

China's Regional Per-Capita Output Disparities In International Perspective

Ronald A. Edwards*

Tamkang University, República of China

ABSTRACT: This paper examines the distribution of per-capita output across regions in China over the 1953-93 period. The paper documents three facts during this period. First, the disparities across China's provinces in per-capita output are large relative to those observed within other countries. The evidence presented throws doubt on the view that China's regional per-capita output disparities are largely driven by natural urban externalities. Only roughly one quarter of the observed disparities appear to be attributable to natural urban externalities. Second, China's disparities are comparable to those observed across groups of countries in Europe and Latin America. Third, it is shown that during the 1978-91 period, the range of mobility experiences across China's provinces is half as large as that observed across countries in the world during the same period. This study suggests China's regional disparities are large in international perspective.

Key-words: Regional income disparities, economic development, China

Received in 08/12/2005; revised in 12/12/2005; accept in 20/12/2005.

** The author thanks Ed Prescott for many helpful discussions. In addition, I am grateful to Tim Kehoe, Albert Keidel, Angus Maddison, Barry Naughton, Stephen Parente, Arilton Teixeira, Bart van Ark as well as participants at the University of Minnesota macro workshop for helpful comments.*

Corresponding author:

Phd in Economics

Department of Economics, Tamkang University

151 Ying-Chuan Road, Tamsui, Taipei Hsien 251,

Taiwan, Republic of China,

Email: redwards@mail.tku.edu.tw

Telephone: 27 33413520

1. INTRODUCTION

This paper examines the distribution of per-capita output across regions in China over the 1953-93 period. This study documents three observations during the 1953-93 period. First, the disparities in per-capita output across regions in China were larger than those observed within many other countries. It is shown that there is room for much skepticism of the view that China's disparities in per-capita output are largely driven by natural urban externalities. Second, China's regional disparities are shown to be comparable to those observed across groups of countries in Europe and Latin America. Lastly, during the 1978-91 period it is shown that the range of mobility experiences across regions in China was on half as large as the range of mobility experiences across countries in the world.

This article first shows that during the 1953-93 period the disparities in per-capita output across regions in China were large relative to those observed within other countries. In 1973 Shanghai's per-capita output was over 14 times as large as Guizhou's per-capita output. In sharp contrast, within Spain in 1992 the city province of Madrid had a per-capita output less than double Spain's poorest province's per-capita output. Over a two-decade period, India's urban region of Delhi had a per-capita output that did not even triple that of the poorest Indian province. In Korea, the city province of Seoul per-capita output less than doubled the per-capita output of Korea's poorest provinces during the late 1980's. Many other countries including the Former Soviet Union are shown to have much smaller regional disparities in per-capita output than observed across China's provinces.

It is not uncommonly argued that China's large regional disparities are the result of an urban-rural effect, since the provinces with the highest per-capita output are the city-provinces: Beijing, Shanghai and Tianjin. This study aims to clarify this statement and cast doubt on one determinant. Urban-rural disparities in income and output are commonly used in analyzing regional disparities. Various measures of urban-rural income disparities are often constructed and reported. This difference is commonly ascribed to an urban-rural effect. However, this statement is somewhat vague. In particular, it is obvious that cities offer a reduction of costs of production from their high population density. There are also natural spillovers in ideas between firms and industries that are also inherently natural in an area with a dense population. This author refers to these effects as *natural urban externalities*. All cities in all countries can capture natural urban externalities. However, there can also be other factors that also contribute to the urban-rural disparities. Government policies that favor cities may also increase the urban-rural disparity. Labor migration restrictions, urban biased loan policies and other measures can increase the urban-rural disparity. Such effects are referred to as *urban biased policies*. Countries that implement urban biased policies may experience higher urban-rural disparities. This study shows that in China the disparities between some cities and other provinces are large compared to the regional disparities within other countries that also have city provinces. If China's disparities are almost completely driven by natural urban externalities, why do we not see such large disparities in many other countries that also have city provinces? This observation suggests that natural urban externalities can not account for a considerable component of China's urban-rural disparity.

Second, the magnitude of China's regional disparities in per-capita output is documented to be comparable to those observed across two out of four groups of countries in the world. Thirdly, it is shown that during the 1978-91 period, the range of mobility experiences across China's provinces is half as large as that observed across countries in the world during the same period.

Although this paper does not attempt to identify the factors that do account for China's regional disparities, a discussion in the conclusion suggests other possibilities and relates them to previous studies. This paper proceeds as follows. Section 2 provides a literature review and Section 3 describes the data and methodology. Section 4 documents the China's regional disparities in international perspective, Section 5 documents China's provincial mobility relative to other countries and Section 6 concludes.

2. LITERATURE REVIEW

China's rapid economic growth since the late 1970's has drawn the attention of many scholars. In addition to features of the aggregate economy, many regional differences have been examined. Recent studies such as those in Riskin et al. (2001), Yang (1999) and many others make use of household survey data to analyze urban-rural and regional disparities.¹ In most of these studies different versions of the Gini coefficient are often used as a measure of inequality. The purpose of this paper is to document China's provincial disparities in international perspective. Absent an extensive worldwide household survey data set, official aggregate data from national statistical bureaus offers an appropriate data, which is available for this study's purpose. The provincial data from China's State Statistical Bureau is compared with the regional data reported by the statistical bureau in other countries. The measures of disparity used also depart somewhat from previous studies. In studies based on household survey data the object of study is often inequality among individual or groups of households. In international comparisons in economic development the object of study is often the range of the distribution of income per-capita across large groups.² Given the purpose of this study, the most appropriate methodology tends toward the later type. Putting China's regional disparities in international perspective compels this study to depart with some of the standard conventions of previous studies. Given that many notions of disparity are sensitive to the data and measures used, one should not interpret the conclusions of this study as conclusive statements refuting other studies based on household survey data. Rather it is intended to provide a different perspective to view China's regional disparities.

Other research such as Edwards (1998), Garbaccio and La Croix (1996), Jian et al. (1996), Lee (2000) and Lyons (1991) have also studied disparities in per-capita output across China's provinces. Edwards (1998) finds that there were large persistent disparities in per-capita output during the 1953-78 period. He also documents that the disparity of changes in

¹ In addition see Griffen and Zhao (1993), McKinley (1996), and Leung and Chai (1985). Note that various measures of urban-rural disparities, which are based on household surveys, are not uncommonly reported as factors between two and three. These figures are reported to be about twice as high as observed in other developing Asian countries. See Zhao (2001). In contrast this study is based on aggregate output figures from national income and product accounts. A possibility that may reconcile the results of this study and previous disparities is that income and product may differ in definition within a region. This indeed is the case between China's two measures National Income and National Income Used. Their difference is net imports into the province. See Hseuh et al. (1993) p. 553 and *Statistical Yearbook of China* (1994) p. 53. It may be the case that a portion of the value of output, which might include government transfers, is transferred to other regions so that income and output values differ by this figure. In other words China's regional income and output disparities may be different objects. This study considers output based GDP measures as opposed to income measures based on household surveys as more commonly done.

