

Regional Inequality in Contemporary China*

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This paper surveys the literature on regional inequality in contemporary China. It reviews the trend of convergence or divergence of real GDP or income across different regions in China since 1952, and examines the degree of regional inequality using different measurements. It then discusses various factors that may cause the increasing regional inequality and the empirical evidences correspondingly. Finally it gives policy implications.

Key Words: Regional inequality; Convergence; Economic growth.

JEL Classification Numbers: H, O, R.

1. INTRODUCTION

Since 1978, China has been undergoing a process of gradual and incremental reforms from a centralized economy to a ‘socialist market economy’. A significant economic growth has accompanied more than two decades of reform. The average annual growth rate of real GDP was 9.8 percent over the years 1978–1998, among the world’s highest during the time period.

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While the economic growth in China is exceptional during the reform era, it is by no means even across the country's 31 provinces, centrally-administered municipalities and autonomous regions. From 1978 to 1998, Fujian (on the eastern coast), the fastest growing province, experienced an average annual growth rate of 13.9 percent in real GDP; whilst Gansu (on the hinterland), the slowest one, grew only at 6.7 percent. In 2000, the top 10 provincial units with the highest GDP per capita were mostly from the eastern coast of China. The GDP per capita in Shanghai (on the eastern coast), the country's highest, was 9.65 times the level of Guizhou (on the inland), the country's lowest.

A question of great interest is whether there exists convergence in real GDP per capita across regions in China such that the poor regions are catching up with the rich ones, or the poor regions and the rich regions diverge into two clubs such that the gap in the level of living standards between the poor and the rich is persistent or even widening. The neoclassical growth theory states that poorer economies tend to grow more rapidly than richer ones due to decreasing returns. The theory predicts absolute convergence across economies with similar technologies and preferences, where 'technology' here takes a broad view that includes production technology, natural resources, institutional factors, government policies and etc., see Barro and Sala-I-Martin (1995). Empirically, Barro and Sala-I-Martin (1991) find evidence supporting absolute convergence across states in the U.S. over the years 1880-1988, as well as across 73 regions in Western Europe over the years 1950-1985. However, absolute convergence in general does not hold across a more heterogeneous group of economies. Therefore, people turn to investigate conditional convergence after controlling for differences in technologies and preferences across economies, see Barro and Sala-I-Martin (1995). Under conditional convergence, different economies approach different steady states. Thus the gap in the level of living standards between the poor and the rich may be persistent or even widening. Mankiw, Romer and Weil (1992) find evidence for conditional convergence over the years 1960-1985 across 98, 75 and 22 countries respectively, after controlling for population growth and capital accumulation. Because conditional-convergence considers the fact that differences in institutions and technologies may cause various economies to converge to different steady states, it has become a widely-used measure of convergence.

China is a huge country that displays enormous spatial disparities in the distribution of economic activities, natural resources, local market institutions, local government policies and other determinants of income levels and economic growth. These disparities make the issue of convergence especially interesting while more intriguing. Numerous empirical works have been done to study convergence (either absolute or conditional) across regions in China. The specification they utilize in general fall into the framework

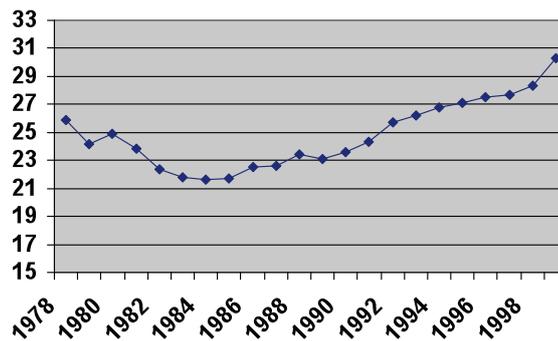
by Barro and Sala-I-Martin (1995):

$$\gamma_{it} = \theta + \alpha x_i + \beta \log(y_0) + u_{it}, \quad (1)$$

where γ_{it} is the average growth rate of region i from time 0 to time t , x_i is a vector of variables characterizing region i 's technology and preference that determine its steady state, y_{i0} is region i 's initial real GDP per capita at time 0 and u_{it} is the error term. A negative β indicates the so-called β -convergence. If $\alpha \neq 0$ and $\beta < 0$, then there exists conditional β -convergence; that is, a region's growth rate is negatively correlated with its initial level of real GDP per capita, given other relevant factors fixed. By experimenting with different variables in the vector of x_i , current literature provides empirical tests of various explanations for the differentials in economic growth across regions in China.

It has been widely documented that regional inequality has been rising in China since the late 1980s due to uneven economic growth across regions. Figure 1 depicts the evolution of regional inequality (measured by the regional Gini coefficient of real consumption expenditure per capita) for the period of 1978–1999. From the figure one can see clear trends. Regional inequality declines from 1978 to 1985 and rises afterwards.

FIG. 1. Regional inequality over 1978–1999



Note: Data source is Kanbur and X. Zhang (2001). Regional inequality is measured by the regional Gini coefficient (in percentage points) of real consumption expenditure per capita.

This paper surveys the literature on regional economic inequality in contemporary China (i.e., since 1952), with a focus on the reform era (i.e., since 1978) during which China has experienced rapid economic growth along with rising income inequality. The rest of the paper is organized as follows. Section 2 summarizes the empirical evidences on convergence/

divergence across regions in China. Section 3 discusses various hypotheses to explain the rising regional inequality in China, and briefs the empirical tests of them. In section 4, there are policy implications based on the analyses outlined in Section 3.

2. CONVERGENCE OR DIVERGENCE: EMPIRICAL EVIDENCE

This section outlines the empirical evidences on regional convergence/divergence in China. First, let us take a look at the evolution of the pattern of regional inequality since 1952.

