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China: Case study on Human Development Progress towards the Millennium Developmental Goals at the Sub-National Level

Wing Thye Woo & Shuming Bao

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SECTION 1.0: AN OVERVIEW OF CHINA IN TIME AND SPACE

[the discussion in the section should be complemented by examination of the materials in file "Part A: Overview Maps and Tables"]

Section 1.1: Key Administrative, Geographical, and Economic Features

The 31 provinces of China cover 9.6 million square kilometers and stretches from the temperate to sub-tropical zones. China is similar in size and climate to the United States but its topography is quite different. The most important difference being that the U.S. has coastlines running the length of its eastern and western borders, whereas western China is landlocked. China is also more mountainous and hilly, with plains at less than 500m elevation making up only 25 percent of the total land area, and mountains and plateaus accounting for 60 percent. These topographic features of China imply higher transportation costs and a greater requirement for physical infrastructure construction. The task of economic development in China is hence more challenging than in the U.S.A.

Physically, China resembles a three-step staircase running downward from west to east. It begins with the 4,000 meters high Qinghai-Tibet Plateau in the west, proceeds to the highlands and basins in the center which are about 1,000 to 2,000 meters above the sea level, and ends with hilly regions and plains that are less than 1,000 meters high. The combination of higher precipitation, warmer climate, and access to navigable rivers and the sea have made the central and eastern provinces more conducive for farming and trade, and, hence, the population centers of China. The Qinghai-Tibet Plateau was traditionally the poorest region.

The location of China's economic center has changed over time, moving eastwards from the Loess Plateau and the Yellow River Valley in the northwest (where Chinese civilization began in 2000 BC), which is about 1,000 kilometers away from the coast. The reason for this original location is because, in ancient times, high agricultural productivity and land-based trade was much more important than sea-based trade. The bulk of China's international trade at that time was conducted through the famous Silk Route that went through the northwestern corner of China. The southeastern coastal region, where Guangdong and Fujian (two of today's most dynamic provincial economies) are located, largely remained uncultivated and sparsely populated in early Chinese history. Although the natural conditions in the southeast were favorable for agriculture, farming was undeveloped because malaria ('zhangqi' in Chinese) and other subtropical diseases checked population growth, and the high temperature sapped human energy faster, resulting in lower labor productivity. Guangdong was considered an almost uninhabitable place in ancient times.

Over time, the pressure of expanding population and the frequent invasions by the northern tribes caused more of the population to move south and into the mid-coastal and southeastern regions. By the 12th century, the Yangtze River valley had become very developed and densely populated. The economic importance of the coastal region increased dramatically after the Opium War in 1840 when the Western powers forced China to first open several ports and then the whole country for trade. China's economy and subsequently politics were quickly (by historical standards) transformed. International trade expanded, foreign direct investments flowed in, and local industrialists made their appearances, especially in the mid-coastal and southeast regions. The Qing

dynasty was overthrown in 1911, followed by a long chaotic period of protracted civil wars and Japanese colonialism, that ended with the foundation of the People's Republic of China on October 1, 1949 by the Communist Party of China (CPC) under the leadership of Mao Zedong.

The key geographical and economic¹ characteristics of China's 31 provinces allow a quite natural classification of the 31 provinces into six regional categories that are useful for analyzing the post-1978 period, see Table A.1 in Part A.²

The metropolises of Beijing, Tianjin and Shanghai that have province-level status (Chongqing was granted province-level status in 1997, but we have included its data under Sichuan province). These are the richest pockets of China, and have had high growth in the 1990s. These cities are highly industrialized, and over 71 percent of their population lives within 100 kilometers of the coast or navigable waters. Beijing, Shanghai and Tianjin are *the exceptionally rich (city) provinces*.

