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Measurement of GDP per capita and regional disparities in China, 1979–2009*

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Abstract

This paper analyzes provincial GDP per capita disparities in China from 1979 to 2009. Provincial GDP per capita of official statistical materials has several problems such as problems of data correctness and reliability, because the data cover the *huji* population and the *changzhu* population. This study compares results using modified *changzhu* population GDP per capita data with results using official statistical materials. The empirical results are as follows: (1) Studies since the 1990s have overestimated inter-province disparities; (2) inter-province disparities have decreased since 2005; and (3) The western region has experienced an increase in intra-regional disparities since 2002. These results suggest that provincial GDP per capita statistics should be used more carefully.

Keywords: Regional disparities; GDP per capita; Statistics; China

JEL classification: E01, O18, O53, R12, R23

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1 Introduction

China has experienced an increase in regional disparities and rapid growth in its economy since the adoption of the Reform and Opening Up (*gaige kaifang*) policy. The Chinese government has realized the significance of regional disparities. In 1995, Chinese policy makers looked at regional disparities at the Fourth Plenary Session of the 14th Central Committee held by the National People's Congress and the Chinese Communist Party for the first time since the adoption of the Reform and Opening Up policy. In 1997, a decision was made by the National People's Congress to implement a balanced regional development strategy. The Chinese government has launched the Western Development Program (*xibu dakaifa*) in the Great Western region since 2000, Revive the Northeast Program (*dongbei zhenxing*) in the northeastern region since 2003, and Promotion of the Rise of Central China (*Zhongbu jueqi*) in the central region since 2004.

Numerous studies have shown that inter-province disparities in China exhibited a U-shaped curve during transition, e.g., Tsui [1], Lyons [2], Wu [3], Chen and Fleisher [4], Tsui [5], Nakagane [6], Chen [7], Lin, Cai, and Li [8], Kanbur and Zhang [9], Cai and Du [10], Fujita and Hu [11], Cai, Wang and Du [12], Kato [13], Liu, Wei, and Li [14], Kanbur and Zhang [15], and Fleisher, Li, and Zhao [16]. These studies mainly used province-level output data such as national income utilized or per capita GDP, and they observed that inter-province disparities in China decreased from 1978 because of decreases in coastal region disparities.

In contrast, provincial disparities have grown with increasing disparities between the coastal and inland regions since the mid- or late 1980s.[*1] Hence, many studies have investigated the main causes of increasing inter-province disparities during China's transition phase. For example, Kato [13] discusses how marketization and privatization impact increasing regional non-primary industry disparities. Wang and Fan [17] use regional (*didai*) data to argue that regional productivity disparities affect capital flow among three regions. Liu, Wei, and Li [14] consider regional development strategy and policy, globalization and economic liberalization, and market distortions to be important factors in regional disparities. Fleisher, Li, and Zhao [16] study regional growth patterns in China since 2003, they find that human capital positively affects regional output and regional TFP growth, and the returns to human capital investment in inland area is higher than that of coastal area. They imply that human capital investment in poor region contributes to decreases in regional disparities.

It should be noted that several articles have observed decreasing inter-province disparities in China since the mid-2000s (see Table 1). Xu and Li [18] show that the Gini index of inter-province nominal GDP per capita disparities declined in 2004. Liu and Zhang [19] use the Gini index and the coefficient of variation, which reveal that inter-province disparities decreased from 2000 to 2001 and from 2003 to 2006. Fan and Sun [20], using revised GDP data after China's 2004 Economic Census, observe decreasing regional disparities from 2005 to 2006. Chan and Wang [21] show that inter-province disparities decreased in 2000, 2003,

[*1] Several studies show a sudden dip from 1989 to 1991, e.g., Chen [7] and Kato [13].

Table1 Literature reviews on decreasing inter-province disparities in China after 2000.

Publication	Type of data (period studied)	Population data source (period studied)	Measurements of inequality (Period of decreasing regional disparities)
Xu and Li [18]	30-provinces nominal GDP per capita (1978–04)	*Rocal Statistical Yearbook* (1978–2004)	*G* (2004)
Liu and Zhang [19]	27-provinces 1952 value real GDP per capita (1952–06)	50 Years (1952–98); *China Statistical Yearbook* (1999–06)	*G* and *CV* (2000–01; 03–06); *V* (2000–01; 05–06)
Fan and Sun [20]	31-provinces 2005 value real GDP per capita (1978–92); 31-provinces 2005 value real revised GDP per capita (1993–06)	*55 Years* (1978–04); *China Statistical Yearbook* (2005–06)	*CV*, *T*, and *G* (2005–06)
Chan and Wang [21]	31-provinces 2000 value real revised GDP per capita (2000–06)	*China Statistical Abstract* (2000–06)	*CV* (2000; 03; 05–06)
Aoki [22]	30-provinces 2000 value real GDP per capita (1978–92); 30-provinces 2000 value real revised GDP per capita (1993–06)	*China Population and Employment Statistics Yearbook* (1978–06)	*MLD* (2005)

Notes: *50 Years* = *Comprehensive Statistical Data and Materials on 50 Years of New China* (Department of Comprehensive Statistics of the NBS [26]); *55 Years* = *China Compendium of Statistics 1949–2004* (Department of Comprehensive Statistics of the NBS [27]); *G* = the Gini index; *CV* = the coefficient of variation; *V* = the variance; *T* = the Theil index; *MLD* = the mean logarithmic deviation.

2005, and 2006. Aoki [22] argues that regional disparities have fluctuated since 2005 because of variable accuracy in population statistics.

However, these results are open to question. Previous studies have used the questionable GDP per capita data because their statistical materials are composed of the two-type GDP per capita data. The former is based on the *huji* population data. The *huji* population is registered with the police, and such registration does not reflect migration patterns; the *huji* population data are based on surveys undertaken by the National Bureau of Statistics (NBS) up until

2004. The *huji* population in the coastal provinces that have many immigrants, e.g., Shanghai and Guangdong, is underestimated, and that in the inland provinces that are the home of many immigrants, e.g. Henan, Hubei, Hunan, Chongqing, and Sichuan, is overestimated. Many studies have neglected inter-province population mobility in China since the 1990s. The latter is based on the *changzhu* population data. The *changzhu* population data reflect the resident population that has stayed in the same area for more than 6 months and indicate migration patterns. The 1990 Population Censuses, 1995 1% Population Sample Survey, 2000 Population Censuses, 2005 1% Population Sample Survey, and annual data since 2006 are the *changzhu* population. Previous studies have not used statistical materials such as the Population Censuses but have used the others. The *China Statistical Yearbook* (NBS [23]), *China Statistical Abstract* (NBS [24]), *China Population and Employment Statistics Yearbook* (Department of Population and Employment Statistics of the NBS [25]), *Comprehensive Statistical Data and Materials on 50 Years of New China* (Department of Comprehensive Statistics of the NBS [26]) (*50 Years*), and *China Compendium of Statistics 1949–2004* (Department of Comprehensive Statistics of the NBS [27]) (*55 Years*) are composed of the *huji* population data and *changzhu* population data (see Table 1).

No studies have yet tried to estimate regional disparities after the Reform and Opening Up policy using the *changzhu* population GDP per capita data. The studies to give much attention to the difference between the *huji* population and the *changzhu* population are Groenewold, Lee, and Chen [28], Fan and Sun [20], and Chan and Wang [21]. Groenewold, Lee, and

Chen [28] which analyzes inter-regional spillovers in China use *huji* population GDP per capita data. Fan and Sun [20], using the *huji* data, compute population size for 1990, 1995, 2000, and 2005, taking the arithmetic average of each preceding year's figure and that of the year that follows. Chan and Wang [21] argue that the NBS revises provincial GDP per capita based on the *changzhu* population by 2006, and they calculate inter-province 2000-value real GDP disparities from 2000 to 2006. However, according to the footnote on the *China Statistical Abstract 2007*, the parts of their data for the period from 2001 to 2004 are GDP per capita based on the *huji* population.

The purpose of this paper is to analyze inter-province disparities in China from 1979 to 2009. This study uses modified *changzhu* population GDP per capita data and compares the results obtained with the results of using official statistical materials, which preceding studies employ.

This paper is organized as follows. Section 2 discusses the GDP per capita data issues. Section 3 presents the disparity measurement methods. Section 4 provides an empirical analysis of disparities. The final section offers some concluding remarks.

2 Data

There are several problems in the official statistical materials that are composed of the *huji* population data and *changzhu* population data. The objective of this section is to consider the problem of population statistics and to determine original GDP per capita data on the basis

of the 1990 and 2000 Population Censuses and the 2005 1% Population Sample Survey.

2.1 Problems of the *China Statistical Yearbook*

First, this study considers the changing definition of population statistics in China from the *China Statistical Abstract* and the *China Statistical Yearbook*.[*2] According to the *China Statistical Abstract 2007*, *2008*, *2009*, and *2010*, the parts of provincial population data for the period from 2001 to 2004 are the *huji* population. Further, the data of 2005 are based on the 2005 1% Population Sample Survey, while the data from 2006 to 2009 are calculated using a population change sample survey. One cannot compare directly the population data in some provinces from 2004 with data from 2005, because the data from 2005 include the floating population (*liudong renkou*) who resided in the same area for more than 6 months, according to the *China Statistical Yearbook 2006* (see Table 2). Thus, the definition of population statistics up to 2004 differs from the definition after 2005.