2.1. Trends in regional convergence/ divergence: a historical review

China has been subject to several distinctive policy regimes since 1952. Following Jian, Sachs and Warner (1996), I divide contemporary Chinese economic history into three periods that reflect dramatic differences in basic economic policies. They are: the period of central planning and the push for industrialization, 1952—1965; the Cultural Revolution, 1966—1977; and the reform era, 1978—present. Empirical studies in the literature have found that during different periods, the country exhibits distinctive tendencies towards regional convergence.

Central planning and the push for industrialization: 1952—1965

This period includes the first 5-year plan based on Soviet-style central planning (1953—1957), the Great Leap Forward (1958—1961) and a return to modified central planning (1962—1965). The distinctive feature of this period is the Soviet-style industrialization and a bias against agricultural regions. Jian, Sachs and Warner (1996) test both the σ -convergence and the β -convergence in real GDP per capita during this period. They find only weak evidence for convergence. Specifically, for σ -convergence, they find that the regional dispersion of real GDP per capita measured by the standard deviation of the log of real GDP per capita fell slightly during this period. Their regression based on Eq. (1) reports an insignificant and negative β , suggesting only weak absolute β -convergence. After including the initial share of agriculture in GDP as an additional explanatory variable, they find a negative β that is almost significant, which indicates conditional convergence. The results confirms the conjecture that the push for industrialization was a driving force towards regional divergence, since agricultural provinces started with lower than average incomes and received disproportionately small share of centrally allocated resources for industrialization.

The Cultural Revolution: 1966—1977

During the Cultural Revolution, central planning was disrupted as a result of Mao Zedong's purge of the central government bureaucracy. Regions in China were forced into autarky. Agricultural production was distorted and damaged because economic incentives were almost fully replaced by bureaucratic controls. The economic growth in agricultural regions stagnated. Meanwhile, heavy industrialization was continued in the Northeast and the East (i.e., Liaoning, Tianjin and Shanghai). The empirical analysis of Jian, Sachs and Warner (1996) shows strong evidence for divergence across provinces during this period. They find that the regional dispersion of real GDP per capita rose steadily and significantly. Moreover, their regression based on Eq. (1) reports a significant and positive β . Kanbur and X. Zhang (2001) confirm the divergence trend in this period, by showing that the Cultural Revolution marks one the three peaks of regional income inequality over the past 50 years in China.

The reform era: 1978—

Empirical evidence shows that since 1978, China's economic growth has been exhibiting conditional convergence across regions. For example, Cai, Wang and Du (2002) find conditional convergence of real GDP per capita between 1978 and 1998, holding constant other relevant factors such as the investment rate, initial human capital, market distortion and etc. Based on data over 1978—1995, Yao and Z. Zhang (2001) report conditional convergence of real GDP per capita, after controlling for the investment rate, the ratio of export to GDP, population growth rate, and a proxy for the geographical distance to the coast. J. Chen and Fleisher (1996) show evidence for conditional convergence of per capita production from 1978—1993 after controlling for employment growth rate, the investment rates of physical capital and human capital and the dummy variable for the coast. Raiser (1998) finds conditional convergence of income per capita between 1978 and 1992. Gundlach (1997) finds conditional convergence of output per worker between 1979 and 1989.

The most striking feature of China's economic growth in the reform era is the formation of geo-economic clubs. The existence of geo-economic clubs must meet two conditions, according to Yao and Z. Zhang (2001): 1) output per capita within each club converges to a long-term stationary state; 2) output per capita between clubs diverges so that the rich become richer and the poor become poorer. Officially, China's provincial units are divided into three groups geographically: West, East and Central. The West includes: Sichuan, Shanxi, Guizhou, Xinjiang, Tibet, Yunnan, Gansu, Qinghai, and Ningxia. The Central includes: Heilongjiang, Jilin, Inner-Mongolia, Shanxi, Henan, Anhui, Jiangxi, Hubei, and Hunan. The East includes: Beijing, Tianjin, Liaoning, Shanghai, Hebei, Shandong,

Zhejiang, Jiangsu, Fujian, Guangdong, Hainan, and Guangxi¹. Yao and Z. Zhang (2001) conduct several tests on the existence of geo-economic clubs in China since the reforms. Through a regression based on Eq. (1), they find significant evidence for conditional convergence, after controlling for the proxy for the distance to the coast, indicating within group convergence in economic growth. According to their estimation, the East grew faster than the Central and the West by 35% and 65% respectively. Thus, the rich East regions became richer and richer relative to the rest of the country. They also carry out a unit root test, through which they show that the regions in the East converge to a long-term stochastic stationary state as well as the regions in the West, but not the regions in the Central. In summary, their results strongly support the view that China has diverged in to two geo-economic clubs, the East and the West, since the reforms.

In 1995, the 5th section of the 14th Plenary of the Chinese Communist Party declared that regional inequalities had widened since the reforms. However, it is worth noting that at different phases of the reform era, the pattern of regional inequalities in China exhibits distinctive features. During the first phase of the reform era, 1978—1989, there was a steady decline in the regional dispersion of real GDP per capita (e.g., Jian, Sachs and Warner (1996), Hu and Wang (1996) and Dayal-Gulati and Husain (2000)). This time period was punctuated by China's first significant reforms, the rural reforms. The rural reforms triggered a one-time spurt in agricultural productivity, mainly between 1978 and 1985, as agricultural production rebounded after the disastrous commune system. Moreover, the reforms led to rapid growth of the township and village enterprises (TVEs), which continue to fuel rural growth today. Because agricultural regions started out below average and benefited disproportionately from the rural reforms, the rural reforms were the main driving force towards regional convergence. Not-surprisingly, there was strong evidence for convergence across provinces that was associated with rural reforms during the first phase of the reform era, see, e.g., Jian, Sachs and Warner (1996).

