984, and to 0.896 in 1995. During the early reform period emphasizing the rural area, Gini coefficient in agricultural output decreased from 0.157 to 0.122. Meanwhile inter-county inequality due to industry increased (Gini coefficient of the industrial sector increased from 0.382 in 1978 to 0.426 in 1984). Since the agricultural and industrial shares were about the same during this period, these two opposite forces cancelled each other. However, when the industrial sector became more dominant in the later reform period, inter-county inequality intensified. As shown in Figure 2, with the emphasis of reforms shifting to urban reforms and open door policies in the mid-1980s, inter-county inequality rose drastically. After a slight setback related to the 1989 Tiananmen incident, and with the deepening of economic reforms, inter-county inequality widened further in Jiangsu.

If we examine the Gini decomposition by source, it is quite evident that the widening in inequality is entirely due to the industrial sector. As the output share of the industrial sector increases, the inequality in the industrial sector dominates regional inequality. The industrial sector Gini coefficient rose from 0.382 in 1978 to 0.426 in 1984 to 0.555 in 1995. As the share of agricultural sector output decreased and was about ten per cent in 1995, the future inter-county inequality would be virtually determined by the industrial sector output distribution.

The recent literature on economic growth and convergence-divergence debate hypotheses two propositions (see Temple [1999] for a survey on the literature). First, σ-convergence postulates that the dispersion of the inter-regional productivity (or income) decreases overtime. However, the above analysis on Jiangsu refutes the σ-convergence hypothesis very strongly. Second, the β-convergence hypothesis suggests that a country (or region) with higher output (and capital) per worker grows slowly because of the law of diminishing marginal returns for capital. Our analysis of the data sharply contrasts with the prediction of the β-convergence model. This is also evident from Figure 7, which depicts the relationship between the 1985 GVIAO per capita and average annual growth rates of GVIAO per capita between 1985 and 1995. Without control of any variables that contribute to the different growth rates, it appears that the counties with higher output per capita in 1985 are associated with higher growth rates between 1985 and 1995.

In summary, during the early reform period (1978–84) that emphasised agricultural reform, inter-county inequality did not change much. However, since the reform policies moved to the urban areas the inter-county inequality started to increase dramatically. The richest industrial counties in Sunan registered much faster economic growth, while agricultural counties in Suibei fell far behind. Due mainly to the uneven industrialisation. The trend of inter-county inequality in Jiangsu during 1950–95, as shown by inequality indexes, casts serious doubt on the relevance of the convergence hypothesis to China.
V. UNDERSTANDING INTER-COUNTY INEQUALITY IN JIANGSU: REGRESSION RESULTS

In order to further the understanding of the disparity of growth among counties during the reform period, we performed a regression analysis. The units of analysis are counties. Ideally, we would like to analyse the whole reform period from 1985, the year when comprehensive economic reforms were fully launched, to 1995, the final year of this research. But some data is not completely available. The earliest year where such data are available is 1990. Hence, we run the regression model using 1990–95 data. The dependent variable is the average annual growth rate of per capita GVIAO in each county (GVIAOPG). The independent variables are suggested by the recent literature in growth economics, economic geography, and the nature of the Chinese economy. Our review of literature and empirical studies leads us to include the following independent variables.

(1) Output per capita at the beginning of the period is included to test whether the β-convergence hypothesis is consistent with our data. According to the β-convergence criterion, the county that starts with lower output (GVIAO) per capita grows faster and the one with higher output grows slower, although the recent endogenous growth literature does not totally support this argument [Sala-i-Martin, 1997]. As shown in Figure 7, without controlling for any variables that contribute to the different growth rates, the counties with higher output per capita in 1985 are associated with higher growth rates between 1985 and 1995. In order to test for the conditional β-convergence and reveal factors underlying uneven regional growth, we include in the following other independent variables in the regression model.