This study discusses the subject from a population growth point of view. Table 3 compares the provincial population with that of the previous year from 2001 to 2009. The population data are based on the *China Statistical Yearbook*.

The point to observe is that the large change in 2005 reflects differences between the 2004 definition of population statistics and the 2005 definition. For example, the population of Zhejiang increases by more than 1.78 million and the population of Guangdong increases by

[*2] The *China Statistical Yearbook*, *China Statistical Abstract*, *China Population Statistics Yearbook*, and *China Population and Employment Statistics Yearbook* contain the same population data.

Table2 Definition of population data in *China Statistical Abstract* and *China Statistical Yearbook*

Statistical Materials	Definition of Population	Data
Abstract 2002	The data in 2000 have been estimated on the basis of the 2000 Population Census; others have been estimated on the basis of the annual national sample surveys on population changes.	1996–01
Yearbook 2002	N. A.	2001
Abstract 2003	N. A.	1997–02
Yearbook 2003	N. A.	2002
Abstract 2004	N. A.	1998–03
Yearbook 2004	N. A.	2003
Abstract 2005	N. A.	1999–04
Yearbook 2005	N. A.	2004
Abstract 2006	N. A.	2000–05
Yearbook 2006	Data of total population by region are based on the 1% Population Sample Survey with careful consideration of floating population. Thus, the data in some regions are not comparable with those from the preceding year.	2005
Abstract 2007	In 2001–2004, the parts of provincial population data are not the *de facto* population.	2000–06
Yearbook 2007	Data in the table are estimates from the 2006 National Sample Survey on Population Changes. The data are not adjusted on the basis of sampling errors and survey errors.	2006
Abstract 2008	In 2001–2004, the parts of provincial population data are not the *de facto* population.	2001–07
Yearbook 2008	Data in the table are estimates from the 2007 National Sample Survey on Population Changes. The data are not adjusted on the basis of sampling errors and survey errors.	2007
Abstract 2009	In 2002–2004, the parts of provincial population data are not the *de facto* population.	2002–08
Yearbook 2009	Data in the table are estimates from the 2008 National Sample Survey on Population Changes. The data is not adjusted on the basis of sampling errors and survey errors.	2008
Abstract 2010	In 2003–2004, the parts of provincial population data are not the *de facto* population.	2003–09
Yearbook 2010	Data in the table are estimates from the 2009 National Sample Survey on Population Changes. The data are not adjusted on the basis of sampling errors and survey errors.	2009

Source: *China Statistical Abstract* (NBS [24]) and *China Statistical Yearbook* (NBS [23])

Notes: *Abstract* = *China Statistical Abstract*; *Yearbook* = *China Statistical Yearbook*; *de facto* population (the *changzhu* population) = resident population of those who stayed in the same area more than 6 months.

Table3 Provincial population compared with the previous year in China, using the *China Statistical Yearbook*: 2001–2009 (in 10,000s).

Province	2001	2002	2003	2004	2005	2006	2007	2008	2009
Definition	h&c	h&c	h&c	h&c	c	c	c	c	c
Eastern Region									
Beijing	26	40	33	37	45	43	52	62	60
Tianjin	3	3	4	13	19	32	40	61	52
Hebei	25	36	34	40	42	47	45	46	45
Shanghai	▲ 27	11	86	31	36	37	43	30	33
Jiangsu	28	26	24	28	42	75	75	52	48
Zhejiang	17	34	▲ 52	41	178	82	80	60	60
Fujian	30	26	22	23	24	23	23	23	23
Shandong	44	41	43	55	68	61	58	50	53
Guangdong	76	76	95	350	890	110	145	95	94
Hainan	8	7	7	8	10	8	9	9	10
Northeastern Region									
Liaoning	10	9	7	7	4	50	27	17	4
Jilin	9	8	4	6	7	7	7	4	6
Heilongjiang	4	2	2	2	3	3	1	1	1
Central Region									
Shanxi	24	22	20	21	20	20	18	18	16
Anhui	42	10	72	51	▲ 341	▲ 10	8	17	▲ 4
Jiangxi	37	36	32	30	27	28	29	32	32
Henan	67	58	54	50	▲ 337	12	▲ 32	69	58
Hubei	15	13	13	15	▲ 306	▲ 17	6	12	9
Hunan	34	33	33	36	▲ 372	16	13	25	26
Western Region									
I-Mongolia	6	1	0	5	2	11	8	9	8
Guangxi	38	34	35	32	▲ 229	59	49	48	40
Chongqing	5	10	23	▲ 8	▲ 324	10	8	23	20
Sichuan	38	33	27	25	▲ 513	▲ 43	▲ 42	11	47
Guizhou	43	38	33	34	▲ 174	27	5	31	5
Yunnan	46	46	43	39	35	33	31	29	28
Tibet	5	4	3	4	3	4	3	3	3
Shaanxi	15	15	16	15	15	15	13	14	10
Gansu	18	18	10	16	▲ 25	12	11	11	7
Qinghai	6	6	5	5	4	5	4	2	3
Ningxia	9	9	8	8	8	8	6	8	7
Xinjiang	27	29	29	29	47	40	45	36	28

Source: Author's calculations. The calculations are based on population data taken from the *China Statistical Yearbook* (NBS [23]).

Notes: Definition = definition of population statistics. h&c = composed of the *huji* population and *changzhu* population. c = the *changzhu* population. ▲= minus.

more than 8.9 million. In contrast, the populations of Anhui, Henan, Hubei, Hunan, Guangxi, Chongqing, Sichuan, and Guizhou decrease by more than one million. In other words, high economy eastern region provinces saw an increase in population, and low economy provinces in other regions saw a decrease. Migrant peasants have emigrated from the central and western regions to the eastern region since the 1990s. In the central and western regions, the *huji* population is larger than the *changzhu* population; in contrast, the *changzhu* population is larger than the *huji* population in the eastern region.

The provincial population data of the two statistical materials are questionable, because they are composed of data on the *huji* population and the *changzhu* population until 2004. Thus, provincial GDP per capita using these population data are open to question.

2.2 Problems of the *55 Years* and the *60 Years*

There are also some problems in historical statistical materials such as the *55 Years* and the *60 Years* (the *China Compendium of Statistics 1949–2008* (Department of Comprehensive Statistics of the NBS [29])), which preceding studies use. This study confirms the definition of provincial population data of the *55 Years* and *60 Years* and finds three problems.

First, the definitions vary between *changzhu* and *huji*. For instance, according to the *55 Years*, the definition of the population of Beijing is *changzhu* (1949–04), that of Tianjin is *huji* (1949–86) and *changzhu* (1987–04), and that of Hebei is *huji* (1949–04). According to the *60 Years*, the definition of the population of Beijing is *huji* (1949–81) and *changzhu*

Table4 Definition of provincial population data of the *55 Years* and the *60 Years*.

Province	*55 Years* (period of data)	*60 Years* (period of data)	Difference
Eastern Region			
Beijing	c (1949–04)	h (1949–81); c (1982–08)	same
Tianjin	h (1949–86); c (1987–04)	h (1949–08)	same
Hebei	h (1949–04)	h (1949–81); c (1982–08)	same
Shanghai	h (1949–04)	N.A.	same
Jiangsu	h (1949–89); c (1990–04)	h (1949–89); c (1990–08)	same
Zhejiang	h (1949–89); c (1990–04)	h (1949–89); c (1990–08)	from 0 to +84
Fujian	c (1952–04)	N.A.	from -40 to +16
Shandong	c (1949–04)	h (1949–84); c (1985–08)	from -44 to +69
Guangdong	h (1949–04)	h (1949–79); c (1980–08)	from +2 to +1306
Hainan	c (1950–04)	h (1950–87); c (1988–08)	same
Northeastern Region			
Liaoning	h (1949–81); c (1982–04)	h (1949–04); c (2005–08)	from -68 to +26
Jilin	h (1949–04)	N.A.	same
Heilongjiang	c (1949–04)	h (1949–81); c (1982–08)	same
Central Region			
Shanxi	c (1949–04)	h (1949–81); c (1982–08)	same
Anhui	c (1949–04)	h (1949–08)	from +7 to +233
Jiangxi	c (1949–04)	h (1949–82); c (1983–08)	same
Henan	h (1949–04)	N.A.	same
Hubei	c (1949–04)	h (1949–81; 08); c (1982–07)	same
Hunan	h (1949–95); c (1996–04)	h (1949–08)	same
Western Region			
I-Mongolia	c (1949–04)	h (1949–89); c (1990–08)	same
Guangxi	h (1950–91); c (1992–04)	h (1949–04); c (2005–08)	same
Chongqing	h (1951–04)	h (1951–95); c (1996–08)	from -147 to -351
Sichuan	h (1950–04)	h (1950–04); c (2005–08)	same
Guizhou	c (1949–04)	h (1949–04); c (2005–08)	same
Yunnan	c (1949–04)	h (1949–81); c (1982–08)	same
Tibet	h (1951–04)	h (1951–89); c (1990–08)	from +3 to +11
Shaanxi	c (1949–04)	h (1949–89); c (1990–08)	same
Gansu	h (1949–89); c (1990–04)	h (1949–82); c (1983–08)	from +9 to +13
Qinghai	c (1949–04)	N.A.	same
Ningxia	c (1949–04)	h (1949–99); c (2000–08)	same
Xinjiang	c (1949–04)	h (1949–89); c (1990–08)	same

Source: Author's calculations are based on population data taken from the *55 Years* (Department of Comprehensive Statistics of the NBS [27]) and the *60 Years* (Department of Comprehensive Statistics of the NBS [29]).