Since 1990, the regional dispersion of real GDP per capita has been rising, mainly due to the widening gap between the coastal provinces and the inland provinces. For instance, Jian, Sachs and Warner (1996) find that the standard deviation of the log of real GDP per capita increased steadily between 1990 and 1993. They divide China's provincial units into two groups, the Coast and the Inland, and then decompose the regional variance of real GDP per capita accordingly. They show that the variance between the Coast and the Inland contributed to most of the increase in

¹In the literature, it is also common to divide China into two geographical groups: Coast and Inland, with the Coast consisting of all the provincial units in the East group (e.g., J. Chen and Fleisher (1996), Jian, Sachs and Warner (1996) and Kanbur and X. Zhang (1999)).

the regional variance during the time period, while the variance within the Coast declined significantly. A simple convergence regression based on Eq. (1) reports that being a coastal region (with coastal dummy value= 1) might increase the annual growth rate by 7.4 percentage points during 1990—1993. In contemplating the causes of the rising regional inequality during the second phase of the reform era, one should keep the following in mind: 1) this time period has witnessed the enormous (positive) impact of China's open-door policies on the development of the coastal regions; 2) at the start of this time period, China's focus of reforms switched from rural to urban. For more discussions on this, please see Section 3.

2.2. Decomposition of income inequality

Before the early 1980s, China was among the world's most egalitarian societies with income inequality much lower than the world average. However, since 1985, income inequality has risen significantly. China's consumption inequality, measured by the Gini coefficient, was 0.376 in 1992 (World Bank (1996)). And it increased to 0.415 in 1995, making the 37th highest among 96 countries all over the world (World Bank (2000)). 'so steep a rise in inequality in such a short time is highly unusual in both the historical and the comparative perspective', according to World Bank (1997). Many recent studies use the decomposition of the Gini coefficient (or the GE coefficient, defined later) to analyze income clubs in China (e.g., Kanbur and X. Zhang (1999) and Yao and Z. Zhang (2001, 2003)). The decomposition analyses help us understand how regional inequalities contribute to the increase in the total income inequality in China. Moreover, they throw light on how regional inequalities are composed of and what are the causes of the rising regional inequalities.

Next, let us briefly review the inequality measures and the decomposition methodology. The Gini coefficient can be decomposed as

$$G = G^W + G^B + G^O, \quad (2)$$

where G^W is the within-group Gini, G^B is the between-group Gini, and G^O is the residual arising when the income ranges of two different groups overlap. In addition to the Gini coefficient, a family of generalized entropy coefficients is also used to measure income inequality in the literature. According to Shorrocks (1980, 1984), the GE coefficient is defined as

$$I(y) = \begin{cases} \sum_{i=1}^n s(y_i) \left[\left(\frac{y_i}{\mu} \right)^c - 1 \right], & c \neq 0, 1 \\ \sum_{i=1}^n s(y_i) \left[\left(\frac{y_i}{\mu} \right) \log \left(\frac{y_i}{\mu} \right) \right], & c = 1 \\ \sum_{i=1}^n s(y_i) \left[\log \left(\frac{\mu}{y_i} \right) \right], & c = 0 \end{cases} \quad (3)$$

where y refers to the sample of income of the total population, y_i is i 's income, $s(y_i)$ is the share of i 's population in the total population, n is the cardinality of the total population, and c is a constant. A nice feature of the GE coefficient is that it is additively decomposable across groups. If $c = 0$, as in most of the cases in the literature, then the GE coefficient can be decomposed as, given that the total population is divided into M groups,

$$I(y) = \sum_{m=1}^M s_m I(y_m) + I(\mu_1 e_1, \dots, \mu_M e_M), \quad (4)$$

where s_m is the share of group m 's population in the total population, $I(y_m)$ is group m 's GE coefficient, μ_m is group m 's mean income, e_m is an n_m -th vector, and $I(\mu_1 e_1, \dots, \mu_M e_M)$ is the population GE when all the individual incomes in each group are replaced by the group mean. The first item on the RHS of the equation measures the within-group inequality, while the second item measures the between-group inequality. Next I will outline the empirical findings obtained via decomposition analysis.

Rural-urban inequality

The rural-urban inequality contributes to a major part of the overall income inequality in China. The rural-urban gap has been widening since mid 1980s, which has an important impact on China's rising income inequality. Kanbur and X. Zhang (1999)'s analysis is based on real rural and urban consumption expenditures per capita at the provincial level. Their data covers 28 Chinese provinces over the years 1983–1995. During this period, the overall regional inequality increased by 25 percent in the term of the Gini coefficient and by 49 percent in the term of the GE coefficient. After decomposing the GE coefficient across rural and urban groups, they find that the rural-urban inequality measured by the between-group GE contributed to more than 70 percent of the overall regional inequality. Moreover, between 1983 and 1995, the rural-urban inequality rose by 29 percent from 0.062 to 0.085, which accounted for 56 percent of the increase in the overall regional inequality. Meanwhile, the percentage contribution of the urban inequality across provinces increased by almost 100 percent from 2 to 4 percentage points. And the percentage contribution of the rural inequality across provinces rose significantly as well; that is, by 27.6 percent from 19.8 to 25.3 percentage points. Considering the inland areas claimed a large percentage contribution to the overall inequality during the time period (48.9 percent in 1995), they also decompose the inequality in the inland areas across rural and urban groups. The results show that the rural-urban inequality in the inland areas widened by 30 percent, which accounted for 90 percent of the increase inequality in the inland areas during the period. Yang (1999) uses the household survey data of 1986, 1988, 1992 and 1994 of China's Sichuan and Jiangsu provinces to conduct his empirical analysis.

He finds that the overall income inequality rose markedly between 1986 and 1994 for both provinces. The decomposition analysis of the Gini coefficient across rural and urban groups shows that the widening rural-urban gap contributed to 82 percent of the increase of the overall income inequality in Jiangsu and almost 100 percent in Sichuan. The decomposition of the GE coefficient generates smaller but still impressive percentage points of the contribution of rural-urban inequality, with 51 percent for Jiangsu and 73 percent for Sichuan. Based on the national level data, Yang and Zhou (1999) find a significant increase in the rural-urban income disparity over the years. A World Bank (1997) study shows that the rural-urban income gap is responsible for a third of China's total inequality in 1995 and a half of the increase in inequality since 1985.