² Note that the main reason for this emphasis is that quantitative questions can be asked. In particular quantitative theory can be used to ask questions of the sort, "Can differences in investment rates across countries quantitatively account for the range of disparities observed in the data?" The question of why some countries are poor and others rich becomes quantified, which removes much subjectivity from the analysis.

relative position across regions in China is large for the 1978-88 period.³ Both Garbaccio and La Croix (1996) and Jian et al. (1996) study trends in regional differences in per-capita output. Both of these studies follow Barro and Sala-i-Martin (1992) in testing for beta convergence of per-capita output across regions. Lee (2000) examines the changing determinants of regional disparities.⁴ Lyons (1991) reports measures of the spread of the distribution of regional per-capita output as well as per-capita consumption during the period 1953-87. All of the above studies analyze the inter-temporal behavior of disparities in per-capita output across regions in China. This study differs from previous work in that it puts China's regional per-capita output disparities in international perspective. In particular, it compares the distribution of per-capita output across China's regions with distributions of per-capita output both within and across other countries.

3. DATA AND METHODOLOGY⁵

This section introduces the data and methodology used in this study. China's system of national accounts is first introduced. The two types of comparisons made in this paper are then described.

After World War II, China adopted the Former Soviet Union's national accounting system, the Material Product System (MPS). In the MPS the main measure of output is National Income which measures only material product, that is it does not include services, and it is a measure of net output as opposed to gross output. This is in contrast to the main measure of output, Gross Domestic Product (GDP), in the System of National Accounts (SNA) used by the United Nations. Output measures of GDP include the value added by services and are gross measures of output.⁶ In 1978, China's State Statistical Bureau (SSB) began making the transition from the MPS to the SNA. Recently provincial GDP figures have been reported, as the result of a major project involving China's State Statistical Bureau and its Reform and Development Program.

The data source for China's provinces used in this study is Hsueh and Li (1999) which reports nominal per-capita GDP figures for 30 provinces for the period from 1952 to 1995. When considering China's provincial data it must be noted that China's State Statistical Bureau does not use a common set of prices when constructing China's provincial GDP figures.⁷ Therefore regional price differences may distort the figures to some degree. For example, the price of housing services in Shanghai may be higher than in Guizhou. To the extent that prices are higher in Shanghai, the reported GDP of Shanghai relative to Guizhou will overestimate the true disparity. However, all of the data used for other countries is also subject to this problem, since the value of different region's output is also not based on a common set of prices. To the extent regional price differences in China are not greatly different than the regional price differences in the other countries considered, this is not a problem.⁸

³ Since the publication of this paper, revised provincial data on GDP and population have since been reported and published. Using this revised data the findings in Edwards (1998) remain unchanged.

⁴ Note the Lee uses "gross value of industrial and agricultural output." This measure of the value of output involves double counting of inputs. This measure is not as good as GDP which does not double count. However, Lee uses the former since the later data is not available at the city and county level.

⁵ The methodology used in this study was influenced by Parente and Prescott (1993).

⁶ The closest relative in the SNA to National Income is a measure of output called, Net Material Product.

⁷ I thank Barry Naughton for bringing this to my attention.

⁸ In other words, the conclusions of this paper remain valid in so far as the *differences* in regional prices in China are not much larger than the regional price *differences* in other countries. For example if a car in Shanghai is
BBR, Braz. Bus. Rev. (Engl. ed., Online),
Vitória, v. 2, n. 2, Art. 1, p. 87 - 107, jul.- dec. 2005

The national data used for comparisons across groups of countries comes from the World Bank publication, *World Tables*.⁹ This data set is more appropriate than the commonly used Penn World Tables (PWT) in this study because a common set of prices is used in constructing the PWT. The output figures used in the World Bank publication are based on an exchange rate method. While this method is not as accurate in making international comparisons across countries, it is appropriate for my purposes because China's regional GDP figures do not use a common set of prices. A comparison between China's provincial GDP disparities and international GDP disparities in the PWT would require a set of Chinese provincial GDP figures which are based on a common set of prices. Such data does not currently exist. All of the regional data sources used for the within country comparisons are listed in the Appendix.

Two types of comparisons are made in this study. The first type considered is the disparity in per-capita GDP across a group of economies at a point in time. This type of comparison is made both within and across countries. The second type of comparison measures the range of growth experiences across a group of economies during the 1978-91 period. Lastly, it should be pointed out that for both types of comparisons made in this study current price (nominal) GDP figures are used.

Note that for both types of comparisons made in this study, output figures in current prices are superior to constant price figures in some base year. In a comparison of the first type, relative levels of per-capita GDP are considered. A relative comparison at a point in time does not involve the inter-temporal upward shift of a single economy or the entire distribution that real output figures capture. General increases in the set of prices do not change the relative position of economies at any point in time.¹⁰ Since only the relative position of countries or states is relevant when considering the disparities at a point in time, nothing is gained by using the real output figures that is not offered by the use of nominal output figures.

In addition when analyzing disparities at a point in time, there are two problems that arise when one uses real output figures. First, relative positions can be very sensitive to the choice of base year prices. For example, consider the provincial real per-capita GDP figures in Hsueh and Li (1999). Using 1995 base year prices, the ratio of Shanghai's to Guizhou's per-capita GDP in 1978 is 10.5. However with 1952 base year prices this ratio drops to 4.3. One is forced to justify the choice of the base year over other possibilities. Secondly if a common set of prices is not used across economies, distortions can arise from the use of real output figures.¹¹ Using nominal price data avoids both of these problems.

In studying regional disparity in per-capita output within a country, the definition of a region must be given and measures of disparity in per-capita output must be introduced. A region in China is taken to be a province. For all other countries a region is taken to be a state or province as reported by the national statistical bureau. This choice is a natural one avoids many problems that arise from grouping provinces arbitrarily.¹²

twice as expensive than in Guizhou, this will over estimate Shanghai's output relative to Guizhou. But if in Madrid a car is also twice as expensive as in the poorer provinces of Spain, then the *differences* are about the same. The object of this study is not to show what the *true* regional disparities are in China. It is to put China's disparities in international perspective by comparison.

⁹ See the reference section under World Bank for the full citation.