Notes: *60 Years* = *China Compendium of Statistics 1949–2008*; Difference = between Population of *60 Years* and that of *55 Years* (in 10,000s); h = the *huji* population (population of those registered with the police); c = the *changzhu* population (resident population of those who stayed in the same area more than 6 months).

Table5 Provincial population compared with the previous year in China, using the *60 Years*: 1999–2006 (in 10,000s).

Province	Definition	1999	2000	2001	2002	2003	2004	2005	2006
Eastern Region									
Beijing	*changzhu*	12	106	20	40	33	36	45	43
Tianjin	*huji*	5	2	2	5	7	7	7	10
Hebei	*changzhu*	45	60	25	36	34	40	42	47
Shanghai	N.A.	7	9	6	7	8	11	8	8
Jiangsu	*changzhu*	31	114	28	26	25	27	42	75
Zhejiang	*changzhu*	19	205	17	33	33	40	95	82
Fujian	*changzhu*	17	94	30	26	22	23	24	23
Shandong	*changzhu*	45	114	44	41	43	55	68	61
Guangdong	*changzhu*	228	432	83	109	121	148	83	110
Hainan	*changzhu*	9	26	8	8	7	7	10	8
Northeastern Region									
Liaoning	*change* 05	13	32	12	8	7	11	48	50
Jilin	N.A.	13	11	10	12	9	3	8	10
Heilongjiang	*changzhu*	19	15	4	2	2	2	3	3
Central Region									
Shanxi	*changzhu*	31	44	24	22	21	21	20	19
Anhui	*huji*	53	73	47	44	41	51	55	77
Jiangxi	*changzhu*	40	▲ 83	37	37	32	29	28	28
Henan	N.A.	72	101	67	58	54	50	51	52
Hubei	*changzhu*	31	22	15	13	14	14	15	19
Hunan	*huji*	30	30	34	33	34	35	34	36
Western Region									
I-Mongolia	*changzhu*	17	11	5	1	1	5	2	6
Guangxi	change 05	38	38	37	34	35	32	▲ 229	59
Chongqing	*changzhu*	▲ 10	▲ 12	▲ 20	▲ 14	▲ 12	▲ 10	5	10
Sichuan	change 05	43	49	29	38	55	66	▲ 383	▲ 43
Guizhou	change 05	52	46	43	39	32	34	▲ 174	27
Yunnan	*changzhu*	49	48	47	46	43	40	35	33
Tibet	*changzhu*	4	4	3	4	3	4	3	4
Shaanxi	*changzhu*	22	26	15	15	16	15	15	15
Gansu	*changzhu*	23	14	18	17	11	15	▲ 24	12
Qinghai	N.A.	7	7	7	6	5	5	5	5
Ningxia	change 00	7	11	9	8	9	8	8	8
Xinjiang	*changzhu*	28	74	27	29	29	29	47	40

Source: Author's calculations are based on population data taken from the *60 Years* (Department of Comprehensive Statistics of the NBS [29]).

Notes: ▲ = minus. change 00 = changing *huji* into *changzhu* in 2000; change 05 = changing *huji* into *changzhu* in 2005.

(1982–08), that of Tianjin is *huji* (1949–08), and that of Liaoning is *huji* (1949–04) and *changzhu* (2005–08) (see Table 4).

The second problem is low reliability of the definitions of the *55 Years*. In the data of 20 provinces, there are no differences between the population of *60 Years* and that of *55 Years*; nevertheless, the definition has changed. To take a simple example, the definition of Beijing changes from *changzhu* (1949–04) to *huji* (1949–81) and back to *changzhu* (1982–04), although the population data for the period from 1949 to 2004 of *55 Years* are the same as that of *60 Years* (see Table 4).

Third, the most recent historical statistical material, namely the *60 Years*, has serious problem (see Table 5). Although the definitions of *changzhu* do not change in 2000, the populations of parts of provinces increase by more than one million. For instance, Beijing's population increases by more than 1.06 million, and Guangdong's increases by more than 4.32 million. The reliability of the definition is called into doubt.

2.3 The *Changzhu* Population Data

In the analysis, this study uses the *Changzhu* population data based on the 1982, 1990, and 2000 Population Censuses and the 2005 1% Population Sample Survey.[*3] The modified

[*3] This study does not use the 1964 Population Censuses because local governments were reported to overestimate the population to the NBS to receive large subsidies after the Great Chinese Famine (Xue, Maeda, and Minami [30]).

population data for the period from 1978 to 1982 are based on the *China Population Statistics Yearbook 1990* (Department of Population Statistics of the NBS [31]) and the *China Compendium of Statistics 1949–2008*; the data for 1982 are based on the *1982 Population Census of China* (*Results of Computer Tabulation*) (Population Census Office under the State Council and Department of Population Statistics, State Statistical Bureau, People's Republic of China [32]); the data for 1990 are based on the *Tabulation on the 1990 Population Census of the People's Republic of China* (Population Census Office under the State Council and Department of Population Statistics, State Statistical Bureau, People's Republic of China [33]) and the *Tabulation on the 1990 Population Census of Sichuan Province* (*Computer Tabulation*) (Population Census Office under Sichuan Province [34]); the data for 2000 are based on the *Tabulation on the 2000 Population Census of the People's Republic of China* (Population Census Office under the State Council and Department of Population, Social, Science and Technology Statistics, NBS [35]); and the data for 2005, 2006, 2007, 2008, and 2009 are based on the *China Statistical Abstract 2010* (NBS [24]). Populations for the period from 1983 to 1989 are estimated using the geometric mean of two year's data, say 1982 and 1990. For instance, the population for 1983 is calculated by multiplying the geometric mean of the data for 1982 and 1990 by the population figure of 1982. The calculation of the population for the periods from 1991 to 1999 and from 2001 to 2004 uses the same methods (see Table 6).

Table6 Definition and source of the modified provincial *changzhu* population data

Years	Definition	Source
1979–81	*huji*	(1) *China Population Statistics Yearbook 1990* (Department of Population Statistics of the NBS [31]); (2) *60 years* (Department of Comprehensive Statistics of the NBS [29]) (Guangdong, Hainan, Chongqing, and Sichuan)
1982	*changzhu*	*1982 Population Census of China* (*Results of Computer Tabulation*) (Population Census Office under the State Council and Department of Population Statistics, State Statistical Bureau, People's Republic of China [32])
1983–89	Close to *changzhu*	estimated from geometric mean of the data for 1982 and 1990
1990	*changzhu*	(1) *Tabulation on the 1990 Population Census of the People's Republic of China* (Population Census Office under the State Council and Department of Population Statistics, State Statistical Bureau, People's Republic of China [33]); (2) *Tabulation on the 1990 Population Census of Sichuan Province* (*Computer Tabulation*) (Population Census Office under Sichuan Province [34]) (Chongqing and Sichuan)
1991–99	Close to *changzhu*	estimated from geometric mean of the data for 1990 and 2000
2000	*changzhu*	*Tabulation on the 2000 Population Census of the People's Republic of China* (Population Census Office under the State Council and Department of Population, Social, Science and Technology Statistics, NBS [35])
2001–04	Close to *changzhu*	estimated from geometric mean of the data for 2000 and 2005
2005–09	*changzhu*	*China Statistical Abstract 2010* (NBS [24])

2.4 GDP per Capita Data

This study employs the 31 provinces' data for 1978 real GDP per capita. In order to compare the result using the *changzhu* population GDP per capita data with the results of previous studies, this study uses four other statistical publications: the *China Statistical Yearbook*, *55 Years*, *60 Years*, and *China Population Statistics by County* (Ministry of Public Security of the People's Republic of China [36]). The *China Population Statistics by County* is published by the Ministry of Public Security of China, which registers the *huji* population; all the population data are for the *huji* population.

In the analysis, this study uses the average (mid-year population) between the population

in the previous year and the population of the present year to calculate GDP per capita (Eq. (1)). Because the population data of official statistical publications such as the *China Statistical Yearbook*, *55 Years*, *60 Years*, and *China Population Statistics by County* are year-end population data, GDP per capita is based on mid-year population, according to this study's fact-finding in the NBS on March 16, 2010.

$$GDP\ per\ capita_t = \frac{GDP_t}{(population_{t-1} + population_t)/2} \tag{1}$$

GDP data of China have several problems, such as problems with data correctness and reliability, as shown by Maddison [37], Rawski [38], and Kojima [39]. Even the revised GDP is open to doubt (Holz [40]). Moreover, the problem is more severe when one turns from national GDP to provincial GDP, e.g., *diaoru diaochu* (counting enterprises operating across provincial borders), *panbi* (comparing and competing with each other) among local governments, the fabrications by local governments because of estimations of political leaders' achievements, the differences of statistical authorities between NBS and the local Bureau of Statistics, and the data sources according to this study's fact-finding in the NBS on March 15, 2011, and the research of NBS staff (Xu [41]; Xu [42]; Xu [43]).