Coastal-inland inequality

Decomposition analysis across geographical groups confirms the existence of geo-economic clubs. The differential between the inland and the coastal region has been rising rapidly since the reforms, which has become the major driving force towards regional divergence. After decomposing the GE coefficient of real consumption per capita across coastal and inland groups, Kanbur and X. Zhang (1999) find that over 1983–1995, the coastal-inland inequality widened by 300 percent from 0.005 to 0.021, which accounted for 39 percent of the increase in the overall regional inequality. Meanwhile, the percentage contribution of the coastal-inland inequality to the overall inequality increased sharply by 168.5 percent from 6.45 to 17.33 percentage points. The percentage contribution of the within-coastal inequality declined by 5.5 percent from 35.72 to 33.77 percentage points. And the percentage contribution of the within-inland inequality declined even more; that is, by 15.4 percent from 57.82 to 48.9 percentage points. Considering that the rural areas claimed a large share of contribution to the overall inequality during the time period (25.3 percentage points in 1995), they also decompose the inequality of the rural areas over coastal and inland groups. The results show that the coastal-inland inequality within the rural areas widened by more than 200 percent, which accounted for 65 percent of the increase in the rural inequality across provinces. Yao and Z. Zhang (2001) divide the Chinese provinces into three groups, the East, the Central and the West. They then decompose the Gini coefficient over the three groups based on data of real GDP per capita over the years 1952–1997. They find a clear divergence pattern after 1967, which became even more significant after 1990. The share of the within-group inequality decreased to 20 percentage points by the end of the period while the share of the between-group inequality rose to almost 80 percent percentage points. The overlapping residual fell to below 2 percentage points. In a more recent paper, Yao and Z. Zhang (2003) calculated the GE coefficient of the real GDP per capita and decompose it across the aforementioned three groups.

They investigate the evolution of the ratios of between-group inequality to within-group inequality over the years 1952—1997. Their results show: 1) both the ratios of the East-West inequality to the within-East inequality and the within-West inequality rose since the reforms, with the increase becoming more significant after 1990; 2) both the ratios of the East-Central inequality to the within-East inequality and the within-Central inequality rose since the reforms, especially after 1990; 3) there was no clear time trend for either of the ratios of the Central-West inequality to the within-Central inequality and the within-West inequality. Their findings suggest that the East has formed a (high-income) club since the reforms. However, there is no evidence showing divergence between the West and the Central. They might belong to a single (low-income) club.

2.3. Regional disparities of urban income

In this subsection, I briefly review some of the empirical works on urban income disparities across regions in China. Using data at the provincial-urban level, Kanbur and X. Zhang (1999) find that the disparity of real urban consumption per capita across provinces increased by almost 100 percent between 1983 and 1995. Moreover, such an increase accounted for 11 percent of the increase in the overall regional inequality during the same period.

If the inequality rise over the 1988—1995 period has been well documented the reversed evolution for the 1995—2002 period may be less common knowledge. Using urban household income survey data, Khan and Riskin (2005) find a slight but significant decrease in the inequality of disposable income. They show that the major sources for the decrease are the drop in inter-provincial inequality and changes in the distribution of subsidies, while, at the same time, wage income became more divergent.

Demurger, Fournier and Li (2006) also find similar reversing trend in the spatial inequality of urban household income between 1995 and 2002, based on the same dataset. Moreover, they show that the bias caused by not controlling for the price variation across regions will lead to over-estimation of the spatial inequality in urban household income.

Although most studies of regional inequalities in the literature are based on provincial level data, empirical analysis of growth at the city level is especially pertinent to China for the following three reasons. First, government preferential policies towards certain regions are directly enacted at the city level. Thus examining the performances of cities is appropriate to evaluate the effects of those policies. Second, cities may serve as growth engines for surrounding regions through spillover effects. A better understanding of inter-city inequalities helps understand regional growth inequalities. Third, at the city level, data of 1980s and 1990s indicate more severe disparities in the growth rate of per capita income than at the province level, see,

Jones, Li and Owen (2003). This suggests that aggregating data at the province level may disguise some noteworthy relationships. There are a few studies in the literature exploring China's inter-city inequalities of economic growth. Jones, Li and Owen (2003) investigate why growth rates are different across cities in China. They utilize data of income per capita for 200 cities over the years 1989–1999. Through a standard convergence regression similar to Eq. (1), they find significant evidence for conditional convergence. More importantly, government preferential policies enhanced economic growth to a larger extent than at the province level. Based on their estimations, on average, cities in a special economic zone (SEZ) enjoyed an annual growth rate 5.5 percentage points higher than other cities, and open coastal cities had a growth rate 3 percentage points higher than others. These results are consistent with the findings of geo-economic clubs presented earlier. While they find a significant and positive impact of foreign direct investment (FDI) on growth, surprisingly their results show no significant effect of domestic investment in either physical or human capital, which indicates inefficiencies that needs to be further explored by future research. In a related paper, Song, Chu and Cao (2000) use city level data of 1985 and 1991 to study regional inequalities. Their focus is on the determinants of the level of income at a point in time, not the dynamic growth rate. They find that being an open coastal city or a SEZ city had a positive impact on the income (or GDP) per capita, while the share of State-owned enterprises (SOEs) had a negative impact.

Looking further into the urban income structure, Xu and Zou (2000) address a different question: how and why urban income distributions vary across regions in China. Their work throws light on the variation of income inequality across section, as well as on the relationship between income inequality and economic growth. Specifically, they use data on the income distribution of urban residents across 29 provinces over the years 1985–1995. The data provides average incomes for consecutive percentiles. They then calculate the Gini coefficient and other income inequality indices for each province at each time. They find that while most provinces experienced a positive and significant growth in urban income inequality during the period, the pattern of the change was by no means similar across provinces. By running regressions of income inequality on a bunch of explanatory variables, they find: 1) GDP growth, inflation, and foreign trade have a significant and positive impact on the level of income inequality; 2) the share of SOEs is negatively related to the level of income inequality. They find no evidence showing any significant effect of either schooling or urbanization. Gustafsson and Shi (2001) also find that the rich East regions have a higher urban income inequality than the West, based on household survey data of 1988 and 1995 across 10 provinces.