The northeastern provinces of Heilongjiang, Jilin and Liaoning, which are collectively called Manchuria, and were the industrial heartland of China in 1949 (because of the Japanese control of the economy that started in 1905³). During the central planning period, their early start in industrialization was consolidated, making these provinces the part of China that most resembled the Soviet Union in industrial

¹ Unless otherwise indicated, the income data in Sections 1 and 2 are from National Bureau of Statistics (NBS, 1999). The three main components (primary, secondary and tertiary sectors) of provincial GDP are recalculated at 1995 prices, and then summed up to obtain the real GDP series of the province measured in 1995 prices. GDP data for Tibet and Hainan were available only after 1978. In Sections 1 and 2, Chongqing data were consolidated with there of Sichuan by updating Sichuan data from State Statistical Bureau (1997) from 1996 onward with data on Chongqing and Sichuan in subsequent years of the China Statistical Yearbook.

² As to be noted later, the geographical delineation of China has varied from one study to another. As the same term (e.g. coastal) can refer to different subsets of provinces, we shall try to indicate to the reader whenever the regional term changes meaning in our discussion of the literature.

³ The Japanese started their economic penetration into Manchuria in 1895 after defeating China over the control of Korea, began their economic domination from 1905 by taking over Russian economic interests, rendered Manchuria a puppet state after 1911, and formally annexed Manchuria in 1935.

organization and production structure. In the national ranking of per capita GDP, omitting the three metropolises, Heilongjiang and Liaoning ranked first and second, respectively, in 1978, and ranked seventh and fifth, respectively, in 1998. Heilongjiang and Liaoning are *the traditionally rich provinces*.

The coastal provinces of Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan (Hainan was separated out from Guangdong in 1988). These seven provinces have 82 percent of their population living with 100 kilometers of the sea or navigable rivers. They have grown the fastest of these six groupings in the 1978-1998 period, at an annual average of 10.7 percent. The result is that Zhejiang and Guangdong have soared to the top of the per capita GDP ranking, omitting the metropolises, from fourth and sixth, respectively, in 1978 to first and second, respectively, in 1998. Zhejiang and Guangdong are the archetype of *the nouveau riche provinces*.

The central provinces of Shanxi, Henan, Anhui, Hubei, Hunan, and Jiangxi, through which the plain runs relatively unimpeded from the north of the Yellow River to the south of the Yangtze River. The temperature and rainfall make this region the agricultural heartland of China, which explains why its population density is almost twice that of the northeastern and southwestern regions. The two large rivers and their many tributaries endow 57 percent of the population with easy water transportation. The Yangtze between Wuhan and Shanghai has the industrial potential of the Rhone Valley multiplied several times.

The northwestern provinces of Inner Mongolia, Shaanxi, Ningxia, Gansu, Qinghai, Xinjiang and Tibet (data of Tibet omitted) are truly isolated. The center of the land mass is 1,400 kilometers from the coast. This region is more arid and steeper

compared to the four previous groupings, and it is marked by desert on its western and northern borders. Furthermore, 5 percent of the land has a slope of greater than 10 percent compared to 2.5 percent for the northeastern, coastal and central provinces. The general lack of water makes the region difficult for agriculture, only 8 percent of the land is arable, which helps explain why it has the lowest population density in China in 1998, 46 persons per km² versus 126 persons per km² in the southwestern region, which has the next lowest population density. A large number of residents are of Turkic origin, and are practicing Muslims.⁴ The Han people are in the minority in Xinjiang and Tibet.

The southwestern provinces of Sichuan, Yunnan, Guizhou, and Guangxi have rainfall and temperature conditions that are ideal for crop cultivation but they suffer from being too mountainous. The average elevation is 1,400 kilometers, the average slope is 5.2 degrees, and 14 percent of the land has a slope of greater than 10 degrees. The proportion of arable land of 10 percent is barely above that of the arid northwestern provinces. Lacking the mineral resources of the northwestern provinces, the southwestern provinces have the lowest GDP per capita in 1978, and the lowest growth rates in the period of market-oriented reform. A significant proportion of the population belongs to non-Han ethnic groups.