Therefore this study uses indices of revised GDP which are more correct and reliable. Indices of GDP for the period from 1979 to 1992 are drawn from Kato and Chen [44]. The revised indices of GDP for the period from 1993 to 2003, which were adjusted after China's

Table7　Definition and source of indices provincial GDP

Years	Definition	Source
1979–92	indices of GDP	Kato and Chen [44]
1993–03	the revised indices of GDP adjusted after China's first Economic Census conducted in 2004	*Data of Gross Domestic Product of China 1952–2004* (NBS, Department of National Accounts [45])
2004	the repeated revised indices of GDP	*China Statistical Yearbook 2008* (NBS [23])
2005–09	the revised indices of GDP adjusted after China's second Economic Census conducted in 2008	*China Statistical Yearbook 2010* (NBS [23])

first Economic Census conducted in 2004, are published in the *Data of Gross Domestic Product of China 1952–2004* (NBS, Department of National Accounts [45]). Furthermore, the repeated revised indices of GDP for 2004 are published in the *China Statistical Yearbook 2008* (NBS [23]). Finally, the revised indices of GDP for the period from 2005 to 2008 adjusted after China's second Economic Census conducted in 2008 indices of GDP in 2009 and are published in the *China Statistical Yearbook 2010* (NBS [23]) (see Table 7).

2.5 Differences of GDP per Capita

This study analyzes the difference between the modified *changzhu* population GDP per capita data and four other GDP per capita data sets, and it considers the differences in GDP per capita of the official statistical materials that previous studies use.

Table 8 compares the *huji* population GDP per capita with the modified *changzhu* population GDP per capita from 1999 to 2008. The *huji* population data are taken from the *China*

Table8 Differences in GDP per capita of the *huji*: 1999–2008 (percent)

Province	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Eastern Region										
Beijing	19	21	23	24	26	28	29	31	33	36
Tianjin	6	7	8	8	9	10	10	12	14	18
Hebei	0	0	▲0	0	▲0	▲0	▲0	▲0	▲1	▲2
Shanghai	21	23	25	26	28	29	30	32	34	35
Jiangsu	3	3	3	3	3	3	3	3	3	4
Zhejiang	1	2	2	3	4	5	6	7	8	9
Fujian	2	3	3	4	4	4	4	4	4	4
Shandong	0	0	0	0	0	0	0	0	0	0
Guangdong	13	13	14	15	15	16	16	16	16	16
Hainan	0	▲0	▲0	0	1	1	1	1	▲0	▲1
Northeastern Region										
Liaoning	1	1	1	1	1	1	1	1	2	2
Jilin	1	2	2	2	2	2	2	2	1	1
Heilongjiang	▲1	▲2	▲2	▲1	▲0	0	1	1	0	▲0
Central Region										
Shanxi	2	2	2	1	1	1	2	1	1	▲0
Anhui	▲5	▲6	▲6	▲6	▲6	▲6	▲6	▲7	▲8	▲9
Jiangxi	▲2	▲3	▲3	▲3	▲3	▲2	▲2	▲2	▲3	▲4
Henan	▲4	▲4	▲4	▲6	▲6	▲5	▲6	▲7	▲9	▲10
Hubei	▲1	▲0	▲0	▲2	▲3	▲4	▲4	▲5	▲6	▲6
Hunan	▲3	▲3	▲3	▲3	▲4	▲4	▲5	▲6	▲7	▲8
Western Region										
I-Mongolia	▲1	0	1	1	1	1	1	1	0	▲1
Guangxi	▲6	▲7	▲7	▲6	▲6	▲6	▲5	▲5	▲5	▲6
Chongqing	▲1	▲1	▲2	▲4	▲6	▲8	▲11	▲12	▲13	▲13
Sichuan	▲2	▲2	▲2	▲3	▲3	▲4	▲5	▲6	▲7	▲8
Guizhou	▲2	▲3	▲4	▲4	▲4	▲4	▲4	▲4	▲5	▲6
Yunnan	4	4	4	4	4	4	4	4	4	3
Tibet	3	4	4	5	5	4	4	4	4	3
Shaanxi	▲0	▲1	▲1	▲0	0	0	0	0	▲1	▲1
Gansu	▲1	▲1	▲1	▲1	▲1	▲1	▲0	▲0	▲1	▲2
Qinghai	1	1	1	3	5	6	7	8	7	5
Ningxia	▲1	▲1	▲1	▲1	▲1	▲1	0	1	0	▲1
Xinjiang	3	3	3	3	3	3	3	3	3	2

Source: Author's calculations.

Notes: ▲ = minus. Table 8 shows that difference in GDP per capita using population data of the *huji* and modified *changzhu* population data. The *huji* data are taken from the *China Population Statistics by County* (Ministry of Public Security of the People's Republic of China [36]).

Population Statistics by County. In the wealthy provinces of the eastern region that have many immigrants, GDP per capita is overestimated. For example, the differences are 19% to 36% for Beijing, 6% to 18% for Tianjin, 21% to 35% for Shanghai, and 13% to 16% for Guangdong. On the other hand, GDP per capita is underestimated for almost all inland provinces. The differences are -5% to -9% for Anhui, -4% to -10% for Henan, -3% to -8% for Hunan, -1% to -13% for Chongqing, and -2% to -8% for Sichuan.

Moreover, there are some differences in GDP per capita between the official statistical publications such as the *China Statistical Yearbook*, *55 Years*, and *60 Years*, which are composed of the *huji* and *changzhu* population GDP per capita data. In the *China Statistical Yearbook*, the differences are from 1% to 8% for Shanghai, from 6% to 13% for Guangdong, from -4% to -6% for Anhui, from -5% to -7% for Guangxi, from -1% to -8% for Chongqing, and from -1% to -6% for Sichuan. In the *55 Years*, the differences are from 13% to 29% for Shanghai, and they are from 7% to 16% for Guangdong from 1995 to 2004. Inland poor provinces have also underestimated GDP per capita; for instance, the differences are -5% to -7% for Guangxi, and they are from -1% to -8% for Chongqing. Even the *60 Years*, which most recent historical statistical publications, has large differences. From 1999 to 2008, the differences are 7% to 19% for Tianjin, 21% to 35% for Shanghai, and -5% to -9% for Anhui.

As a result, the official GDP per capita statistics of the wealthy eastern region provinces, e.g., Beijing, Tianjin, Shanghai, and Guangdong, are overestimated through underestimating

the population data, and those of the inland provinces are underestimated through overestimating the population data. In the case of the *huji* population, the population of the wealthy coastal provinces is overestimated, whereas that of the inland poor provinces is underestimated.

Thus, the provincial GDP per capita data of official statistical publications have some problems, such as problems with data correctness and reliability, and previous studies that use official data are open to question. One should note that many previous studies might have overestimated inter-province disparities since the 1990s because the official statistical publications that the preceding studies use are composed of the *huji* population and the *changzhu* population GDP per capita data.

3 Methods

In order to calculate regional disparities, this study uses five disparity measurements: the population weighted coefficient of variation (CV_w), population weighted Theil index (T_w), Gini index (G), population weighted mean logarithmic deviation (MLD_w), and population weighted Atkinson index (A_w).

CV_w, T_w, MLD_w, and A_w are defined as follows:

$$CV_w = \frac{\sqrt{\sum_{j=1}^{m} w_j (y_{wj} - \mu_w)^2}}{\mu_w} \tag{2}$$

$$T_w = \sum_{j=1}^{m} w_j \frac{y_{wj}}{\mu_w} \ln \frac{y_{wj}}{\mu_w} \tag{3}$$

$$MLD_w = \sum_{j=1}^{m} w_j \ln \frac{\mu_w}{y_{wj}} \tag{4}$$

$$A_w = 1 - \left\{ \sum_{j=1}^{m} w_j \left(\frac{y_{wj}}{\mu_w} \right)^{1-\varepsilon} \right\}^{\frac{1}{1-\varepsilon}} \qquad for \quad \varepsilon \geq 0, \varepsilon \neq 1 \tag{5}$$

where m is the number of provinces ($m = 31$), y_{wj} is GDP per capita of the jth province, w_j is the ratio between the population of the jth province and the total population of all provinces, and μ_w is the weighted mean of y_{wj} using w_j for the weights, or in other words, total GDP of all provinces divided by the total population of all provinces. The ε of A_w is a measure of the degree of inequality aversion, or the relative sensitivity to transfers at different income levels ($\varepsilon = 2$) (Atkinson [46]).

There are differences in sensitivity to income mobility in these four measurements. In the order of CV_w, T_w, MLD_w, and A_w, these measurements have relative sensitivity to transfers at high income levels (Aoki [47]). T_w is more sensitive to change at high income levels than MLD_w (Theil [48]).