3. CAUSES OF THE RISING OF REGIONAL INEQUALITY

What has caused the rising of regional inequality in China? Numerous studies in the literature have explored the underlying reasons. They not only investigate the spatial variations in technologies and preferences that caused differentials in economic growth, but also address the puzzling question: why were the spillover effects generated by the rich regions too weak to lead the poor regions to catch up? Or put it in another way, why did Deng Xiaoping's 'step ladder strategy' fail to work? Many explanations are provided for the increasing regional inequality, along with empirical tests. They fall mainly into the following seven categories: government policies, openness to the world market (FDI and export), market integration, public infrastructures, education attainment, geographical factors and migration. Next, I will discuss these seven factors one by one.

3.1. Government policies

China's transition process since 1978 is marked by a series of gradual and incremental reforms. The timing and significance of China's reform policies have profound influence on the evolution of regional inequalities.

Regional development strategies

China gradually opened its economy after 1978. In 1980, China established four SEZs in two coastal provinces: Guangdong and Fujian. In the SEZs, private firms and foreign-invested firms were granted considerable privileges such as tax incentives, exemption from import duty on intermediate inputs, the right to retain some or all of the foreign exchange earnings, and the flexibility of employment. The development of the SEZs was so successful that the central government decided to set up another 14 open coastal cities in 1984, opened Hainan in 1988 and set up Shanghai Pudong Development Zone in 1989. In 1988, the government introduced a coastal region's development strategy and the two-ends outside policy, which aimed to encourage processing trade in order to exploit China's abundant labor resource. Export-oriented FDI was encouraged by such policies as tax holidays and tax rebates for exports. As a result, FDI and exports increased rapidly in the coastal regions, which helped China become a main trading country in the world and the largest recipient of FDI among the developing countries. Following Deng Xiaoping's call for more opening of China and for economic acceleration in 1992, more cities (including major inland cities) were opened and many preferential policies were given to foreign investors. However, the coastal regions benefited more from this push than the inland regions, not only because they have advantageous geographical conditions to attract FDI, but also because they had already developed social and economic environments more appealing to FDI than the inland

regions at this stage, thanks to the regional development strategies in the 1980s.

China's regional development strategies have contributed directly to the rising of regional inequalities. Due to the preferential policies, investments, both domestic and foreign, were highly concentrated in the coastal regions. In addition, the open-door policies helped introduce more advanced technologies and management skills to the coastal regions. Industrial agglomeration took place and the coastal regions enjoyed high growth rates driven by scale economies. Golley (2002) identifies industrial agglomeration (a so-called 'cumulative causation effect') in five southeastern provinces using data covering 22 industrial sectors of the period 1989–1994. Meanwhile, vast volume of labor migration was attracted to the coastal regions from the inland. The coastal regions gained the momentum from the regional development strategies for an initial takeoff in the 1980s, which in turn led to persistently higher than average growth rates in the 1990s due to the effects of agglomeration and increasing returns, see Litwack and Qian (1998). For various reasons to be discussed later, spillover effects were not strong enough to lead the inland regions to catch up with the rich coastal regions. Thus widening coastal-inland income inequality resulted. Empirical evidences support the view that preferential investment and trade policies are important determinants of growth differentials in China (e.g. Demurger et al. (2002)).

Urban-biased policies

The urban reforms in China that started in 1985 were far more complicated and difficult than the initial rural reforms. Due to concerns for economic and political stability, the government installed a set of urban-biased fiscal and monetary policies after 1985. Urban price subsidies totaled 71.2 billion yuan in 1998, which was 7.6 percent of government's budget. The government also subsidized the urban-based, loss-making SOEs. Such subsidies totaled 232.5 billion yuan for the period 1986–1990 and 206.1 billion yuan for the period 1991–1995, which accounted for 19 percent and 9 percent of the government's revenue, respectively (Yang (2002)). The shares of the budget devoted to cities ranged from 52 percent to 62 percent for the period of 1986–1992 (Yang (1999)). In addition to fiscal transfers, the urban state sector received preferential credit allocations that caused redistributions of income in favor of the urban areas, too.

The urban-biased fiscal and monetary policies have led to a steady increase in the rural-urban inequality, which in turn has contributed to a large part of the rising inequality in China after 1985, see Section 2.2. Regions in China vary widely in the urbanization rate. Because provinces with a higher level of GDP per capita in general have higher urbanization rates, the widening rural-urban inequality is translated into the rising re-

gional inequality (e.g., A. Chen (2002), Demurger (2001), Fu (2004) and Yang (2002)).

Reforms of SOEs

China's state sector has been lagging behind the non-state sector in economic growth during the reform era. Between 1978 and 1993, the share of SOEs in industrial output dropped from 78 percent to 43 percent. In 1994, most of the SOEs had excess employment and close to half of them were loss-makers. Yet the SOEs continued to consume a great portion of bank credit and resources. It had become evident that the lack of fundamental SOE reforms had seriously undermined China's development (Cao, Qian and Weingast(1999)). In 1995, China started a profound reform in privatizing and restructuring its SOEs, proceeding in three areas: 1) privatization of small SOEs at the county level; 2) mass lay-offs of SOE workers at the city level; and 3) mergers, conglomerations, corporatizations and initial public offerings of some large SOEs which often involve the central government. The reforms in the first two areas, driven mainly by local governments, have proceeded relatively smoothly with fewer social problems than expected.

The reforms of SOEs have notable influences on regional inequality. The rich coastal regions have comparative advantages over the poor inland regions during the reforms of SOEs. First, the rich regions have larger shares of private sector, which makes the reemployment of laid-off workers from SOEs relatively easier. Second, the rich regions have more financial resources and other resources to support the privatization and restructuring of SOEs. Third, both labor market and capital market institutions are more mature and developed in the rich regions to facilitate the privatization and restructuring of SOEs.