¹⁰ Note that this argument applies more directly to cases when a common set of prices is used. The general increase in the set of prices reflects inflation. However, without a common set of prices using real output figures also introduces additional distortions. See Keil and Parente (1996) pages 7-8.

¹¹ See Keil and Parente (1996) pages 7-8.

¹² In many studies of regional disparities, China's provinces are grouped into coastal and inland groups. Implicit in this procedure is the notion that provinces with easy access to trade are different from provinces that do not

Unless indicated otherwise, only regions and countries that have a population of at least one million are considered. This principle is followed since economies with populations less than one million are overly susceptible to influence from outside their borders.

Three measures of disparity are used to document differences in per-capita output across a collection of regions. The first two are ratios of the upper to lower tails of the distribution while the third measure is the standard deviation. Given a collection of regional per-capita output figures for a particular year, three measures of the disparities are constructed and reported. The first measure is the ratio of the highest to the lowest per-capita output levels within the collection. The second measure is the ratio of the highest 10% to lowest 10% of per-capita output figures in the collection.¹³ A method of rounding up was used when considering 10% of the total number of regions. For a collection of between 1-10 regions, 10% of these regions is taken to be one region.¹⁴ Similarly for a collection of between 11-20 regions, 10% is chosen to be two regions, and so forth. Lastly, consider the natural log of the per-capita output figures of all of the regions. The third measure is the standard deviation of the collection of the natural log values for all of the regions' per-capita output figures. The choice of these measures follows the methodology in Parente and Prescott (1993) which applies this methodology in international comparisons. The advantage of this approach is that it allows a comparison of the range of the distributions.¹⁵

In the second type of comparison, changes in the relative positions of economies during the 1978-91 period are considered. For this type of comparison the upward shift of the distribution (the real effect) is not relevant. Changes in economies' relative position are the objects of analysis. During the 1978-91 period, the disparity in regional growth experiences across China's regions is shown to be large. Mobility experiences relative to the United States are considered in examining growth experiences. In 1978 China's per-capita GDP was about 5% of the United States' per-capita GDP. China's relative position in 1978 is defined to be the value 0.05. In 1991 China's relative position was 0.075. For the 1978-91 period, China's mobility experience is defined to be the natural log of the ratio of its 1991 relative position to its 1978 relative position. The standard deviation of mobility experiences for a collection of economies is considered as a measure of the disparity in growth experiences.

have such easy access. This may be appropriate for studies that analyze secular characteristics of disparities but it is not for an international comparison. If groups of regions are to be defined by some characteristic, such as access to trade, the same definition must be applied to all countries in grouping their regions. If access to trade is picked to be the key characteristic, then what meaning will this grouping have for Austria's provinces? Applying some meaningful definition of a group for the purpose of grouping states together is very difficult to accomplish without introducing much subjectivity in practice. Rather than make such difficult and subjective decisions, this author simply takes as given the regions that are reported by national bureaus (e.g. states for the United States, prefectures for Japan, provinces for China, etc.). This allows the central governments of the countries to decide what a major region will be and minimizes the subjective influence of any choices this author might make.

¹³ Note that the ratio of the highest 10% to lowest 10% is equivalent to the ratio of average of the highest 10% to the average of the lowest 10%.

¹⁴ Therefore for countries with no more than ten regions the first two measures will agree.

¹⁵ Although this study tends to follow the methodology more common in international comparisons, i.e. the range of the distribution is emphasized, there is another good reason for doing this. To construct the Gini coefficient one needs good samples of reasonable quality. This statistic captures more than the range, it is more detailed in that it captures a notion of inequality in the distribution. This is a relatively detailed concept. The range of the distribution is simply concerned with the notion of how much wealthier the upper tail of the distribution is as compared to the lower tail. Output measures reported in national income and product accounts are rough measures. It is inherently an approximation of the total value of goods and services produced. Using such rough measures of the value of output in constructing a Gini coefficient may well not be preferable to detailed household survey data.

Lastly, it is worth emphasizing that the use of current price output figures allows for the possibility of relative price changes. Changes in relative GDP can only arise with relative changes in prices or quantities. Changes in relative prices are relevant to a study of relative per-capita GDP. If the world relative price of oil drops dramatically, this view suggests that the relative per-capita GDP of an oil producing country such as Saudi Arabia should decline along with the relative price of oil. Changes in relative prices are not captured by the use of real prices in some base year.¹⁶

4. DISPARITIES

In this section we shall show that during the 1953-93 period, the disparity of per-capita output across China's provinces is much larger than those observed across regions within many other countries. Furthermore, China's provincial disparities will be shown to have been comparable to those observed across two out of four groups of countries in the world.

Note that the year 1978 is a year when many institutional changes began in China. After these changes, China's real per-capita output began to dramatically grow. The choice of years to report regional disparities was dictated by the desire to include the year 1978 for comparison. Five-year intervals are considered for as many years the data source allows. Table 1 below reports these three measures of disparity in per-capita GDP across regions in China during the 1953-93 period.¹⁷

Table 1

China's Provincial Disparity in Per-capita GDP¹⁸

<i>Year</i>	<i>Number of Regions</i>	<i>Max / Min</i>	<i>Ratio of Avg Top to Bot 10%</i>	<i>Sd</i>
1953	28	7.7	5.4	0.50
1958	28	8.1	5.9	0.53
1963	28	9.0	5.4	0.49
1968	28	9.6	5.8	0.50
1973	28	14.2	7.4	0.56
1978	28	13.1	7.4	0.56
1983	28	9.2	6.0	0.50
1988	30	7.3	5.1	0.46
1993	30	8.7	5.5	0.49

It must be pointed out here that the disparities in per-capita output observed across China's provinces are driven by high per-capita GDP levels in China's three city provinces, Shanghai, Beijing and Tianjin. There is no question that these disparities are due in part to

¹⁶ See Parente and Prescott (1993) for comparisons of the two types made in this study using current price data across countries. This argument applies to comparisons made without a common set of prices in so far as there are co-movements in the relative price changes of the different set of prices.

¹⁷ Since the earliest figures for Hainan and Tibet are in the mid-1980's, they are not included prior to 1988.

¹⁸ Note that a three year smoothing method was used for each year reported. For example, a province's relative position was averaged over the years 1977-79 to obtain its relative position for the year 1978. This procedure reduces the effects in the data from high frequency fluctuations. See the next section on mobility for an explicit description of a similar smoothing procedure for constructing relative positions.

natural urban externalities. The important quantitative question to keep in mind when looking at disparities within other countries, is how much of this disparity can one reasonably attributed to natural urban externalities. It will be documented below that the magnitude of China's disparities is far greater than those observed within other countries that also contain city-state regions. This suggests that natural urban externalities are not driving all of the disparities. A rough quantitative statement can be made after considering disparities within other countries.