Moreover, this study uses two disparity decomposition measurements that are based on T_w and MLD_w. Consider the hierarchical structure of a country: country-region-province, these measurements decompose total disparity into intra-region (inter-province) and inter-region

disparities. They are defined as:

$$T_w = \sum_{i=1}^{n} \frac{Y_i}{Y} \sum_{j=1}^{m} \frac{Y_{ij}}{Y_i} \ln \frac{Y_{ij}/Y_i}{X_{ij}/X_i} + \sum_{i=1}^{n} \frac{Y_i}{Y} \ln \frac{Y_i/Y}{X_i/X} \tag{6}$$

$$MLD_w = \sum_{i=1}^{n} \frac{X_i}{X} \sum_{j=1}^{m} \frac{X_{ij}}{X_i} \ln \frac{X_{ij}/X_i}{Y_{ij}/Y_i} + \sum_{i=1}^{n} \frac{X_i}{X} \ln \frac{X_i/X}{Y_i/Y} \tag{7}$$

where n is the number of regions ($n = 4$), X is the total population of all provinces, X_i is the population of the ith region, X_{ij} is the population of the jth province in the ith region, Y is the total GDP of all provinces, Y_i is the GDP of the ith region, and Y_{ij} is the GDP of the jth province in the ith region.[*4]

G has several definitions. This study uses the definition of G as the area between the 45-degree line and the Lorenz curve because this definition considers the population ratio. It is defined as:

$$G = 2\left\{0.5 - \sum_{j=1}^{m} \frac{1}{2} w_j \left(cy_{wj} + cy_{wj-1}\right)\right\} \qquad for \quad y_{w1} \le y_{w2} \le \cdots \le y_{wm} \tag{10}$$

where cy_{wj} is the jth cumulative percentage of GDP, and y_{wj} is ranked by lowest GDP per capita.

[*4] If one defines $w_j = X_j/X$, $y_{wj} = Y_j/X_j$, and $\mu_w = Y/X$ in Eqs. (3) and (4), T_w and MLD_w are calculated as follows:

$$T_w = \sum_{j=1}^{m} \frac{Y_j}{Y} \ln \frac{Y_j/Y}{X_j/X} \tag{8}$$

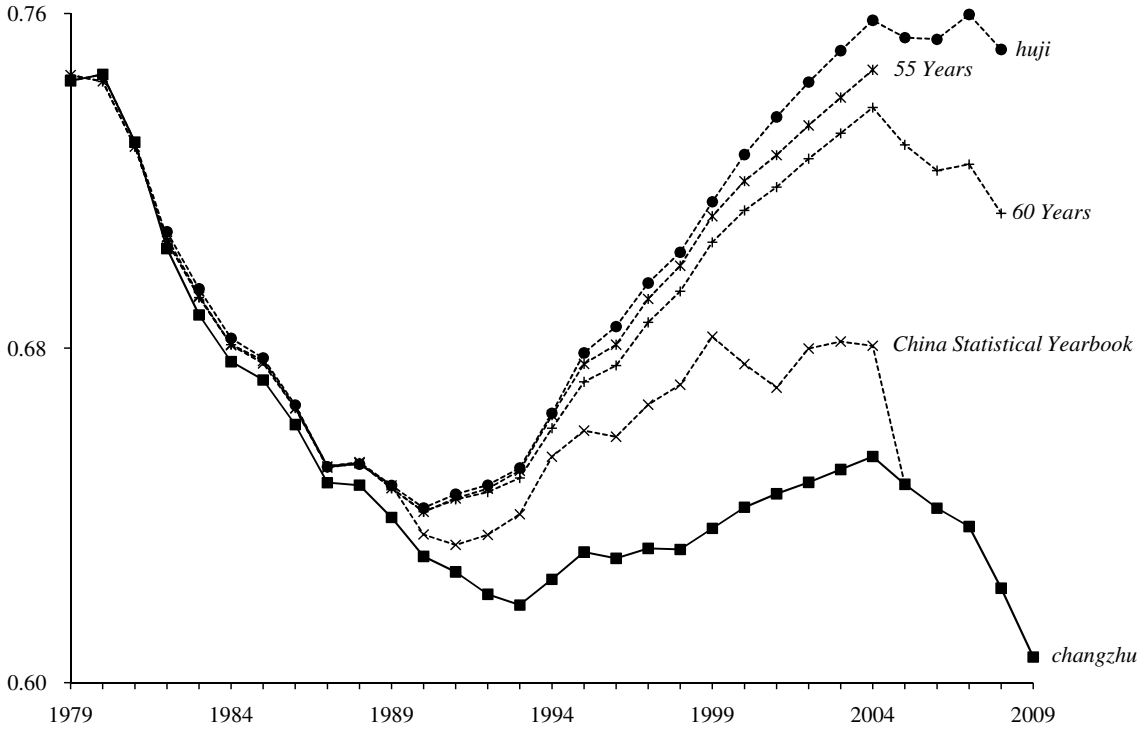
$$MLD_w = \sum_{j=1}^{m} \frac{X_j}{X} \ln \frac{X_j/X}{Y_j/Y} \tag{9}$$

.

4 Results

This study calculated CV_w, T_w, G, MLD_w, and A_w from the five GDP per capita data sets: *huji* (1982–2008), *55 Years* (1979–2004), *60 Years* (1979–2008), *China Statistical Yearbook*

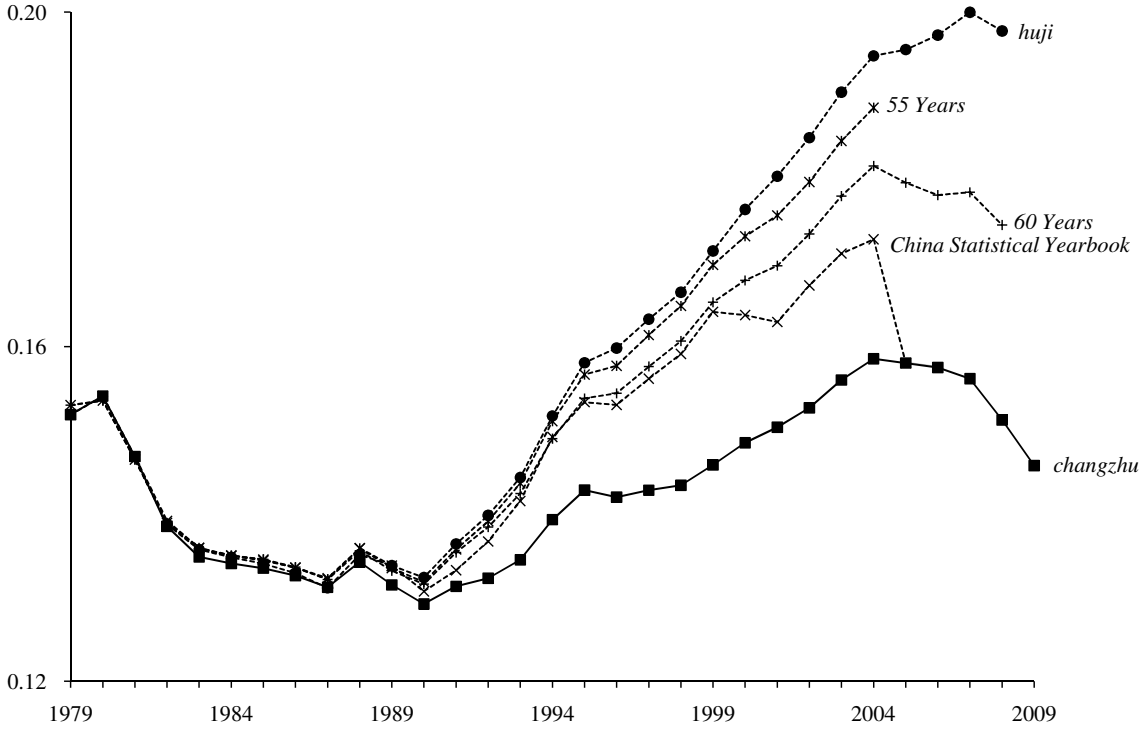
Figure1 Inter-province disparities (CV_w): 1979–2009



Source: Author's calculations.

Notes: *huji* = are computed based on the *China Population Statistics by County* (Ministry of Public Security of the People's Republic of China [36]) population GDP per capita data; *55 Years* = are computed based on the *China Compendium of Statistics 1949–2004* (Department of Comprehensive Statistics of the NBS [27]) population GDP per capita data; *60 Years* = are computed based on the *China Compendium of Statistics 1949–2008* (Department of Comprehensive Statistics of the NBS [29]) population GDP per capita data; *chagnzhu* = are computed based on modified *changzhu* population GDP per capita data (see Table 6). This study uses the mid-year population. Data sources of Indices of GDP are shown in Table 7. The coefficient of variation (CV_w) is weighted by population.