Moreover, the reforms of large SOEs contain more difficult economic and political problems and remain one of the biggest challenges to China in the years to come. As Renard (2002) points out, the reforms of SOEs in China will be accompanied by greater unemployment in the next years and will probably increase regional inequality because large SOEs are concentrated in those provinces that have already lagged behind the rich coastal provinces in economic growth.

Fiscal decentralization

China has gone through fiscal reforms to decentralize its fiscal system since the beginning of the reform era. In 1980, China implemented the policy of *fenzhaochifan* ("eating in different kitchens"), aiming to separate the central and local budgets. Budgetary contracts between the central and local governments were established which often varied by regions and were subject to renegotiations when circumstances changed. The contracting system hardens local budget constraints and improves fiscal efficiencies, because marginal central taxation rates drop well below 100 percent and

this provides incentives for local governments to increase their revenues and allocate their spendings more efficiently. During the process of fiscal decentralization, local governments develop power and their relationships with local enterprises strengthen.

Fiscal decentralization has impacted China's regional inequality through various channels. One is that, as Young (2000) points out, fiscal decentralization, combined with distorted price systems and duplicated (and often inefficient) industry structures across regions, leads to inter-regional trade protection and fragmented domestic markets due to local governments' rent-seeking behaviors. Qiu et al. (2003) develop a theoretical model to demonstrate that fiscal decentralization and international trade protection together give rise to inter-regional trade protection. As discussed in Section 3.7 later, inter-regional trade protection can widen the regional gap in China.

Another concern is that China's fiscal decentralization may have gone so fast and so far that national priorities have been crowded out in public spending by local public projects, which could hurt growth. Some public infrastructures crucial to economic growth are better provided by the central government, such as high ways, railways, telecommunication, and power. This is because 1) their production technologies dictate that it is more efficient to produce them at a national scale; 2) Such infrastructures involve large inter-regional externalities and local provision of them may lead to underproduction; 3) Since fiscal decentralization, local governments in China assume two sometimes conflicting roles, public good provider and entrepreneur. This may lead to irrational behaviors of local governments. T. Zhang and Zou (1998) provide supportive evidence showing that in China, the share of central government development spending has a positive impact on economic growth while the share of provincial government development spending is negatively related to growth. Using data across 28 Chinese provinces over the period of 1980—1992, they find a significant and negative relationship between the degree of fiscal decentralization (measured by the ratio of local budgetary spending to central budgetary spending) and provincial economic growth. Differences in the degree of fiscal decentralization across regions lead to spatial variations in economic growth in China.

Lastly, since decentralization, local governments' capacity to finance public goods production mainly depends on local revenues and their ability to negotiate with the central government. This varies a lot spatially, which in turn leads to variations in economic growth across regions.

There are some direct empirical evidences showing that fiscal decentralization has exacerbated regional inequality in China. Tsui (1991) uses a graph analysis based on data up to 1985 to demonstrate that decentralization raised regional inequality. Kanbur and X. Zhang (2002) examines

the time series of regional inequality measured by the GE coefficient over the period of 1952—1999. They find that decentralization (measured by 1-ratio of central government revenues to total government revenues) had a significant and positive effect on the degree of regional inequality; and it especially widened the rural-urban inequality. However, it reduced the coastal-inland inequality, intriguingly. To gain more insight on this matter, further empirical analyses need to be done in the future based on more refined measures of decentralization and more disaggregated data.

3.2. FDI and export

FDI and export, closely related to China's reforms and open-door policies, are two major driving forces behind its economic growth. According to the standard growth theory, FDI helps a region with the accumulation of capital and enhances its adoption of more advanced technologies from abroad. Moreover, in China, FDI is closely related to export. For example, in 1999, exports of foreign invested enterprises accounted for 45 percent of the country's total exports, see Fu (2004). Export helps a region achieve its comparative advantages through specialization and enjoy economies of scale. It may also alleviate a region's foreign exchange constraints and thus allow the region to import more advanced materials and machinery. Due to various social, economic and geographical reasons, such as the central government's regional development strategies, the spatial distribution of FDI and export are by no means even in China. According to Fu, 83.7 percent of the country's total FDI was concentrated in the coastal regions by 1999. Meanwhile, the coastal regions claimed 90 percent of the country's total exports. The average ratio of export to GDP was 25 percent in the coastal regions and only 4.8 percent in the inland regions in 1999. Plenty of empirical evidences show that the uneven spatial distribution of FDI and export has contributed significantly to the rising of regional inequality in China, see, e.g., Brun and Renard (2002), Demurger (2001), Fu (2004), and Fujita and Hu (2001).

Fu (2004) explores the spillover effect of export as growth engine. She finds that export has been the major driving force of economic growth for the coastal regions, but not for the inland regions. More importantly, she reports that the export-led growth in the coastal regions has an insignificant spillover effect on the inland regions, which reinforces the widening regional gap. She argues that the reason for the weak spillover effect lies in the structure of the export sector; that is, a large portion of the coastal exports are through processing trade, which has limited backward linkages towards the inland regions.

3.3. Market integration

Inter-regional trade protection has become a serious problem in China since the reforms, which is reflected by all kinds of barriers to trade erected by local governments to protect local businesses against outside competition, such as special charges levied at roadblocks, outright prohibition, and legal and financial restrictions on marketing non-local goods. As a result, domestic markets become fragmented. Young (2000) finds a clear divergence trend in regional prices in the late 1980s, followed by alternating rounds of convergence and divergence in the 1990s without overall trend.

The deterioration of market integration in China worsens regional inequality. Market fragmentation prevents regions from developing proper industry structures based on comparative advantages. As supportive evidence, Young (2000) reports a convergence in the structure of output across regions combined with a divergence in factor intensities during China's reform era. Notice that the lack of an integrated domestic market has less negative impact on the coastal regions than on the inland regions, because the coastal regions can achieve specialization and enjoy scale economies and increasing returns through international trade, which sustains economic growth. This contributes to the ever-growing gap between the coastal and inland regions. Moreover, the spillover effect from the rich regions to the poor regions is weakened by a fragmented domestic market, which also strengthens the tendency towards regional divergence.