The remainder of this section documents observed disparities in per-capita output both within and across countries for the purpose of a comparison with China's regional disparities. A wide variety of countries in terms of land, population and level of economic development are considered when comparing regional per-capita output disparities across China's provinces. Countries with city states were sought in particular. For many countries considered, data was available over a long period of time.¹⁹ For those countries with many years of data available, only those years with the highest or lowest per-capita output disparity in terms of one of the three measures are reported in the following tables. China's regional disparities are largest in 1973 and smallest in 1988. These two years will be emphasized in what follows since the range for all other years falls between the two. For the remainder of this section the term disparities is used synonymously with the term disparities in per-capita output.

4.1 Disparities Within Other Countries

Disparities within Western European countries are reported below in Table 2.

Table 2

**Regional Per-capita GDP Disparity:
European Countries, 1992**

Country	# of regions	Max / Min	Ratio of Avg Top to Bot 10%	sd
<i>Austria</i>	3	1.4	1.4	0.17
Belgium	2	1.3	1.3	0.16
France	8	1.9	1.9	0.20
Germany	15	5.2	4.4	0.55
Greece	3	1.3	1.3	0.09
Italy	11	1.9	1.8	0.25
Netherlands	4	1.2	1.2	0.09
Spain	7	1.6	1.6	0.20
U.K.	11	1.5	1.3	0.10

Four countries in Table 2 have regions that are city states. Germany includes Berlin and Hamburg, Greece includes Athens, Spain includes Madrid while Greater London and Essex are city states of the United Kingdom. None of the disparities reported in Table 2 under

¹⁹ The list of countries and the number of years of data consulted is: Brazil - 15 years, Canada - 10 years, India - 25 years, Japan - 9 years, Korea - 8 years, Mexico - 4 years and the United States - 23 years. All other countries considered had only one year of data reported.

the first two measures come close to China's observed disparities. Only in terms of the third disparity measure are German disparities larger than China's disparities, except in the 1970's. Note however that Germany's disparities reflect an international disparity. In terms of per-capita GDP, the western city state of Hamburg has the highest level while all of the lowest levels are observed among the states that formerly comprised East Germany. As of 1992, the effects of German reunification have not yet removed the remaining international disparities in east and west Germany. Furthermore, when considering the urban-rural effect in China the third measure is the least useful since it is capturing something in addition to the disparities of the three Chinese city states.²⁰ Within all eight other European countries, the disparities reported are far smaller than across China's provinces in all years in terms of all three measures of disparity. In particular note that Greater London and the cities of Athens and Madrid have no more than twice the per-capita GDP of any other region within the U.K., Greece and Spain respectively. China's provincial disparities in are extremely large when compared to those observed within European countries.

Other Western countries and the Former Soviet Union are considered next in Table 3.²¹ China's provincial disparities throughout the 1953-93 period are far larger than those observed within Canada, the United States and the Former Soviet Union. Note that the Former Soviet Union was a large developing country under a planned economy during the year reported and its regional disparities reported are much smaller than those observed in China.

Table 3

**Regional Per-capita GDP Disparity:
Other Western Countries and the FSU**

Country	# of regions	Year	Max / Min	Ratio of Avg Top to Bot 10%	sd
	5	1980	1.8	1.8	0.24
<i>Canada</i>	5	1992	1.3	1.3	0.12
	48	1963	2.1	1.9	0.18
United States	48	1978	1.5	1.5	0.12
F.S.U. (USSR)	15	1990	3.8	3.3	0.39

Three Asian countries are considered next in Table 4 - India, Japan and Korea. India is a particularly interesting country for this comparison. A very large country both in terms of land and population, it is roughly comparable to China. In addition, it is also a developing country. While no region in India is officially a city state, the population in the state of Delhi is reported to be 90% urban in 1971.²² At least two city states are among the Japanese regions reported, Tokyo and Kyoto. In Korea's case there are six city states, one of which is the city of Seoul. The reported disparities for India, Japan and Korea are very small when compared to China's provincial disparities. The state of Delhi has the highest per-capita GDP in India, while Tokyo has the highest per-capita GDP in Japan's case. Furthermore this data shows that within India, Japan and Korea, any city state's per-capita GDP is less than four times as large

²⁰ Note that there are only three city states among China's provinces during the period 1953-93. While the first two measures are ratios of per-capita GDP in city states relative to non-city states, the third measure also captures the range of disparities across non-city states.

²¹ See the Appendix under the individual countries' names for the data sources. In the case of the United States only the 48 contiguous U.S. states were considered.

²² See the Appendix for India's 1971 population data source.

as any other region's per-capita GDP. This urban-rural disparity factor of four is slightly less than Germany's factor of about five but larger than the factor of two observed in Spain and the U.K. The range of China's disparities of the wealthiest city-province to poorest province ranged from a factor of seven to fourteen during the 1953-1993 period. The former factor is large compared to disparities within other countries which have city-states and the latter factor is relatively huge.

Table 4

**Regional Per-capita GDP Disparity:
Asian Countries²³**

<i>Country</i>	<i># of regions</i>	<i>Year</i>	<i>Max / Min</i>	<i>Ratio of Avg Top to Bot 10%</i>	<i>sd</i>
<i>India</i>	13	1961	3.3	2.5	0.32
	19	1974	2.7	2.5	0.28
	20	1984	3.0	2.7	0.33
<i>Japan</i>	40	1980	3.4	2.2	0.23
	40	1985	2.9	2.0	0.19
<i>Korea</i>	13	1988	1.7	1.6	0.17
	14	1994	1.9	1.7	0.18

There are two Latin American countries for which regional disparities are reported next, Brazil and Mexico. However, in both of these countries there is a state that is called the "Federal District". Ideally one should have a definition for a Federal District (e.g. a region in which at least 50% of the workforce is employed by the federal government) to apply and rule out such a region in a study of states. However this data is not available for all countries, so a uniform rule cannot be applied. Tables 5 and 6 report the measures of disparity for Brazil and Mexico both with and without the Federal Districts in comparison to China with and without its capital region, Beijing.²⁴

²³ India's reported output measure is Net Domestic Product.

²⁴ Note that only the years 1973 and 1988 are reported here since these are the years with the largest and smallest regional disparities across China.