Table A.2 report the GDP, production structure, population and employment of China's 31 provinces in 2001. The six richest provinces (the three metropolises, Zhejiang, Guangdong, and Jiangsu) are all coastal, and they have at least 27 percent of

⁴ In the 1950s, 3.5 million of Xinjiang's population of 5 million were Muslims Uighurs, with Han Chinese accounting for less than 200,000. It is estimated that 6 million Han Chinese have settled there since then, bringing the total population to about 16 million in 1994, with 62 percent belonging to non-Han ethnic groups. Data are from "Wang Enmao, 87, Who Ruled a Rebellious Chinese Province", *The New York Times*, April 23, 2001, and "Xinjiang's Minorities Feel Torn Between Desire for Independence, Benefit of Economic Reform", *The Asian Wall Street Journal Weekly*, September 5, 1994.

their workforce in the secondary industry and at most 42 percent of the labor force in agriculture. Five of the six poorest provinces (Guizhou, Gansu, Guangxi, Yunnan, Shaanxi, and Anhui) are located inland, and these six poorest provinces have at most 17 percent of their labor force in secondary industry, and at least 55 percent of the labor force in primary industry.

Section 1.2: An Outline of Regional Economic Policies in China

1.2.1: The Central Planning Period, 1949-1978

Industrialization was shallow in 1949, and a largely coastal phenomenon.⁵ In 1952, the secondary sector produced 8 percent of GDP and employed 7 percent of the labor force compared with the primary sector, which produced 74 percent of GDP and employed 84 percent of the work force. The coastal provinces had 72 percent of fixed assets, and accounted for 69 percent of the gross value of industrial output.⁶ Naturally, just like the Communist Party of the Soviet Union in 1917, CPC saw its most important economic task to be industrialization.

China adopted the two key sets of guiding principles behind the Soviet development strategy: (a) the Marxist principles of common ownership with the state as trustee, and of generalized egalitarianism; and (b) the Stalinist practices of central planning for resource allocation, suppression of light industries and services in favor of

⁵ In this section, we use the classification of coastal, central and western provinces, which is the one commonly used in official publications. Coastal provinces include Beijing, Tianjin, Hebei, Liaoning, Shanghai, Zhejiang, Fujian, Guangxi, Jiangsu, Guangdong, Hainan, and Shandong. The central and western provinces are collectively called interior provinces. Wang and Hu (1999) used two schemes: (a) metropolitan cities, eastern provinces, central provinces and western provinces (e.g. Table 3.1), and (b) coast, central and west (e.g. Table 6.1). Wang and Hu's definition of coast corresponds to the official classification, and it equals, in their first classification, metropolitan cities plus eastern provinces plus Guangxi.

⁶ The data are from Table 2.2 in Yang (1997).

heavy industries, and minimizing trade and financial linkages with the capitalist economies.

Mao added a third guiding principle to China's economic policy-making, the principle of regional economic self-sufficiency, a region should be self-sufficient not only in food production but also in industrial goods as well. This third principle had unquestionably the greatest impact on regional economic outcomes. The self-reliance principle had several virtues. The first was that it overlapped with the egalitarian principle because it reduced provincial inequality, which Mao had identified to be one of the key social contradictions to be eliminated in the new China.⁷ The second virtue was that the biggest beneficiaries of the self-reliance principle were the poorest provinces (because they were overwhelmingly agricultural), and this distributional outcome was in accordance with the gratitude that many veteran party leaders felt toward these provinces. Many of the poorest provinces were where CPC had retreated to and rebuilt their strength after the Kuomintang had driven it out of the urbanized areas.⁸

The third, and most decisive, virtue of self-sufficiency was that, beginning in 1963, it coincided with the national security considerations of China. The worsening Sino-Soviet political relationship and the growing military presence of the United States in Vietnam convinced Mao that regional economic self-sufficiency was key to China being able to engage in protracted defense of its territory. Mao and his generals envisaged three lines of defense (coastal, central and western), and they decided in 1964 on a massive construction of military-industrial complexes in western China, the third

⁷ Mao (1956).