That trade has important impact on economic growth is endorsed by the growing literature of international trade. Moreover, if markets themselves are viewed as economic institutions, studying the effect of market integration mirrors the new emphasis on the importance of institutions for growth in the literature. However, few empirical studies have examined the relationship between market integration and economic growth in China. Due to various geographical, social and economic reasons, the degree of market integration varies significantly both across regions and across sectors in China. This provides a natural context to test the relationship between market integration and economic growth cross section, the results of which will deepen our understanding on the patterns of regional and sector growth disparities. A notable exception by Keller and Shiu (2004) examines the degree of integration of rice markets in China's 12 provinces between 1723 and 1993. It finds that the degree of rice market integration in the 1720s is a very good predictor of per capita income in the 1990s; namely, regions with higher degrees of market integration in the 1720s had higher per capita income in the 1990s.

It is worth noting that as China becomes more and more integrated into the global economy, the country's regional inequality would decline. Kanbur and X. Zhang (2001) find empirical evidence showing a negative relationship between China's openness to the world (measured by the re-

duction in the effective tariff rate) and regional inequality. Qiu et al. (2003) argues that local governments have less incentive to impose inter-regional trade barriers when the nation's external trade barrier is lower. These studies imply that access to WTO has a reversal effect on China's rising regional inequality.

3.4. Public infrastructures

Investment in public infrastructures, including transport services, telecommunication, power and etc., can enhance the total factor productivity growth by facilitating market transactions and the realization of externalities among firms or industries. In the case of China, transportation and telecommunication infrastructures may be of particular importance because the country is of huge distances and diverse geo-topographical features (even within the same province). Moreover, industrial activities tend to be located far away from energy and raw material resources such as coal and natural gas. In addition, technological progress is often imported from abroad and spread from the open and more developed east regions to the west through spillovers.

Public infrastructures are unevenly distributed across regions in China. This might be a legacy from the pre-reform era. For example, the province of Liaoning that is concentrated in heavy industries has average railway length of 24 *km* per 1000 *km*² (Demurger (2001)), well above the national average 13. It might also be attributed to the decentralization since the reforms because different regions have different capacities to invest in public infrastructures, as discussed earlier. For example, in Guangdong, a rich coastal province, the highway density is 372 *km* per 1000 *km*², well above the national average 237. In Qinghai, a poor northwestern province, the highway density is only 23 per 1000 (Demurger (2001)). In addition, there are geographic factors. Differences in public infrastructures are an important determinant of differences in economic growth across regions.

A few empirical works study the relationship between infrastructure development and economic growth in China. Chen and Fleisher (1997) investigate how the transportation route length influences both the level and growth of total factor productivity in Chinese provinces from 1978 to 1993. Mody and Wang (1997) find that both road network length and telecommunication facilities had positive and significant effects on growth for seven coastal provinces from 1985 to 1989. A recent paper by Demurger (2001) uses a larger database (covering 24 provinces from 1985 to 1998) and more comprehensive infrastructure indicators than previous studies. The indicator of transportation infrastructure is the density (*km/1000km*²) of railway, road and inland navigable waterway networks. The indicator of telecommunication infrastructure is the number of telephones per 1000 people. After controlling for other relevant variables, the paper finds a nonlinear

relationship between the transportation indicator and growth. The effect of transportation infrastructure is significantly positive and exhibits diminishing returns. Estimations also indicate that telecommunication infrastructure has a significant and (although less than that of transportation infrastructure) and positive effect on growth. Moreover, the development of telecommunication in the rural areas (measured by number of villages with access to telephone services) has a positive impact on growth.

3.5. Education attainment

Education attainment is often used to measure the level of human capital. Human capital plays an important role in economic growth, especially endogenous growth models (Barro (1995) and Lucas (1988)). Empirical evidence based on data across countries show a significant and positive relationship between education attainment and economic growth (e.g., Barro (1991)). Will the positive relationship hold across regions in China? Plenty of empirical analyses have addressed this question in the literature. For instance, Cai, Wang and Du (2002) show a positive and significant relationship between the initial human capital (measured by log average years of school in 1982) and the growth of GDP per capita, using data across 29 provinces over the period 1978—1998. Demurger (2001) finds that the impact of human capital (measured by the proportion of total population with at least secondary education) on regional growth of GDP per capita was positive and significant over 1985—1998. Also, according to Chen and Fleisher (1997), the initial human capital (measured by the ratio of university graduates to total population) has a significant and positive effect on both the level and growth of total factor productivity. Another paper by Chen and Fleisher (1996) reports a positive but insignificant relationship between the growth of GDP per capita and the investment rate of human capital (measured by the percentage of total population enrolled in secondary school). The confirmed positive effect of the initial human capital on growth implies that regional disparities in education attainment generate variations in economic growth.

Although education attainment varies a lot across regions in China, few studies in the literature have explored the determinants of the spatial variations in education attainment, which has become an increasingly important matter in recent years. On one hand, evidences indicate that productive characteristics are increasingly rewarded as the labor market develops with the deepening of market-oriented reforms. In particular, the return to education increases dramatically, which accounted for 40 percent of the total increase in the level of urban wage between 1988 and 1995, and 11 percent of the total increase in urban wage inequality (Knight and Song (2003)). On the other hand, segmentation and discrimination grow in the labor market. In particular, spatial segmentation (reinforced by restrictions on

migration) accounted for 33 percent of the total increase in urban wage inequality (Knight and Song (2003)). The two factors together should have profound influence on households investment decisions, which in turn determine regional disparities in education attainment. More research needs to be done on this matter in the future.