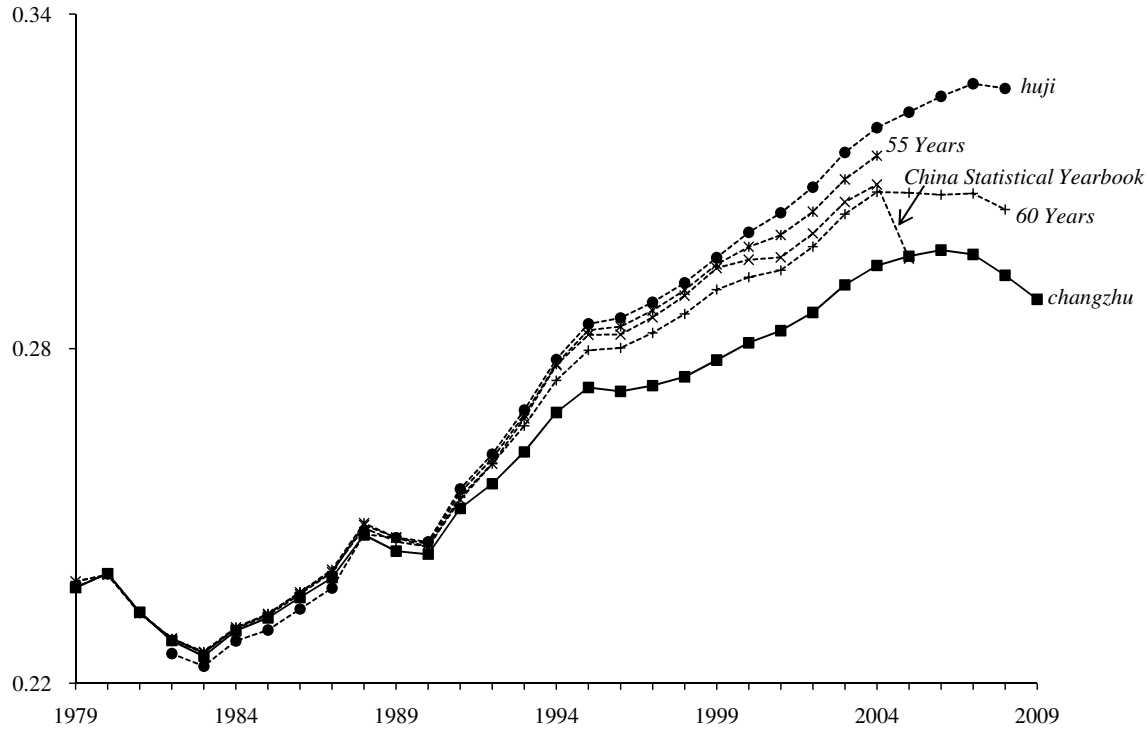
Figure2　Inter-province disparities (T_w): 1979–2009



Source: Author's calculations.
Notes: The Thiel index (T_w) is weighted by population.

(1979–2009), and *changzhu* (1979–2009). The *China Statistical Yearbook* and *changzhu* contain the same data for the period from 2005 to 2009. The figures present the overall disparity measures over the period from 1979 to 2009, and the diagram helps to define the results of the differences in *huji*, *55 Years*, *60 Years*, the *China Statistical Yearbook*, and *changzhu* (Figures 1, 2, 3, 4, 5, 6, 7, 8, and 9). The thin line designates *changzhu*, and the broken line designates *huji*, *55 Years*, *60 Years*, and the *China Statistical Yearbook*.

Figure3　Inter-province disparities (*G*): 1979–2009

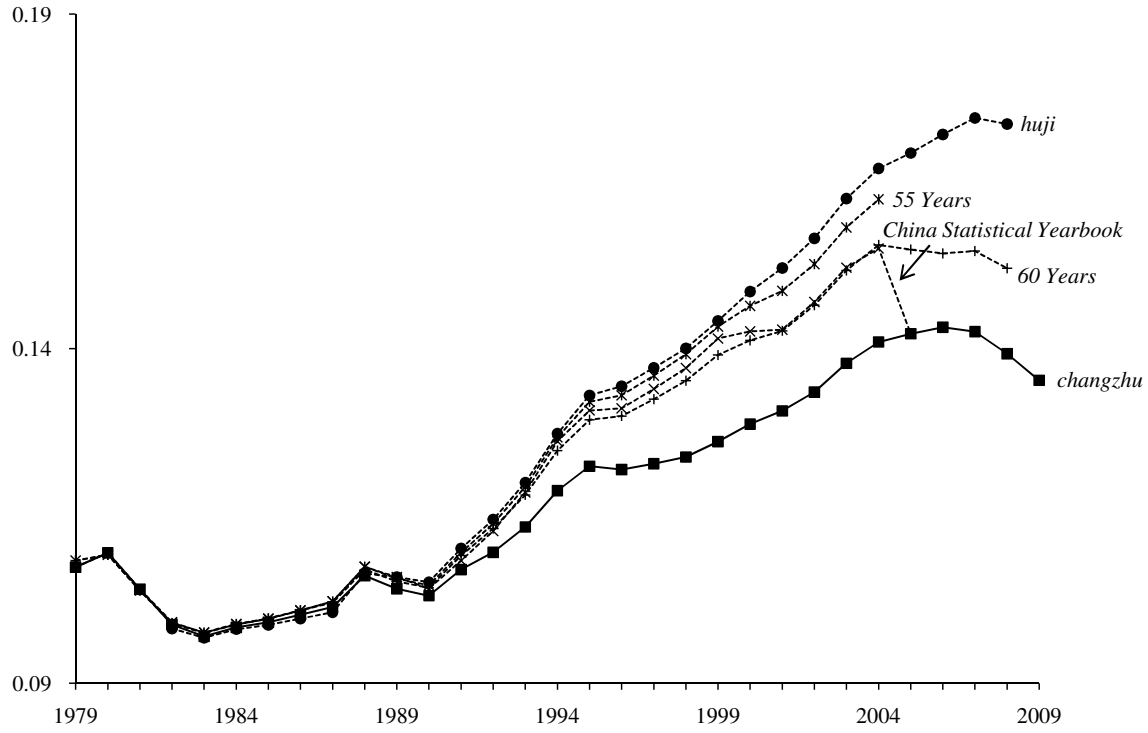


Source: Author's calculations.
Notes: The Gini index (*G*) is ranked by lowest real GDP per capita.

4.1　Inter-province Disparities

These diagrams show two features. First, they suggest that previous studies have overestimated inter-province disparities that occurred since the 1990s. The overall disparity indices indicated that the disparities of *changzhu* have been smaller than those of *huji*, *55 Years*, *60 Years* , and *China Statistical Yearbook* since the 1990s. There are large differences between

Figure4 Inter-province disparities (MLD_w): 1979–2009

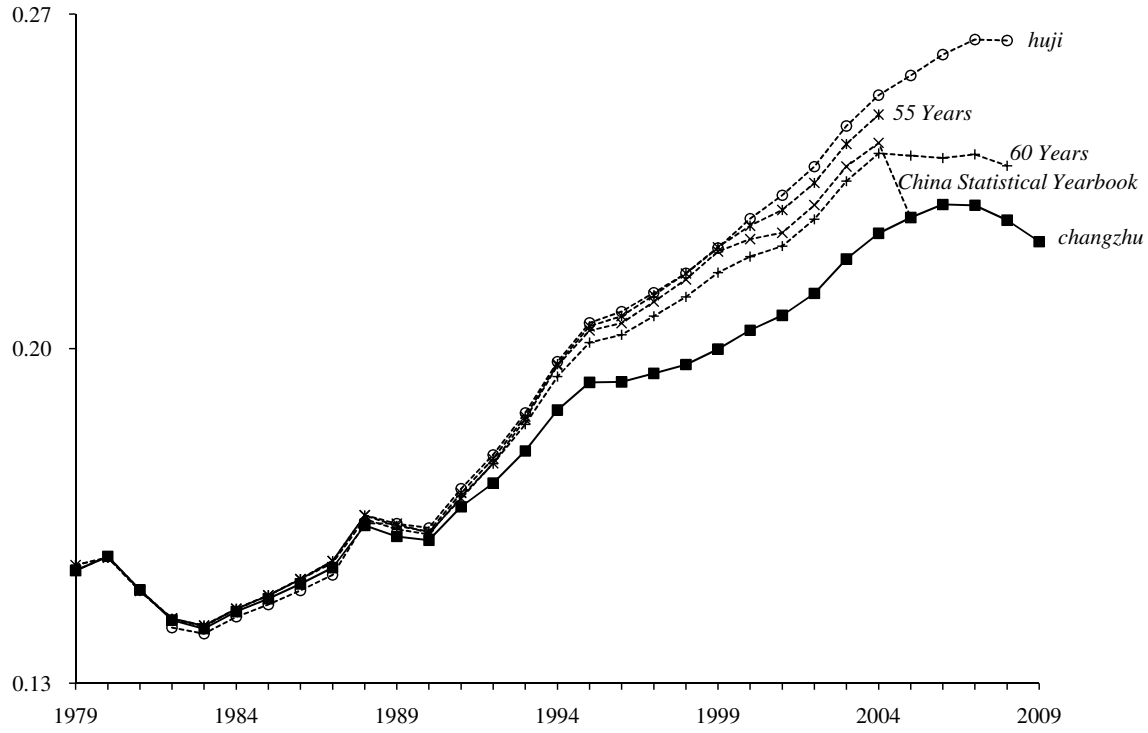


Source: Author's calculations.
Notes: The mean logarithmic deviation (MLD_w) is weighted by population.

changzhu and the others. For example, the differences correspond roughly to the decreases in disparities in the 1980s in Figure 1. The large difference between the *changzhu* and the *huji* since 1990 indicated inter-province migration, because the *changzhu* population GDP per capita reflects migration.