Table 5

**Regional Per-capita Output Disparity:
Brazil²⁵**

<i>Country</i>	<i># of regions</i>	<i>Year</i>	<i>Max / Min</i>	<i>Ratio of Avg Top to Bot 10%</i>	<i>Sd</i>
China w/FD	28	1973	14.2	7.4	0.56
	30	1988	7.3	5.1	0.46
China w/o FD	27	1973	14.2	6.6	0.52
	29	1988	7.3	4.4	0.42
Brazil w/FD	12	1939	10.6	7.3	0.69
	18	1954	12.5	9.1	0.65
	19	1966	8.5	7.5	0.55
	22	1985	7.9	6.0	0.57
<i>Brazil w/o FD</i>	11	1939	4.8	3.9	0.51
	17	1954	7.7	5.7	0.53
	18	1966	6.7	5.4	0.47
	21	1985	6.0	4.9	0.57

In all four years reported, Brazil's regional disparities by some measures are larger than those observed in China. However, when the Federal Districts are thrown out we see that this observation ceases to be true. Under the first two measures, without the Federal Districts China's disparities in 1973 are larger than those observed in Brazil, while the reverse is true in 1988. No region in Brazil is a city state.

Table 6

**Regional Per-capita Output Disparity:
Mexico**

<i>Country</i>	<i># of regions</i>	<i>Year</i>	<i>Max / Min</i>	<i>Ratio of Avg Top to Bot 10%</i>	<i>Sd</i>
China w/FD	28	1973	14.2	7.4	0.56
	30	1988	7.3	5.1	0.46
China w/o FD	27	1973	14.2	6.6	0.52
	29	1988	7.3	4.4	0.42
Mexico w/FD	8	1940	18.2	8.1	0.86
	8	1950	7.3	5.0	0.67
	14	1960	10.8	8.4	0.71
	18	1970	12.9	8.6	0.73
Mexico w/o FD	7	1940	4.4	2.7	0.46
	7	1950	3.6	2.5	0.42
	13	1960	8.3	5.8	0.61
	17	1970	10.0	7.0	0.67

²⁵ Note that Brazil's regional output figures are based on the concept of National Income (National Income is GNP less depreciation less indirect business taxes).

Mexico's disparities follow a pattern similar to Brazil's when compared to those of China. Mexican disparities are for the most part larger than those observed in China both in 1973 and 1988. However, when the Federal Districts are thrown out, China's disparities in 1973 by most measures are larger than those observed in Mexico; the reverse is true in 1988. No region in Mexico is a city state. It is worth noting that when regional disparities without the Federal District are considered, the regional disparities across China in the 1970's are generally larger than those observed in both Brazil and Mexico.

Four countries with city states during years earlier in the twentieth century are reported next in Table 7.²⁶ Note that the minimum population restriction imposed above has been relaxed for the countries reported in Table 7.

Table 7

**Regional Per-capita Output Disparity:
Older European Countries**

<i>Country</i>	<i>Year</i>	<i># of regions</i>	<i>Max / Min</i>	<i>Ratio of Avg Top to Bot 10%</i>	<i>sd</i>
<i>Austria</i>	1957	9	2.2	2.2	0.21
<i>Ireland</i>	1960	26	2.3	1.8	0.20
<i>Old Empire Germany</i>	1900	14	1.7	1.5	0.13
<i>Old Empire Germany</i>	1928	15	2.5	2.3	0.25
<i>West Germany</i>	1950	9	2.5	2.5	0.30

All of the countries in Table 7 have at least one region that is a city-state.²⁷ For all of these developing countries, none of the observed disparities remotely come close to factors of seven to fourteen for the first measure of disparity. The other two measures of disparity are also smaller than those observed in China.

From the previous tables we can see that China's provincial per-capita output disparities are generally larger than those observed in Brazil and Mexico (without the Federal District) during the 1970's. In addition, throughout the 1953-93 period China's regional disparities are much larger than observed across regions within all of the other reported countries.

4.2 Disparities Across Groups of Countries

How do per-capita output disparities across China's provinces compare those observed across groups of countries? In the following comparisons, the international GDP data used

²⁶ These countries are reported in Williamson (1965). A country from the study's appendix was considered if two conditions were met. First, the country had at least one region that the author recognized as a city state. Second, the figures reported were output per capita. Note that many are based on personal income measures that are not necessarily the same as measures of product for a region. The measures of output for the countries are: Austria - National Income, Ireland - "Earned" Income, West Germany - Net Product, and Old Empire Germany - National Income.

²⁷ The city states are: Salzburg, Austria - Dublin, Ireland - Hamburg, West Germany - Hamburg, Old Empire Germany.

comes from the World Bank's *World Tables*.²⁸ This GDP data is not based on a common set of prices but rather on exchange rates with the US dollar. The more commonly used Penn World Table figures are less appropriate for the purposes of this study.²⁹ To keep the collection of countries from the *World Tables* data set the same for these comparisons as well as the mobility study in the subsequent section, the following procedure was followed. Any country that had a population of at least 1 million and had data available for the years 1977-79 and 1990-92 was used. There are 84 countries from the data set, which satisfy these conditions and are considered in what follows.³⁰

Table 8

**Regional Per-capita GDP Disparity:
China's Provinces and Grouped Countries**

<i>Group</i>	<i># of regions</i>	<i>Year</i>	<i>Max / Min</i>	<i>Ratio of Avg Top to Bot 10%</i>	<i>Sd</i>
<i>China's Provinces</i>	28	1973	14.2	7.4	0.56
	30	1988	7.3	5.1	0.46
Europe and its Offshoots	21	1978	9.1	4.9	0.59
	21	1991	12.9	5.2	0.59
Latin America	21	1978	17.7	7.4	0.66
	21	1991	13.4	8.9	0.72
Africa	29	1978	10.1	8.5	0.67
	29	1991	29.4	13.7	0.78
Asia	13	1978	68.8	40.1	1.19
	13	1991	142.8	83.9	1.44

From Table 8 we see that the disparities across China's provinces are comparable to those observed across Europe and its offshoots as well as across Latin America. The disparities observed in 1973 across China's provinces were generally larger than those of Africa in terms of the first measure in 1978. Disparities throughout Africa are all larger than those observed across China by the other measures and years. Only the collection of Asian countries consistently displays much larger disparities than those observed across China's provinces.

The evidence presented here shows that the observed per-capita output disparities across China's provinces throughout the 1953-93 period are generally larger than those reported for 21 other countries.³¹ The disparities in the 1970's across China's provinces have

²⁸ See Section 2 for details.

²⁹ The Penn World Table figures are based on a common set of prices. Using a common set of prices in international comparisons usually drastically reduces the measured disparities. This is because the same prices are used for non-traded goods unlike the exchange rate based approach. In practice this lowers the international disparities. The regional figures for China are not based on a common set of prices. To give the international groupings the chance to exhibit larger disparities that arise from the use of exchange rate based figures, the World Bank data is used. This is a conservative comparison in that the disparities reported across countries are given the opportunity to be artificially large from international price differences.