(2) One independent variable selected is share of SOE fixed assets. Fixed asset is considered as a major factor of growth in the literature and in the Chinese economy. Regional allocation of fixed investment is considered a key instrument in China’s industrialisation and regional development policy [Ma and Wei, 1997]. During China’s economic transition, the distribution of fixed asset in state and non-state sectors well reflects the infusion of market mechanisms and local resource endowments. We hypothesise that if a region has a high share of fixed assets in SOEs, its output grows slowly, as productive units have less incentive to improve productivity and to capture opportunities created by economic reforms. In other words, regions with more shares of fixed assets in the non-state sector (mainly township and village enterprises and foreign-invested enterprises) tend to grow faster. Therefore, fixed asset in SOEs as a percentage of total fixed assets in 1990 (SOEFA) is expected to negatively relate to regional GVIAO per capita growth.
(3) Another institutional aspect of different growth rates is captured by foreign direct investment (FDI). With the integration of the world economy (globalisation), FDI flowing into developing countries like China has risen rapidly, making FDI an important factor of production in these countries. With the opening up of China to the outside world, FDI has become an important factor in the national and regional development of China. Proactive units financed by FDI are more likely to enjoy higher levels of technology and management [Khan, 1997]. Because of strong profit motives and connections to the international market, these units are more likely to improve their productivity and enjoy more rapid growth. Regions with more FDI also tend to export more to the outside world since 70 per cent of Chinese export is generated by foreign-invested enterprises. Thus, FDI per capita (FDIP) is likely to be associated with faster regional economic growth.

(4) Recent literature emphasises the role of human capital and technology innovation in economic growth [e.g., Mankiw et al., 1992], regional growth [Mallick, 1993], and industrial growth of poor areas in China [Rozelle et al., 1998]. It is difficult to measure human capital, including technology. Data on human capital is especially limited in China. Fortunately, we are able to include the number of technical workers per 1,000 people (TECH) as a surrogate variable for human capital of the county.

(5) Research on regional development has re-emphasised the importance of agglomeration in regional development [Krugman, 1991; Arthur, 1994]. Counties in Sunan have developed close social and economic ties with Shanghai and cities in Sunan, and have benefited greatly from linkages with those cities. We have calculated the industrial potential index (INDPOTENT) for each county. The index represents the level of accessibility of the county in question weighted by gross value of industrial output (GVIAO), and is analogous to population potential index, which is more widely known.

The results of the regression analysis are reported in Table 4. Tests show no violations of regression assumptions. The regression equation as a whole and the regression coefficients are all significant at five per cent level, except that the output per capita in 1990 is not statistically significant at five per cent level. This is clearly in contrast with the β-convergence hypothesis and long-term convergence across US states, West European countries, Australasian states, and Japanese prefectures [e.g., Barro and Sala-I-Martin, 1991; Cashin, 1995; Crown and Wheat, 1995]. As Table 4 shows, adjusted R square is 0.596, indicating that 59.6 per cent of the variance in regional GVIAO per capita growth rate is explained by the independent variables. GVIAOPG is positively related to TECH, FDIP, and

| TABLE 4 |
| RESULTS OF REGRESSION ANALYSIS FOR THE 1990–95 PERIOD |

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<thead>
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<th></th>
<th>Coefficient</th>
<th>Std. error</th>
<th>Std. Coefficient</th>
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<th>p-value</th>
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</tr>
<tr>
<td>FDI Per Capita in 1990</td>
<td>0.030</td>
<td>0.015</td>
<td>0.265</td>
<td>2.220</td>
<td>0.030</td>
</tr>
<tr>
<td>Tech. Workers per 1,000 People in 1990</td>
<td>0.000</td>
<td>0.000</td>
<td>0.380</td>
<td>2.262</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Dependent variable: Average annual growth rate of GVIAO per capita between 1990 and 1995 (GVIAOPG).