⁸ According to Lane (1998): "Yan'an [in Shaanxi] became the cradle of the Chinese revolution and earned a lasting place in the hearts of party members who lived there.... The First Five-Year Plan (1953-1957) targeted the province as a key site for industrial development, and 24 of the plan's 156 major projects undertaken with Soviet assistance were located there."

line of defense, popularly translated as the “Third Front.” To minimize the vulnerability of the third front industries to air attacks, Lin Biao, then the Defense Minister and Mao’s designated successor, instructed that these projects be located “in mountains, in dispersion, and in caves.”⁹

The first two virtues of the self-sufficiency principle helped to ensure that the First Five-Year Plan (1953-1957) allocated 56 percent of state investment to the interior provinces, and that the Second Five-Year Plan (1958-62) allocated 59 percent. As the concern for national security grew in the early 1960s, the Third Five-Year Plan (1966-1970) allocated 71 percent of state investment in the interior provinces, with the bulk of it in Sichuan, Hubei, Gansu, Shaanxi, Henan, and Guizhou. Furthermore, many companies in Shanghai and other coastal cities were relocated to the mountains in Guizhou, Sichuan, and Hubei, where highways and railroads were deficient or non-existent, water and electricity were in shortage, and the sources of raw materials were far away. A significant proportion of the relocated factories could not produce anything for many years, with the equipment rusting into junk.

Post-mortem studies of the third front industries concluded that:

“only half of the factories built performed to design specifications and the rest were either only partially completed (30 percent) or not completed at all (20 percent). Fully one-third of the total investment was wasted...”¹⁰

The pouring of investment funds into the interior provinces was a clear violation of the comparative advantage principle. The growth of the interior provinces not only occurred at the expense of the coastal provinces, it also lowered the overall growth rate of

⁹ Quoted in Yang (1997, pp. 19)

¹⁰ Yang (1997, pp. 19) who also reported that 100 yuan of fixed asset investment in 1978 yielded 70 yuan of output from the third front enterprises compared to 141 yuan from the coastal enterprises. The profit rate in 1978 was 9 percent for the third-front enterprises compared to 23 percent for coastal enterprises.

the economy. The wastage that occurred with this discrimination against coastal investments was further increased because of the poor planning, poor execution and poor management of the investments in the interior provinces. What should have been important for the government was not where the investments were located but whether the dividends from the investments were used to enhance the development of the interior provinces.

A policy shift occurred in 1972. China began reducing its discrimination against investments in the coastal provinces and increasing its economic interaction with the capitalist economies. The policy shift occurred because the government realized that China's economy and technological capacity was falling further behind the rest of the world. If this negative trend were not reversed, China might not be able to defend itself. Furthermore, because the Soviet Union was fast becoming a bigger threat than the United States, an invasion through the traditional land route by the Soviet Union had become much more likely than a coastal landing by armed forces supported by the United States. The national security justification for the third front industries was hence undermined. Economic modernization required the import of foreign technology, and this necessitated that China increased its export earnings.

With the improvement of Sino-US relations on course after Kissinger's secret visit in July 1971, the coastal enterprises, especially those in Guangdong, were expanded in order to increase their export capacity. Total export earnings jumped from US\$2.6 billion in 1972 to US\$3.4 billion in 1973, and continued soaring to reach US\$9.8 billion in 1978. Just as national security considerations in the 1950s and 1960s have played a large part in justifying the bias in favor of investments in the interior provinces, national

security considerations in the face of changes in international politics in the 1970s helped to reverse this bias.

1.2.2: The Market-Oriented Reforms Period, 1978-98¹¹

The process of increased economic interaction with the outside world accelerated at the end of 1978 upon the decisive political victory by the rehabilitated cadres over the remnants of the Maoist establishment at the Third Plenum of the 11th Party Congress. The emphasis on the domestic front was the decentralization of agricultural production, the decentralization of the fiscal system, and the deregulation of prices; and the emphasis on the international front was the Open Door Policy.

Fiscal decentralization took the form of tax contracting between the central government and the provinces.¹² Each fiscal contract was individually negotiated, and it ranged from fixed lump-sum contracts for five years like in the cases of Guangdong and Fujian to highly complicated (province-specific) revenue-sharing formulae. The provincial governments in turn negotiated individual revenue contracts with the local governments. Since the marginal tax rate set by the central government varied tremendously across provinces, the incentive of the provincial and local governments to engage in local economic development in order to generate tax revenue also varied tremendously. Given the importance of Shanghai to the central coffers, its marginal tax rate was set higher than that of most coastal provinces until the early 1990s.