³⁰ See Section 4 for a description of the procedures used to smooth the disparities for both China's provinces and the country data from the *World Tables*. See the Appendix for a list of the countries for each of the four groups. A three year average is taken here as was done with the figures for China's regions.

³¹ Austria in 1957 and 1992 as well as West Germany in 1950 and Germany in 1992 are counted as different countries in this statement. At their respective different points in time both Austria and Germany were at dramatically different levels of development

been shown to be larger than those of Brazil and Mexico (without Federal Districts) and much larger than those observed within 19 other countries. The disparities across China's provinces during the rest of the 1953-93 period are comparable to those observed in Mexico and Brazil (without Federal Districts) and are larger than those observed in all other countries reported.

Ten of the countries considered have regions that are city-states.³² The average maximum to minimum disparity of these ten countries with city-states is 2.4. In sharp contrast for the nine years reported the average of China's regional maximum to minimum disparity is 9.7, which is over four times as large as the average of from other countries with city-states.³³

China's regional per-capita output disparities are much larger than observed in a wide variety of countries including large developing countries like India and command economies like the Former Soviet Union. China's regional disparities are on average over four times as large as a group of ten countries that have city-states. Finally, China's provincial disparities are shown to be comparable to two out of four groups of countries in the world. China's regional per-capita output disparities are large in an international perspective.

5. MOBILITY

In this section the range of mobility experiences for the 1978-91 period across China's provinces is reported to be similar to the range of mobility experiences for a set of countries across the world. This period was chosen for two reasons. First, the post 1978 period is a period where there were large differences in growth experiences across China's provinces relative to the period prior to 1978, when differences are small.³⁴ Second, the final year was picked in order to consider the longest period possible where data is available in the *World Tables*. In what follows, a definition of mobility experience is given and two distributions of mobility experiences are constructed for the 1978-91 period. A distribution of mobility experiences is constructed for both a collection of 84 countries from the *World Tables* and China's provinces. Lastly, the standard deviation of these two distributions is reported.

In order to define the mobility experience of a country, a definition of relative position is first introduced. Let y_t^i denote country i 's per-capita GDP in current year t US dollars.

Country i 's relative position, relative to the United States in 1978, x_{78}^i , is defined as,

$$x_{78}^i \equiv \left(\sum_{t=1977}^{1979} y_t^i / y_t^{us} \right) / 3 \quad (1)$$

where y_t^{us} is the per-capita GDP of the United States in current year t US dollars. Averaging over three years reduces the effects of high frequency fluctuations. Country i 's relative position in 1991, x_{91}^i , is similarly defined by equation (1) where the averaging is done over the 1990-92 period. The relative position change of country i over the 1978-91 period is then

³² Note that Brazil and Mexico are not among the countries that contain a region that is a city state. There are eleven such countries if India is considered in this group.

³³ The ten countries, the year and max to min ratio are: Germany, 1992, 5.2; Greece, 1992, 1.3; Spain, 1992, 1.6; United Kingdom, 1992, 1.5; Japan, 1980, 3.4; Korea, 1994, 1.9; Austria, 1957, 2.2; Ireland, 1960, 2.3; Old Empire Germany, 1928, 2.5; and West Germany, 1950, 2.5. When more than one year of data was available the year with the highest disparity was used. The range of this measure among these ten countries varied between 1.3 and 5.2. All but one country had a disparity less than 3.5. Only Germany in 1992 showed a higher disparity of 5.2. To a large degree this represents an international disparity since the disparity is driven by the former states of the former East Germany.

³⁴ See Edwards (1998).

defined by the ratio of country i 's relative position in 1991 to its 1978 relative position, x_{91}^i / x_{78}^i . Finally the mobility experience of country i during the 1978-91 period, z^i , is defined as the natural log of country i 's relative position change,

$$z^i \equiv \log(x_{91}^i / x_{78}^i) \quad (2)$$

A collection of 84 countries from the *World Tables* is considered where their mobility experiences are constructed as shown above.³⁵ The mobility experiences of China's provinces are considered next.

Before considering the mobility experience of a Chinese province, its relative position to the United States is first introduced. Let Y_t^p denote province p 's per-capita GDP in current year t Chinese dollars and Y_t^{ch} represent China's national per-capita GDP in current year t Chinese dollars.³⁶ Province p 's relative position in 1978, x_{78}^p , is defined as,

$$x_{78}^p \equiv \left\{ \sum_{t=1977}^{1979} \left(\frac{Y_t^p}{Y_t^{ch}} \times \frac{y_t^{us}}{y_t^{ch}} \right) \right\} / 3 \quad (3)$$

where y_t^{ch} and y_t^{us} are per-capita GDP in current year t US dollars for China and the United States respectively.³⁷ Province p 's relative position in 1991 is defined as in equation (3) where the averaging is done over the 1990-92 period. Finally, province p 's mobility experience during the 1978-91 period, z^p , is similarly defined as,

$$z^p \equiv \log(x_{91}^p / x_{78}^p) \quad (4)$$

The range of these two distributions of mobility experiences relative to the United States for the 1978-91 is considered next. The standard deviation of the distribution is considered as a measure of the range. Below in Table 9, the standard deviation of the mobility experiences is reported for both the collections of 84 countries and China's provinces.

³⁵ Any country with a population of at least one million and with data for the six years was included in this study. The output of countries with a population less than one million is overly susceptible to influences from external factors. Missing data and low populations are the only reasons countries were excluded. There are a total of 84 countries in the *World Tables* that met these two conditions.

³⁶ Note that the data for China's provinces and the national data in current year t Chinese dollars come from Hsueh and Li (1999).

³⁷ The figures for y_t^{ch} and y_t^{us} are the same ones used above in constructing mobility experiences for the collection of countries, namely figures from the *World Tables*. It would be best if all the figures in (3) were in the same currency units. Such data is not available and these figures are used in constructing approximations for China's provincial per-capita GDP relative to the United States.

Table 9

Standard deviation of mobility experiences during the 1978-91 period

<i>Collection of z^j</i>	<i># of regions</i>	<i>Standard deviation</i>
Chinese provinces' z^p	28	0.23
Countries' z^i	84	0.46

During the 1978-91 period, the standard deviation of mobility experiences across China's provinces is half of that observed for the collection of 84 countries. It is interesting to note that the low mobility experiences of China's city provinces are largely responsible for the large standard deviation reported for China's provinces in Table 9. In addition to large regional disparities in per-capita output across China, the range of regional growth experiences was large as measured by the standard deviation of mobility experiences.