R Square: 0.628
Adjusted R Square: 0.596
Number of Observation: 64
F Ratio: 19.296 (p = 0.000)

INDPOTENT, but is negatively associated with SOEFA. In terms of the relative importance of the independent variables, agglomeration is the most important factor, followed by fixed asset allocation, technological workers, FDI per capita, as indicated by standard regression coefficients. We have also added the sixth variable, the share of industrial output as a percentage of GVIAO, to the regression model. But it turns out to be insignificant, and hence it is not reported here. Incorporating the above analysis, we now have a clearer picture regarding the rise of inter-county inequality in Jiangsu. Our data show a rise of inter-county inequality during the 1950–95 period and a dramatic increase of inequality since the reform of the mid-1980s. In fact, holding constant the share of the SOE's fixed assets, FDI per capita, technical workers per capita, and industrial potential, growth rate appears to be independent of the level of output per capita at the beginning of the period (1990). The estimated parameters for the level of output per capita do not significantly vary from zero.

We have observed that outputs across counties have diverged since China started to implement urban-based comprehensive reforms in 1984/85. To summarise, inter-county inequality is exacerbated by the following factors. First, the agglomeration economy measured in industrial output potential is a very strong determinant of the growth rates. The existing network of markets and proximity to larger cities including Shanghai play an important role in determining the post reform growth rates. Since the reform effort has been directed towards the industrial sector, agglomeration factors are naturally more likely to be important.
plays an important role in the growth of the county, as large cities are both sources of input and markets for output. Moreover, counties located close to large cities grew faster by exploiting the transportation cost advantage bestowed by better accessibility. The potential for growth of counties located in remote regions would not be great unless there were a great deal of improvement in linkages to large cities and in transportation and communication networks.

Secondly, institutional variables such as the share of state-owned enterprises are an important determinant in explaining divergent growth rates among counties in Jiangsu. The non-state sector, especially township and village enterprises, expanded rapidly in Sunan. This suggests that the incentive system for workers and managers, determined by the institutional structure, is an important determinant of growth. The inefficiency of the SOEs has been documented quite extensively. However, many of the large-scale industrial plants are SOEs. They employ a substantial portion of total workers, have outdated equipment, and produce less-demanded products. It is economically, politically, and socially difficult to reform such organisations into a more efficient organisational form. This is clearly one of the major challenges to the Chinese leadership in coming years.

Next, the level of FDI constitutes an important determinant of uneven growth across counties. China has recorded a dramatic increase in FDI, promoted by the open door policy and facilitated by globalisation and the participation of overseas Chinese. FDI has become an important source of capital formation and economic development in China, especially in coastal regions such as Sunan. The regression analysis has clearly identified FDI as a significant determinant of regional growth and inequality in Jiangsu.

Finally, human capital is another important factor in driving regional economic growth. Sunan has long been a prolific agricultural region and a rich place in China where education has always received high priority. Sunan has enjoyed a high level of education and creativity. Improving education and technology is a major task pursued by governments in Sunan that have provided favourable policies for attracting educated labourers and technology-oriented investment projects. Some of the increasing revenues have been allocated for technical innovation, education, and professional training. As revealed by the regression model, human capital has significantly contributed to uneven regional growth.

VI. CONCLUSION

This article has revealed that inter-county inequality in Jiangsu for the 1950–95 period did not show a pattern of convergence. Rather than confirming scholarly speculation that inter-county inequality contracted during Mao’s era, our analysis suggests that inter-county inequality actually increased slightly or at least persisted. While counties in Jiangsu were generally better off, richer counties still grew somewhat faster than poorer counties. Changing international and domestic development conditions greatly influenced these changing patterns. Policies of decentralisation and rural industrialisation, which partly attempted to develop poorer rural areas, in fact contributed to the persistence of inter-county inequality in Jiangsu. This, on one hand, suggests unexpected outcomes of policy, and on the other hand, implies that counties in Jiangsu retained certain levels of control over their economies, and that the local economies of China during Mao’s era were more dynamic than has often been assumed.

The reform period can be divided into two sub-periods. During the early reform period from 1978 to 1984, inter-county inequality did not change much. But after 1984 and with the shift of reforms to urban and industrial reforms, open door policies, and market reforms, inter-county inequality has been intensified. The intensification of inter-county inequality in Jiangsu partly resulted from the reform which provides more favourable and flexible policies to the more developed counties in Sunan. It is also due to the efforts of counties in Sunan that have developed ahead of Subei in the non-state sectors and enjoy agglomeration economies. Moreover, foreign investors tend to favour Sunan, which provides more attractive open-door policies and local investment conditions.