¹¹ There is a keen controversy about what are the fundamental economic mechanisms in the rapid growth of China after 1978. Some economists (the experimentalist school) believe that the growth was enabled by the discovery of new non-standard economic mechanisms e.g. collectively-owned rural enterprises and fiscal contracting, while some other economists (the convergence school) see the growth as the result of moving toward a private market economy whereby best international practices are adopted and modified according to local conditions; see Sachs and Woo (2000, and forthcoming) for a review of this debate.

¹² For details, see Wong, Heady and Woo (1995).

The fiscal decentralization might have helped economic growth¹³, but this led to state revenue declining from 35 percent of GDP in 1978 to 14 percent in 1992, producing a near fiscal crisis for the state. The state lacked the funds to invest in infrastructure projects to remove production bottlenecks, and to undertake poverty alleviation programs. The practice of each provincial government covering more of its expenditure from local revenue necessarily meant reduced development expenditure in the poorest provinces that had been receiving fiscal subsidies from the center. The tax reform of 1994 that had the value-added tax as its center-piece has reduced the discriminatory elements of the fiscal system, and restored the fiscal capacity of the state to help the poorer provinces.

The deregulation of prices in the industrial sector mainly took the form of a dual track price system for industrial inputs. Since the central and western provinces were the main suppliers of raw industrial materials, the continuation of artificially low prices for these industrial inputs meant that the dual track pricing system was in effect transferring income from the interior producers to the coastal factories. The elimination of the dual-track price system in the 1990-91 period was an equitable move from the viewpoint of regional disparity.

The Open Door Policy consisted in attracting foreign direct investment and promoting foreign trade in targeted areas. This opening up was initially limited to two southern provinces (Guangdong and Fujian), then gradually extended to larger geographical units: first along the coast, and then the inland provinces. The open economic zones provided investors with various preferential tax treatments, exemptions

¹³ The evidence on this front is mixed, see the critical review in Woo (2001).

on duties and from labor regulations, etc.¹⁴ The implementation of regional preferential policies has gone through 3 broad stages:

Early 80s: limited extent to Guangdong and Fujian provinces, with the establishment of Special Economic Zones (SEZ) in 1979-80.

Mid to end of the 80s: coastal preference strategy enforcement, with the designation of Coastal Open Cities (COC), entitled to set up their own Economic and Technological Development Zones (ETDZ), in 1984, followed by the establishment of Coastal Open Economic Zones (COEZ) in 1985, an Open Coastal Belt (OCB) in 1988 and the Shanghai Pudong New Area in 1990.

Early 90s: further extension towards whole China, after Deng Xiaoping's southern tour in 1992. During this year, new open economic zones were officially started in Major Cities along the Yangtze River (MC), Border Economic Cooperation Zones (BECZ), Capital Cities of inland provinces and autonomous regions (CC), ETDZ and Bonded Areas (BA).

FDI inflows did not respond immediately in large volumes to the establishment of the SEZs in southern China (1979 in Guangdong, and 1980 in Fujian), partly because out of caution and partly because the liberal regulatory framework began being introduced only in 1982.¹⁵ FDI flows started pouring in only from 1984 onward (when it doubled from US\$0.6 billion in 1983 to US\$1.3 billion in 1984). This jump in total FDI in 1984 was not simply due to the opening of 14 Open Coastal Cities and 10 Economic and Technological Development Zones that year because there was an enormous rise in FDI

¹⁴ Details on the different preferential policies applied in these zones can be found in Yang (1997, chapter 3), Ma (1999, chapter 7), Wang and Hu (1999, chapter 6), and Démurger (2000, annex 1).