6. CONCLUSION

This article documents three features of the distribution of per-capita output across regions in China in international perspective during the period 1953-93. First it is shown that China's regional disparities in per-capita output are large compared to those observed within a wide variety of other countries. Developing countries with large populations and vast territory such as India and large countries with command economies such as the Former Soviet Union exhibit far lower regional disparities than China. China's three wealthiest regions are the city-provinces Beijing, Shanghai and Tianjin. There can be no doubt that some of the disparities observed can be attributed to natural urban externalities in these cities. However, the observations within other countries with city-states do not show such large disparities as measured in China. The maximum to minimum disparity measure in China is about four times as large as observed within ten other countries with city-states.

It is well known that during much of the period covered, China's government implemented urban biased policies. In particular, movement of labor across provinces was severely restricted through various methods.³⁸ While a definitive policy review is beyond the scope of a single study such as this one, it is safe to say that the other ten countries did not implement such strict labor migration policies.³⁹ Therefore there is at least one likely candidate other than natural urban externalities that may be contributing to China's large regional disparities. Labor migration restrictions as well as other urban biased policies are

³⁸ China's household registration system was associated with papers that gave officially registered people access to services paid by the government such as child education, health and housing services. In practice this limited the movement of labor across provinces to a considerable degree. Other urban biased policies probably also contributed to the large disparities. For example, access to loans has been largely restricted to some big cities by China's state controlled banking system.

³⁹ These ten countries and their respective years are: Germany, 1992; Greece, 1992; Spain, 1992; United Kingdom, 1992; Japan, 1980; Korea, 1994; Austria, 1957; Ireland, 1960; Old Empire Germany, 1928; and West Germany, 1950. A reading of major labor policies of these countries did not reveal any major labor migration policy. Old Empire Germany has the least evidence available on such policies.

often mentioned in numerous studies as factors that cause increases in China's urban-rural disparities.⁴⁰

One main aim of this paper is to quantify China's natural urban externality effect. This is best done by looking at quantitative measures of disparities between comparable city-states and other regions within other countries, since many policies tend to be national policies in China.⁴¹ However, this study distinguishes itself from other studies on China's regional disparities by making such international comparisons. These international comparisons allow a very rough estimate of a natural urban externality effect from ten other countries with city-states. In so far as the average of maximum to minimum disparity of the ten other countries with city-states represents the effect of natural urban externalities in China's three city-provinces, other factors including urban biased policies appear to be driving disparities up by a factor of four. Thus this paper concludes that the natural urban externalities contribute to roughly a quarter of China's regional per-capita output disparities. The remaining three-quarters of the observed disparities appear to be due to factors other than natural urban externalities.

Secondly, this paper documents that China's regional per-capita output disparities are comparable to two out of four groups of countries in the world. In particular, China's regional disparities are comparable to those observed across countries in Europe and Latin America. Thirdly, the range of mobility experiences across China's provinces is half of that observed across eighty-four countries in the world during the 1978 to 1991 period. China's regional per-capita output disparities when viewed in international perspective are large. Natural urban externalities appear not to be the main determinant that is creating these large disparities. This study suggests that other factors that are often emphasized in other studies on China's regional per-capita output disparities are accounting for roughly three-quarters of the observed disparities.⁴²

Appendix

A. Regional Data Sources:

Brazil

Population data:

- Anuario Estatístico Do Brasil, 1994, Table 2.2.

State Income data:

- 1939,1966: Andrade, Thompson Almeida (1974) "*Regional Inequality in Brazil*", Proceedings of the Commission on Regional Aspects of Development of the International Geographical Union, Volume I, Methodology and Case Studies (ed. Thoman, Richard S.), Allister Typesetting and Graphics, Table 1, pg 342.

⁴⁰ See Riskin et al. (2001) pp. 14-16.

⁴¹ That is to say, urban biased policies are generally implemented nationwide in China. The data of other urban-rural differences based on other major Chinese cities will also have the effects of urban biased policies in the figures. One can get a very rough estimate of the measure of these effects by looking at measurable urban-rural effects in comparable data sets from other countries, which do not tend to have such urban biased policies. This is the advantage of the international approach in this study.

⁴² See Riskin et al. (2001), Yang (1999), and Young (1996).

- 1947-58: *Revista Brasileira de Economia*, March 1960, Year 14, No. 1, pgs 116-27.
- 1985: Longo, Carlos Alberto (1994) "*Federal problems with VAT in Brazil*", *Revista Brasileira de Economia*, Jan/Mar 1994, Vol 48, No. 1, Table 4, pg 97.

Note: For the years 1939-66, the state Guanabara was taken as the Federal District.

Canada

Population data:

- 1976,1981: *Census of Canada, Population, 1981*, Statistics Canada, Table 1.
- 1991,1992: *Canadian Economic Observer*, Aug 1993, Table 11.1

Provincial GDP data:

- 1976-80: *Provincial Economic Accounts, Historical Issue 1961-86*, Statistics Canada, pgs 8-48.
- 1988-92: *Provincial Economic Accounts, Annual Estimates 1988-1992*, Statistics Canada, pgs 3-14.

Note: The two provinces, Yukon and Northwest Territories, were combined into one.

China

Population and GDP data:

- 1952-94: *China's National Income, 1952-1995*, eds Hsueh, Tien-tung and Li, Qiang, Westview Press, Boulder, CO, 1999.

European Countries⁴³

Population and Regional GDP data:

- 1992: *Regions (1995)*, Eurostat, General Statistics, Table of Main Indicators.

India

Population data:

- 1961: *Census of India, 1961*, Volume 1, Part II-A(i), General Population Tables, India Republic Office at the Registrar General, Delhi, pgs 71-2.
- 1971: *Census of India, 1971*, Series 1, Paper 1 of 1972, Final Population, India Republic Office of the Registrar General, Delhi, Table 1, pgs 3-4.
- 1985: *Monthly Abstract of Statistics*, Vol. 38, No. 1-6, April 1985, pgs S6-S9.

State Net Domestic Product data:

- 1960-69: *Estimates of State Domestic Product 1960-61--1983-84*, Nov 1985, Central Statistical Organisation, Department of Statistics, Ministry of Planning, Government of India, New Delhi.
- 1970-84: *Estimates of State Domestic Product 1970-71--1984-85*, Nov 1986, Central Statistical Organisation, Department of Statistics, Ministry of Planning, Government of India, New Delhi.

⁴³ This refers to the data sources for the countries reported in Table 2.

Note: In the data, Indian years are reported over the planning period. For example, the 1960-61 period. In this study, I report this data under the first of the two years.

Japan

Population data:

- 1978-93: *Japan Statistical Yearbook, 1997*, Tokyo, Japan, Table 2.3, pg 35.