The regression analysis further suggests that agglomeration, foreign direct investment, and human capital positively contribute to regional economic growth, while regions with higher shares of fixed assets in state-owned enterprises tend to grow slower. These analyses contrast with neoclassical models of regional convergence, and support recent growth and regional development theories which consider agglomeration, foreign investment, human capital, as well as other locational and institutional variables (for example, ownership structure in this case) in determining regional growth.

Widening inter-county inequality and the north-south gap in Jiangsu since the mid-1980s is resisted by residents of poorer Subei, who complained to the provincial government for its lack of action. It has also led to intense interregional conflicts and has generated considerable concern amongst the provincial and local governments. Consequently, more efforts have been made by the provincial and local governments to reduce poverty and stimulate the growth of Subei, especially in improving transportation, education, networking, and resource exploration. But with decentralisation and marketisation, many scholars and government officials are not optimistic about reducing regional gaps. Counties in Jiangsu are likely to be continuously fragmented, and regional inequality and policy in China will
remain important issues to governments as well as scholars. While this article has analysed inequality across counties in Jiangsu, case studies of individual counties are required to further unfold the complex mechanisms underlying uneven regional development. A comparative study of other provinces and an examination of other dimensions of regional inequality should also improve our understanding of regional development in provincial China.

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NOTES

1. For more information regarding the significance of and heated debates on regional inequality in China, see Brumall (1993) and Wei (2000a). Household income inequality is an important scholarly and public policy issue as well. However, rising household inequality will not necessarily increase regional inequality, and vice versa (Hussain and Zhang, 1996).

2. Authors have used different names for regional inequality within provinces. For example, for Rozelle (1994), inter-county inequality refers to inequality across counties (including county-level cities, but excluding city districts or shipa). For Fan (1995) and Wei and Fan (2000), inter-county inequality refers to inequality across all county-level units (including counties, county-level cities, and city districts). In this article, we use inter-county inequality for inequality across counties.

3. Gross value of industrial and agricultural output (GVIAO) is the most often used indicator of local development in China, mainly for three reasons (Wei and Fan, 2000). First, GVIAO is the only county/city level economic indicator with a full array of time-series data for Jiangsu from the 1950s to the 1990s. Second, GVIAO indeed accounts for the bulk of economic output in provincial China, and as such is expected to correlate strongly with income and average well-being of the residents of counties/cities. Third, GVIAO is by far the most reliable indicator of city and county economies, since the Chinese socialist accounting system is complex, and since heavy and miscellaneous subsidies render wages not an accurate measure of economic well-being. Also see Rozelle (1994).

4. CV is the most often used index to measure regional inequality, while Gini is the most often used for measuring income inequality. It seems to be a consensus that Theil’s entropy index is the most appropriate and most commonly used indicator for decomposition.

5. Industrial potential index for county i (INDPOTENT) is defined as follows:

INDPOTENT = \sum_{j=1}^{N} \left( \frac{GVIO_i \times GVIO_j}{d_{ij}} \right)

where \(d_{ij}\) is the distance from county i to city j (including the eleven cities in Jiangsu and Shanghai), and GVIO is gross value of industrial output.

6. We expect that counties with faster growth are those dominated by industries, while those emphasising agricultural production tend to grow slower. Indeed, correlation analysis of the share of industrial output as a percentage of GVIAO (GVIAO/GVIO) confirms that expectation (\(r = 0.628\), significant at one per cent level). However, the inclusion of GVIO variables in the regression analysis for the 1990-95 period does not affect the results very much compared those with the five independent variables only, and the variable is not significant at ten per cent significance level. We have also experimented with several other independent variables including open door policy dummy variables in 1990, the number of telephone lines per capita, and the length of railroad tracks per capita. As all these variables turn out to be seemingly insignificant, their results are not reported in the article.

INTER-COUNTY INEQUALITY IN CHINA, 1950-95

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