¹⁵ Jiang Zemin played a prominent role in getting the liberal regulatory framework for SEZs passed in November 1981; see Gilley (1998, pp.68).

into the existing SEZs. FDI into Guangdong increased from US\$245 million in 1983 to US\$542 million in 1984, and FDI into Fujian increased from US\$14 million to US\$48 million in the same period. This acceleration in FDI in 1984 was most probably the result of foreigner investors being finally convinced by the opening of the 24 more FDI zones of China's commitment to economic integration into the world economy.

The second large acceleration of FDI inflow occurred in 1992 when FDI went from US\$4.4 billion in 1991 to US\$11.0 billion in 1992. This further increase in the confidence of foreign investors was doubtlessly brought about by Deng Xiaoping's call for increased economic openness when he toured southern China (the now famous *nanxun*, "southern inspection") in the beginning of 1992.

The leading role of this selective open-door policy in regional growth has been emphasized by a great number of studies (e. g. Mody and Wang, 1997; Chen and Feng, 2000; Démurger, 2000). Most of them found that FDI had an impact on economic growth that went beyond its addition to the capital stock, FDI also provided competition to domestic firms and hence forced them to raise their productivity, generated demonstration effects that enable domestic firms to improve their operations, provided the training ground for future managers of domestic firms in the same industries.

SECTION 2.0: REGIONAL INEQUALITY IN CHINA SINCE 1952

[the discussion in Section 2 should be complemented by examination of the figures and tables in file "Part B: Provincial Disparity – GDP and HDI"]

Section 2.1: Provincial Growth Experiences

Examination of the materials contained in Part B about the distribution of per capita GDP growth rates allows us to identify several sub-periods that are distinguished by their growth performance.¹⁶ The sub-periods in Tables B.1 and B.2 correspond to the following policy episodes:

- 1953-58: the normal centrally-planned economy
- 1959-65: the Great Leap Forward, the economic collapse and recovery
- 1966-78: the Cultural Revolution
- 1979-84: first reform phase, emphasis on agriculture
- 1985-91: second reform phase, Oskar Lange-inspired reforms
- 1992-98: third reform phase, ultimate goal is a market economy with substantial diversification of ownership structure.

Section 2.2: Provincial Income Disparity, 1952-1998

Table B.3 of Part B shows the ranking of provincial income in key years of China's economic history. Three features stand out from the change in the ranking over time.

¹⁶ For formal statistical analyses of the factors behind the changes in the distribution of provincial income, see Jian, Sachs and Warner (1996); Bao, Chang, Sachs and Woo (2002); and Démurger, Sachs, Woo, Bao, Chang and Mellinger (2002).

First, the chief beneficiaries of the planned period were Beijing, Qinghai and Ningxia, and the biggest losers of the reform period were Qinghai and Ningxia (as compared to their initial ranking). The rise of Beijing's relative standing, and its maintenance of the attained income rank, reflects its paramount political status in the country. The initial large gains of Qinghai and Ningxia (up 10 and 8 places respectively), and the subsequent large reversals (15 and 10 respectively) showed the tremendous transfer of resources under the third front industrialization program.

Second, there has been basically no change at the very top and the very bottom of the scale. Indeed, the three metropolises remained the richest throughout the whole period and Yunnan, Shaanxi, Gansu and Guizhou remained the poorest provinces. Mobility, both upward and downward, is a middle-class phenomenon.

Third, the provinces that improved their ranking most significantly during the reform period were the coastal provinces, especially Fujian, Shandong, and Hainan. The traditional industrial bases of northern China (Heilongjiang, Jilin, Liaoning) and western provinces experienced a decline in the relative scale of regional per capita income.

Table B.4 of Part B looks at inequality by focusing on the two tails of the income distribution, the movements in the gap between the five richest provinces and the five poorest provinces. The absolute income gap has increased tremendously over both the planned and reform periods. When we examine the gap in relative terms first by normalizing the absolute gap with the average national income, and second by the ratio of the two incomes, the evidence is mixed. The relative gap decreased from 1.5 in 1978 to 1.4 in 1998, but the income ratios rose from 3.4 to 3.6. In any case, the widening of relative income in the reform period is small compared with the widening in the planned

period, confirming the conclusions drawn from the movements of the coefficient of variation.