Prefecture GDP:

- 1978-80: *Japan Statistical Yearbook, 1983*, Tokyo, Japan, Table 16-12, pg 564.
- 1985, 1988-89: *Japan Statistical Yearbook, 1992*, Tokyo, Japan, Table 16-12, pg 566.
- 1991-93: *Japan Statistical Yearbook, 1997*, Tokyo, Japan, Table 4-14, pg 154.

Korea⁴⁴

Population data:

- 1987-94: *Korea Statistical Yearbook, 1997*, National Statistical Office, Republic of Korea, Seoul, Table 3.

Province GDP data:

- 1987: *Korea Statistical Yearbook, 1995*, National Statistical Office, Republic of Korea, Seoul, Table 3, pg 499.
- 1988-94: *Korea Statistical Yearbook, 1996*, National Statistical Office, Republic of Korea, Seoul, Table 1, pg 515.

Mexico

Population data:

- 1940,1950,1960,1970: Unikel, Luis, (1976) *El Desarrollo Urbano de Mexico, diagnostico e implicaciones futuras.*, El Colegio de Mexico, Tables II-A3,II-A4.

State GDP data:

- 1940,1950,1960,1970: Unikel, Luis, (1976) *El Desarrollo Urbano de Mexico, diagnostico e implicaciones futuras.*, El Colegio de Mexico, Tables VI-A5,A6,A7, and A8.

U.S.S.R.

Population and GDP data:

- 1990: *Statistical Handbook, States of the Former USSR*, Studies of Economies in Transformation, Country Department III, Europe and Central Asia Region, No. 3, 1992, The World Bank, pgs 4-5.

⁴⁴ The 1987 GDP was obtained by multiplying per-capita GDP by population, in all other years GDP and population data are both reported.

United States

Population data:

- 1929-87: *State Personal Income: 1929-87: Estimates and a statement of sources and methods*, U.S. Department of Commerce, Bureau of Economic Analysis, Washington D.C., Government Printing Office, July 1989.
- 1988-95: *Statistical Abstract of the United States, 1996*, Department of Commerce, Economics and Statistics Administration, Bureau of the Census, Washington D.C., Government Printing Office, October 1996.

State GSP data:

- 1963-76: *Survey of Current Business*, Department of Commerce, Bureau of Economic Analysis, Washington D.C., Government Printing Office, May 1988, Vol. 68, No. 5, Table 1.
- 1977-90: *Survey of Current Business*, Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, Washington D.C., Government Printing Office, Aug 1994, Vol. 74, No. 8, Table 1.
- 1991-92: *Survey of Current Business*, Department of Commerce, Economics and Statistics Administration, Bureau of Economic Analysis, Washington D.C., Government Printing Office, May 1995, Vol. 75, No. 5, Table 1.

B. Country Groupings⁴⁵

Europe and its Offshoots (21): Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom and the United States.

Latin America (21): Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay, Venezuela.

Africa (29): Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Cote d'Ivoire, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Tanzania, Togo, Zambia, and Zimbabwe. Also included are Algeria, Egypt, Morocco, and Tunisia.

Asia (13): Bangladesh, India, Nepal, Pakistan, Sri Lanka, China, Indonesia, Korea-Rep, Malaysia, Papua New Guinea, Philippines, Thailand and Japan.

References

- Barro, R. J. and X. Sala-i-Martin. (1992) Convergence, *Journal of Political Economy*, Vol. 100, No. 2 (April): 223-51.
- Edwards, R. A. (1998) Some Observations on Chinese Provincial Per-capita National Income. In *China's Tax Reform Options* edited by, Fulton, T., J. Li and D. Xu. London: World Scientific Press.
- Garbaccio, R.F. and S.J. La Croix. (1996) Convergence Across Regions: Evidence

⁴⁵ The author follows Maddison in grouping the United States, Canada and Australia with Western Europe. See Maddison (1991) page 10. Other regions are geographically arranged.

- from China, working paper.
- Griffin, Keith and Renwei Zhao, editors. (1993) *The Distribution of Income in China*, St. Martins Press, New York, NY.
- Hsueh T. and Q. Li. (1999) *China's National Income 1952-1995*, Westview Press, Boulder, CO.
- Hsueh T., Q. Li, and S. Liu. (1993) *China's Provincial Statistics, 1949-1989*. Boulder: Westview Press.
- Jian T., J. Sachs and A. Warner. (1996) Trends in Regional Inequality in China, *China Economic Review*, Vol. 7, No. 1 (Spring): 1-22.
- Keil, M.W. and Parente, S.L. (1996) Changes in the Wealths of States, working paper.
- Lee, Jongchul. (2000) "Changes in the sources of China's regional inequality." *China Economic Review* 11: 232-45.
- Leung, Chi-Keung and Joseph C.H. Chai. (1985) *Development and Distribution in China*. Hong Kong: University of Hong Kong.
- Li, S. and Lian, P. (1999) Decentralization and coordination: China's credible commitment to preserve the market under authoritarianism, *China Economic Review*, Vol. 10, No. 2 (Fall): 161-190.
- Lyons, T.P. (1991) Interprovincial Disparities in China: Output and Consumption, *Economic Development and Cultural Change*, Vol. 82, No. 4 (April): 471-506.
- Maddison, A. (1991) *Dynamic Forces in Capitalist Development: A Long-Run Comparative View*. Oxford: Oxford University Press.
- McKinley, Terry. (1996) *The Distribution of Wealth in Rural China*. New York: M.E. Sharpe.
- Parente, S.L. and E.C. Prescott. (1993) Changes in the Wealth of Nations, *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 17, No. 2 (Spring): 3-16.
- Risken, Carl, Zhao Renwei, and Li Shi editors. (2001) *China's Retreat from Equality*. New York: M.E. Sharpe.
- State Statistical Bureau. (1994) *Statistical Yearbook of China*. Beijing: China Statistical Publishing House.
- Williamson, J.G. (1965) Regional Inequality and the Process of National Development: A Description of the Patterns, *Economic Development and Cultural Change*, Vol. 13, No. 4, Part 2 (July): 47-70.
- World Bank. (1995) *World Tables*, Johns Hopkins University Press, Baltimore, MD.
- Yang, Dennis Tao. (1999) "Urban-Biased Policies and Rising Income Inequality in China" *American Economic Review* 89 no. 2: 306-10.
- Young, A. (1996) *The Razor's Edge: Distortions and Incremental Reform in the People's Republic of China*, working paper.
- Zhao, Renwei. (2001) "Increasing Income Inequality and Its Causes in China." In *China's Retreat from Equality*, edited by Carl Riskin, Zhao Renwei, Li Shi. New York: M.E. Sharpe.