One may recall that numerous previous studies have relied on official statistical publications, such as *55 Years*, *60 Years*, and the *China Statistical Yearbook*, in which the data are composed of data on the *huji* population and the *changzhu* population. If one uses the *huji* population data, the population of the wealthy coastal provinces is underestimated, while that of the inland poor provinces is overestimated. Thus, official GDP per capita statistics of

Figure5 Inter-province disparities (A_w): 1979–2009



Source: Author's calculations.
Notes: The Atkinson index (A_w) ($\varepsilon = 2$) is weighted by population.

the wealthy eastern region provinces are overestimated through underestimating the population data, and those of the inland poor provinces are underestimated through overestimating population data, as shown in Table 8.

Second, inter-province disparities decreased from 2005 at the earliest, according to the *changzhu* population GDP per capita. There are different results among the disparity measures. For example, CV_w declined after 2005 (from 0.654 in 2004 to 0.606 in 2009) (see Figure 1), T_w also declined gradually after 2005 (from 0.159 in 2004 to 0.146 in 2009) (see Figure 2), G decreased after 2007 (from 0.298 in 2006 to 0.289 in 2009) (see Figure 3), and MLD_w and A_w dipped in 2007 (from 0.143 in 2006 to 0.135 in 2009 and from 0.230 in 2006

to 0.222 in 2009, respectively) (see Figure 4 and 5).

The main point to note is the rapid drop in the data from the *China Statistical Yearbook* in 2005. As was mentioned above, the drop in 2005 reflects differences between the 2004 definition of population statistics and the 2005 definition. If one does not distinguish the *changzhu* population from the *huji* population, one might be misled by this drop.

4.2 Decomposition of Inter-province Disparities

One should distinguish provinces according to economic level. As can be seen in Figure 1, 2, 3, 4, and 5, there were larger declines in the mid-2000s in the order of CV_w, T_w, MLD_w, and A_w. As mentioned in Section 3, this decline was due to the relative sensitivity to transfers at high income levels in the order of CV_w, T_w, MLD_w, and A_w.

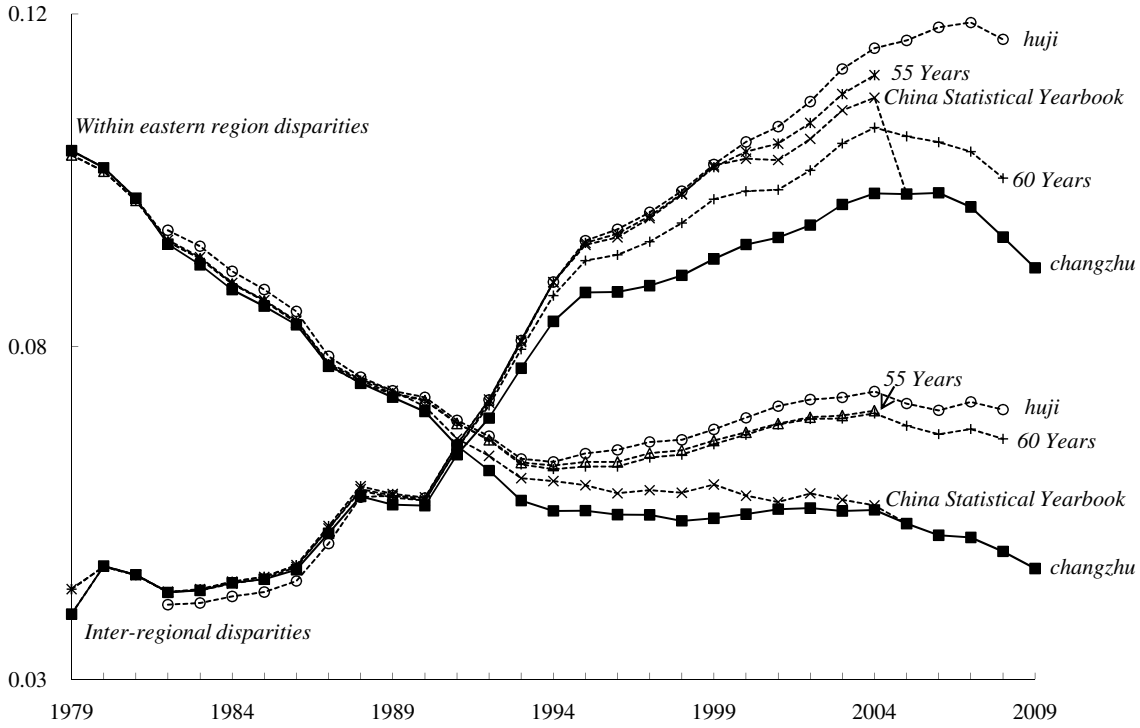
This study divides the 31 provinces into four regions: the eastern, northeastern, central, and western regions. The eastern region provinces have experienced rapid growth in their economy since the adoption of the Reform and Opening Up (*gaige kaifang*) policy. Since the 2000s, the Chinese government has launched regional development programs in three poor regions, namely the Western Development Program (*xibu dakaifa*), the Revive the Northeast Program (*tongbei zhenxing*), and the Promotion of the Rise of Central China (*zhongbu jueqi*). As a result, the compound annual growth rate of the inland poor provinces has increased since 2005 (see Table 9). For example, the growth rate of Jilin is 15.2%, that of I-Mongolia is 18.2%, that of Chongqing is 14.4%, and that of Shaanxi is 14.9%.

Table9 Provincial compound annual growth rate in China: 1979–2009 (percent)

	1979–1992	1992–2005	2005–2009
Eastern Region			
Beijing	9.3	11.5	11.7
Tianjin	7.7	12.9	15.8
Hebei	9.4	12.1	11.6
Shanghai	8.0	12.4	11.4
Jiangsu	11.8	13.2	13.7
Zhejiang	12.6	13.7	11.9
Fujian	12.8	12.9	13.8
Shandong	11.1	13.1	13.3
Guangdong	14.1	13.8	12.4
Hainan	13.1	9.4	12.7
Northeastern Region			
Liaoning	8.5	10.2	13.9
Jilin	9.2	10.3	15.2
Heilongjiang	7.1	9.4	11.8
Central Region			
Shanxi	8.2	11.6	10.6
Anhui	9.0	11.5	13.1
Jiangxi	8.9	10.3	12.9
Henan	10.2	11.7	13.0
Hubei	9.1	10.7	13.7
Hunan	8.0	10.3	13.8
Western Region			
I-Mongolia	9.7	13.4	18.2
Guangxi	8.7	10.8	13.8
Chongqing	8.9	10.9	14.4
Sichuan	8.6	10.5	13.4
Guizhou	9.0	9.4	12.6
Yunnan	10.1	9.5	11.6
Tibet	7.1	13.1	12.4
Shaanxi	9.5	11.1	14.9
Gansu	8.7	10.4	11.0
Qinghai	7.7	10.0	12.6
Ningxia	9.1	10.0	12.5
Xinjiang	11.2	9.2	10.6

Source: See Table 7.

Figure6 Decomposition of inter-province disparities (inter-regional and within-eastern-region disparities) (T_w): 1979–2009

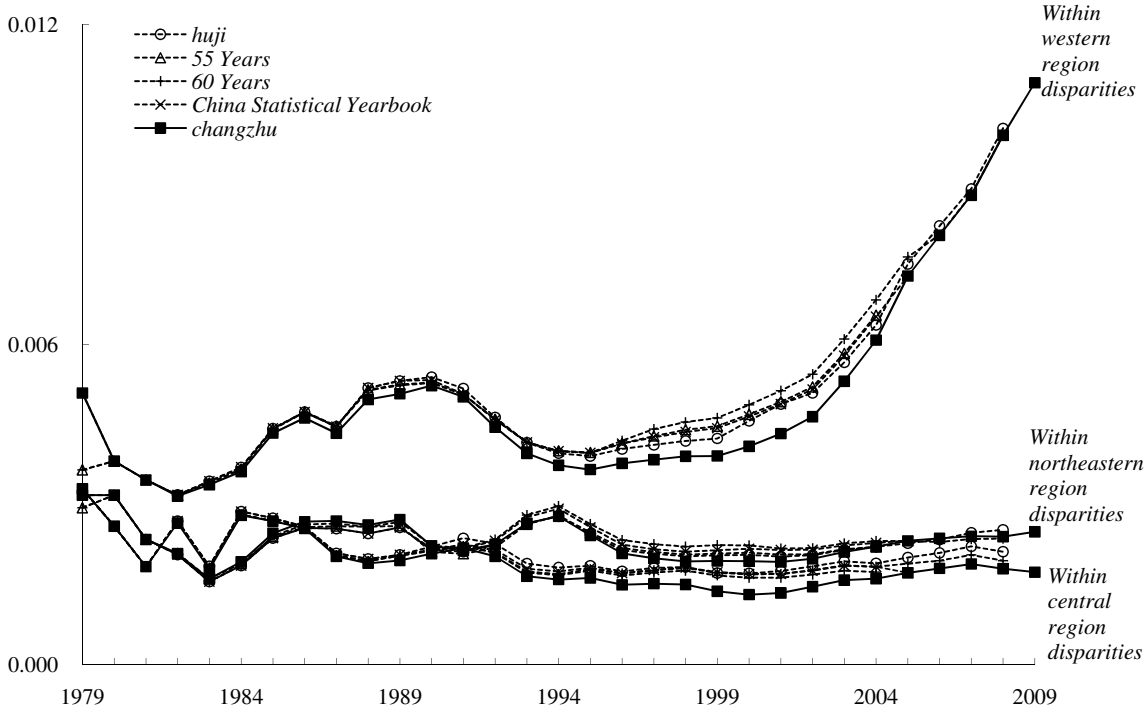


Source: Author's calculations.