Figure B.1 of Part B summarises the evolution of provincial inequality in China by reporting the coefficients of variation of per capita provincial incomes during the 191952-1998 period. The coefficients of variation were constructed from two data samples. The first sample consisted of 28 provinces that had complete income data coverage for the 1952-98 period. The coefficient of variation of the per capita income (measured in 1995 prices) of the 28 provinces, Cov28, increased significantly from 0.45 to 0.54 over the 1958-60 phase of the Great Leap Forward campaign to boost output growth through a combined program of large-scale agricultural collectivization and large-scale investments in heavy industries. The flow of investment funds to the existing industrial bases in the Northeast was so massive that real per capita GDP in 1958 jumped 40 percent in Liaoning, 25 percent in Jilin and 34 percent in Heilongjiang. Unfortunately, the growth strategy of the Great Leap Forward turned out to be disastrously wrong. The resulting economic crash created a nation-wide famine that brought the country to subsistence level, a feat that had the fortuitous result of attenuating provincial income disparity drastically, as evidenced by Cov28 dropping to 0.38 in 1961.¹⁷ A steady increase in provincial income inequality accompanied the recovery from the depression (1962-65) and the renewed growth during the decade of the Cultural Revolution (1966-1976). Cov28 reached 0.68 in 1978, the eve of the implementation of

¹⁷ In 1961, real per capital GDP fell 57% in Liaoning, 23% in Jilin, and 45% in Heilongjiang. Per capital income in these three provinces climbed back to their 1961 levels only in mid-1970s – a feature that indicates to us a general overstatement of output during the Great Leap Forward period. It is estimated that about 30 million people starved to death during the four years of the Great Leap forward.

market-oriented economic reforms. Cov28 reversed course temporarily to decline gradually to 0.62 in 1987-89 before resuming its upward march to reach 0.71 in 1998.

Cov28 may not be a satisfactory indicator of inter-provincial inequality, however, because it gives Beijing, Shanghai and Tianjin (which are metropolises with province-level status) the same weight with the provinces that are much larger in population and/or land area. We hence constructed another coefficient of variation, Cov25 that excluded these three province-level cities. Cov25 shows a much lower degree of inequality than Cov28, and does not show the upward trend seen in Cov28 during the 1963-78 period. These two differences mean that the three major cities have always been substantially richer than the other provinces, and that the gap between them widened substantially during the period of orthodox socialist economic management. The vast gulf that we see between urban and rural income in today's market economy is definitely not a new phenomenon.

Both Cov25 and Cov28 are in agreement that a clear upward trend in provincial income inequality had emerged by 1992, and that the present level of provincial income disparity is unprecedented since the founding of the New China in 1949. Cov25 exceeded the 1961 peak of the Great Leap Forward in 1995, and then went on to reach 0.43 in 1998.

Table B.5 of Part B reports the 1999 provincial scores on the Human Development Index (HDI). HDI is a broader indicator of per capita welfare than per capita GDP because it also takes life expectancy and education attainment into account. Not unexpectedly, the three richest metropolises (Shanghai, Beijing, and Tianjin) stood at the top of the HDI ranking. The seven provinces at the bottom of the HDI ranking are

western provinces, and they are -- in ascending order -- Tibet, Guizhou, Qinghai, Gansu, Yunnan, Ningxia, and Sichuan. The remaining five western provinces are ranked as follows: Inner Mongolia 22nd, Guangxi 21st, Shaanxi 20th, Chongqing 18th, and Xinjiang 15th. Only one of the 12 western provinces is in the top half of the HDI ranking, and even then, barely so.

Tibet's life expectancy index and education attainment index were the lowest in China, and they were so low that they rendered Tibet's HDI score to be the lowest in China even though Tibet's income index (50.3) was higher than those of Shaanxi (49.7), Guangxi (49.9), Gansu (47.8), and Guizhou (41.3). 31st-ranked Tibet had an income that was 22 percent higher than 30th-ranked Guizhou, but education attainment in Tibet was only 59 percent of that in Guizhou (and 63 percent of that in Qinghai, which had the second lowest level of education attainment).