3.6. Geographic factors

Geographic effects on regional economic growth in China have been explored in the literature. A recent paper by Chang et al. (2002) applies the new geographic theory to study the experiences of China since the reforms. The paper develops a theoretical model different from a canonical neoclassical growth model to explain the regional growth pattern in China. The model is based on two assumptions that hold true particularly in China during the transitional period: 1) unlimited supply of capital from overseas 2) unlimited labor supply from the rural surplus labor². According to the model, in the context of market reforms and open-door policies, the geo-topographic advantages of the coastal regions in international trade and transportation are realized. As a result, returns to capital investment in the coastal regions are higher than in the rest of the country. Thus more FDI and more migrant workers are attracted to the coastal regions, which fuels persistently higher than average growth rates there. They use several variables (rather than a simple coastal dummy) to characterize the geographic factor in their empirical analysis. The results strongly support the prediction of the model. Specifically, the coastline length of each province alone could account for 68% of the variations in economic growth across provinces between 1978 and 1997. Demurger (2001) finds that the interaction between the coastal dummy and the time effect has a significant and positive impact on growth, which corroborates Chang et al.'s argument that the reforms help the coastal regions realize their geographic advantages. Moreover, he finds that the degree of rural isolation has a negative effect on growth.

3.7. Labor mobility and migration

Although market-oriented reforms have made considerable progress in China during the past two and a half decades, a fully-fledged labor market approaching the flexibility of the major industrial nations is far from established. There are still serious obstacles to labor mobility (Fleisher and Yang (2003)). First of all, hukou remains a critical barrier to rural-urban and inter-city migration³. Second, local protectionism arises due to decen-

²There were about 77 million rural migrants working temporarily in cities in 2000 (Cai, 2003).

³As of today, according to Cai (2003), hukou reform is incomplete and its progress differs across provinces and even cities: 1) in over 20,000 small towns, applicants may

tralization. Local governments impose various restrictions on immigration in order to protect the job security of local workers. For instance, migrant families have to bear much higher cost for their children's education. Third, the lack of a well-developed social safety net, particularly unemployment insurance, health insurance and pension, discourages migration. Fourth, the lack of well-developed complementary markets such as housing markets deters migration. Lastly, it has been documented that rural migrants in urban labor markets suffer from discrimination in terms of both wage offers and occupational attainment (Meng and J. Zhang (2001)).

Barriers to migration hamper economic growth. It prevents labor movements from the lower productivity sector (agriculture) to the higher productivity sector (non-agriculture). Moreover, Au and Henderson (2002) show that restrictions on migration limit urban agglomeration and thus curb the productivity growth of cities in China. In a related paper, Au and Henderson (2003) use a structural model to estimate urban agglomeration economies for 206 cities in China. Their estimation generates an inverted U-shape relationship between city size and productivity. They find that in 1997, only 7 cities were oversized, while 73 cities were undersized, resulting in substantial productivity losses. Because cities can serve as growth engines for surrounding regions through spillover effects, the spatial distribution of cities of different sizes has important implications for the pattern of regional economic growth.

With the gradual removal of restrictions on migration in recent years, the volume of migration soars. What is the impact of migration on regional inequality in China? On one hand, labor mobility is one of the major driving forces towards regional convergence. This should hold true for the case of rural-urban migration. The rural-urban migration should reduce the rural-urban inequality. On the other hand, there is a growing concern for the brain-drain problem caused by the inland-coastal migration. Most emigrants from the poor inland to the rich coastal regions are young, educated and skilled, because people of this type face less de facto restrictions on migration. They possess higher human capital per capita than the average levels of their hometown. Considering that the coastal regions can keep attracting FDI (thus with almost unlimited supply of physical capital) and the inland regions have low levels of physical capital, the migration leads to no change in the capital (physical plus human) to labor ratio in the Coast while lowers capital to labor ratio in the Inland. As a result, the gap between the Inland and the Coast widens. The inequality could be

receive local registration if they have a permanent source of living and housing in the locality. 2) In many medium-sized cities, including a few provincial capitals, requirements for gaining hukou status have been reduced; some just require a long-term work contract. 3) In mega-cities such as Beijing and Shanghai, it is very difficult to obtain hukou.

further exacerbated when agglomeration economies are involved. Fu (2004) discovers evidence showing that rural emigration from inland provinces exacerbates the inland-coastal inequality based on data over 1990-1999. To obtain an overall picture of the impact of migration on regional inequality, further research in the future needs to be done, based on data of both rural-urban migration and coastal-inland migration.

4. POLICY IMPLICATIONS

The rising regional inequality presents great challenges to China's social and economic stability. Empirical studies in the literature throw light on the magnitude and mechanisms through which economic and policy variables influence the pattern of regional growth, which provides valuable guidance in search for solutions. The following are some policy implications:

- Promote the economic growth of less-developed regions through a set of new regional development strategies. In 2000, the State Council of China set up a special committee to facilitate economic development in the West, along with a promotion program.
- Lift restrictions on migration. Encourage rural-urban migration. In particular, the removal of the hukou system is crucial.
- Establish various labor market institutions to facilitate labor mobility across locations and sectors. Especially, it is vital to establish a well-functioning social security net including unemployment insurance, health insurance and pension.
- Develop a system of cities to serve as growth engines for regional development. A reasonable spatial distribution of city size is important.
- Develop integrated domestic markets by removing inter-regional trade barriers. As Fleisher and Yang (2003) point out, in order to reduce and eliminate local protectionism, the central market must understand the incentives that local governments need to cooperate with national laws and regulations. Thus central policies should be drawn on a basis of incentive compatibility. The central government in China has exerted various efforts in this direction, including the establishment of the Ministry of Internal trade whose main purpose is to ensure the smooth circulation and distribution of commodities nationwide; and mediate inter-regional trade conflicts.
- As an amendment to fiscal decentralization, 1) help finance or coordinate the production of public infrastructures such as highways and telecommunication networks that have large inter-regional externalities; 2) develop an effective mechanism of risk-sharing among regions to achieve the macroeconomic stabilization at the regional level. Aware of the problems of

fiscal decentralization, China implemented another round of fiscal reforms in 1994 to recentralize revenues and strengthen the central governments capacity to conduct its own policies.

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