The concern for social equity and social stability has led China's top leaders to commit themselves to accelerating the economic growth of the interior provinces. The budget for infrastructure investments in the poor provinces have increased substantially every year, and a Western Region Development Office has just been established under the State Council (the Chinese cabinet) to formulate a comprehensive development strategy and to coordinate its implementation.

SECTION 3.0: URBAN-RURAL INEQUALITY, 1980-2000

[the discussion in Section 3 should be complemented by examination of the figures and tables in file "Part C: Urban-Rural Disparity and Household Registration"]

A large part of income inequality in China has its origin in the inequality between urban and rural incomes. Table C.1 of Part C shows that the two biggest urban-rural expenditure per capita ratios in 1980 were Gansu (3.18) and Yunnan (3.10), and the two lowest ratios were Shanghai (1.71), and Liaoning (1.87). Tables C.1 and C.2 reveal two interesting points about the gap between urban and rural expenditure.

First, the urban-rural ratios of these four provinces were all higher in 2000: Gansu (3.81), Yunnan (4.08), Shanghai (2.14), and Liaoning (2.48). Roughly speaking, urban-rural inequality declined in the first decade of economic reforms but increased so significantly in the second decade that it was higher in 2000 than in 1980. Of the twenty-five provinces for which data is available in 1980, the urban-rural expenditure ratios declined in twenty cases during the 1980-1990 sub-period but went up in twenty-one cases over the entire 1980-2000 period. The first reform decade was dominated by high agricultural productivity growth in the 1978-84 sub-period and then by the surge in industrial production by rural enterprises in the 1985-89 period. This explosive industrial growth urbanized the most dynamic rural areas, and the large inflow of foreign direct investments after 1992 into the traditional urban centers of the coastal provinces made economic growth an increasingly urban-based phenomenon. The result of these

developments was an initial decline in the urban-rural expenditure ratio, followed by a large jump in the ratio.

Second, the urban-rural gaps are larger for the provinces with the lowest Human Development Index (HDI) scores than for the provinces with the highest HDI scores. The urban-rural expenditure ratio in 2000 for the five lowest HDI scores was 4.97 for Tibet, 3.90 for Guizhou, 3.44 for Qinghai, 3.81 for Gansu, and 4.08 for Yunnan. The urban-rural expenditure ratio for the five highest HDI scores was 2.14 for Shanghai, 2.48 for Beijing, 3.07 for Tianjin, 3.03 for Guangdong, and 2.48 for Liaoning. This negative correlation between the size of the urban-rural gap and the welfare level might be attributable to more dynamic urban centers generating greater positive spillovers to their surrounding rural areas.

Table C.3 attempts to capture the amount of migration of rural workers to urban areas by reporting the proportion of population in each province that did not have permanent registration status in the locations that they were residing in during the 2000 census. The proportion of non-permanent residents was 12.6 percent at the national level, and it is not surprising that the three rich metropolises, and the fast-growing coastal provinces of Guangdong, Zhejiang and Fujian had proportions much above the national average. Less expected was that the poorer western provinces of Xinjiang and Ningxia also had proportions above the national average. This may reflect the rural migration induced by the recently initiated urban-based development projects in these western provinces.

**SECTION 4.0: GENDER INEQUALITY, ILLITERACY, LIFE
EXPECTANCY, AND INFANT MORTALITY RATE**

**[The maps and data for Section 4 are in file "Part D: Urban-Rural Disparity
and Household Registration"]**

SECTION 5.0: ENVIRONMENT I: SOLID WASTE FROM
INDUSTRIES AND HOUSEHOLDS

[The maps and data for Section 5 are in file "Part E: Pollution Solid Waste –
Industrial and Household "]

SECTION 6.0: ENVIRONMENT I: AIR POLLUTION

[The maps and data for Section 6 are in file "Part F: Pollution Air "]

SECTION 7.0: ENVIRONMENT III: WATER POLLUTION

[The maps and data for Section 7 are in file "Part F: Pollution Water"]

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