Notes: *Inter-regional disparities* = regional disparities between the eastern, northeastern, central, and western regions. The Thiel index (T_w) is weighted by population.

This study decomposed total inter-province disparities into inter-regional, within-eastern-region, within-northeastern-region, within-central-region, and within-western-region disparities, using the Theil index and the mean logarithmic deviation. The eastern region is defined as Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan; the northeastern region, as Liaoning, Jilin, and Heilongjiang; the central region, as

Figure7　Decomposition of inter-province disparities (within-northeastern-, -central-, and -eastern-region disparities) (T_w): 1979–2009



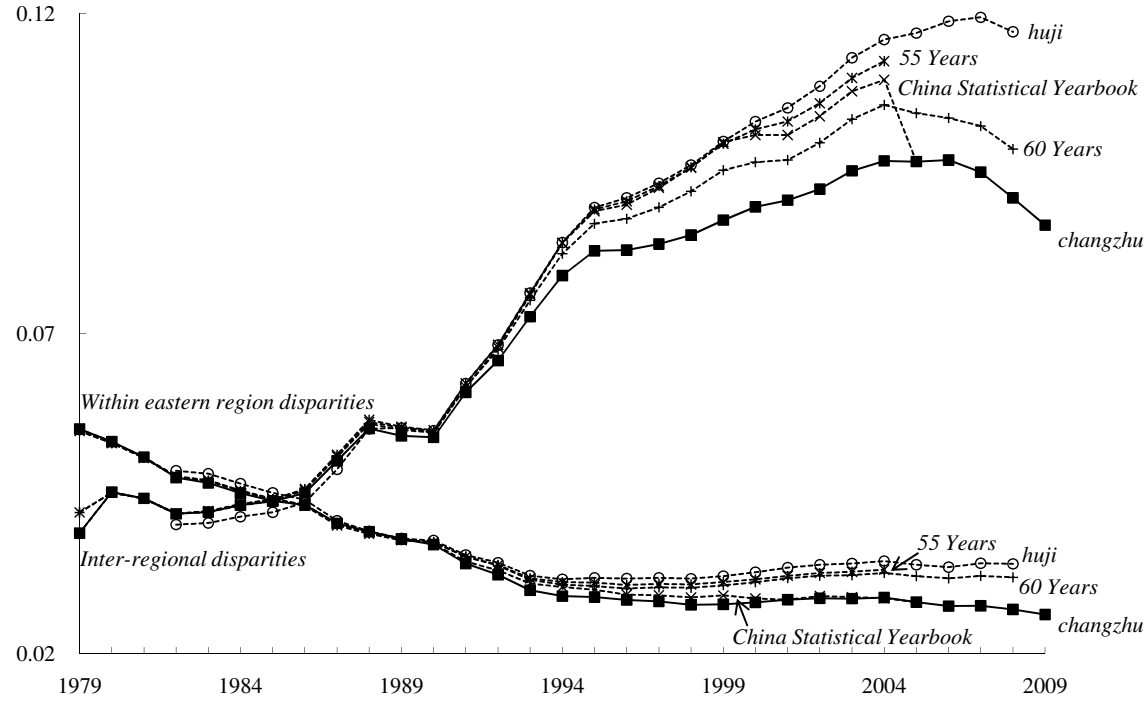
Source: Author's calculations.
Notes: The Thiel index (T_w) is weighted by population.

Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan; and the western region, as the others.

Figure 6, 7, 8, and 9 displays three features. First, previous studies overestimated inter-regional, within-eastern-region, within-northeastern-region, within-central-region, and within-western-region disparities that have occurred since the 1990s. All disparity measures indicated that the disparities of *changzhu* were smaller than those of *huji*, the *55 Years*, the *60 Years*, and the *China Statistical Yearbook* after the 1990s.

Second, inter-regional disparities and within-eastern-region disparities contributed to the decrease in overall inter-province disparities during the mid-2000s. T_w decreased in inter-

Figure8 Decomposition of inter-province disparities (inter-regional and within-eastern-region disparities) (MLD_w): 1979–2009

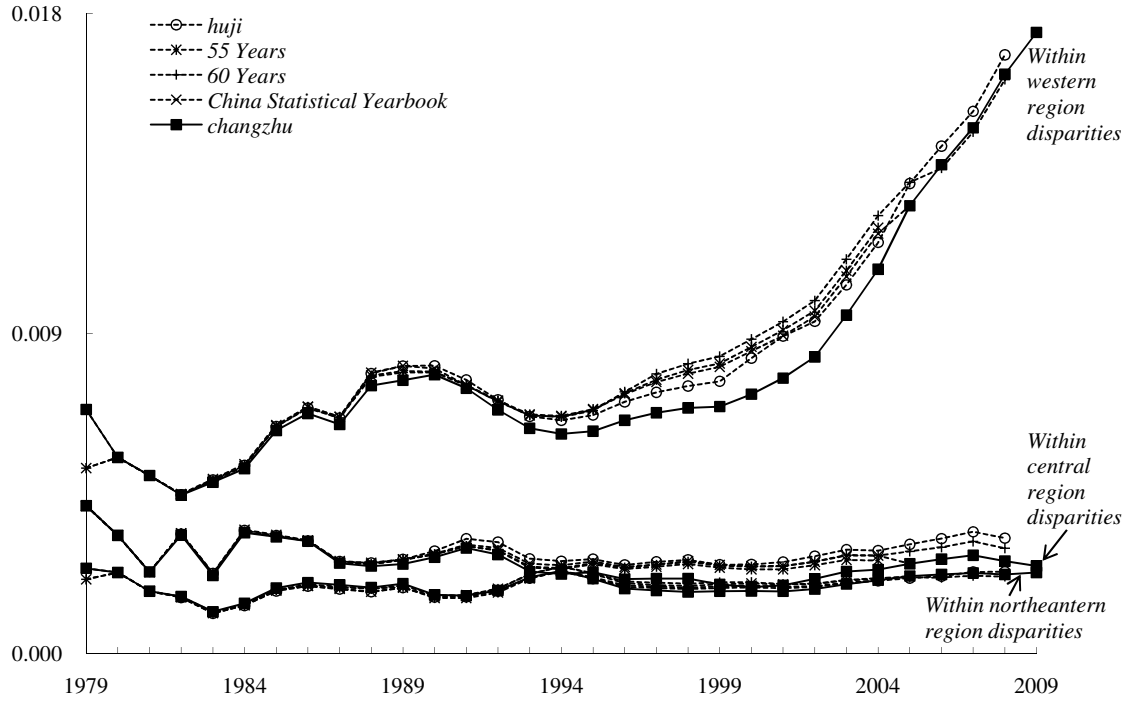


Source: Author's calculations.
Notes: The mean logarithmic deviation (MLD_w) is weighted by population.

regional disparities since 2007 (from 0.096 in 2006 to 0.086 in 2009) and in within-eastern-region disparities since 2005 (from 0.053 in 2004 to 0.045 in 2009) (see Figure 6). MLD_w reduced inter-regional disparities after 2005 (from 0.097 in 2004 to 0.087 in 2009) and within-eastern-region disparities after 2005 (from 0.029 in 2004 to 0.026 in 2009) (see Figure 8). A decrease in inter-regional disparities could reflect rapid economic growth as a result of the regional development programs in the northeastern, central, and western regions (see Table 9).

Third, within-western-region disparities have increased rapidly since 2002 (from 0.004 in

Figure9　Decomposition of inter-province disparities (within-northeastern-, -central-, and -eastern-region disparities) (MLD_w): 1979–2009



Source: Author's calculations.
Notes: The mean logarithmic deviation (MLD_w) is weighted by population.

2001 to 0.011 in 2009, using T_w; from 0.008 in 2001 to 0.017 in 2009 and using MLD_w) (see Figure 7 and 9). I-Mongolia has experienced the most rapid economic growth of any region in China since 2002 through its development of natural resources and mining industries. This development lifted the I-Mongolian GDP per capita higher than the average Chinese GDP per capita in 2005. Further, Chongqing and Shaanxi have experienced accelerated economic growth since 2005 (see Table 9). On the other hand, Yunnan, Gansu, and Xinjiang have maintained low economic growth rates.

5 Conclusions

This paper presented provincial GDP per capita disparities in China from 1979 to 2009. The provincial GDP per capita of official statistical publications that previous studies use has several problems, such as problems with data correctness and reliability, because the data of official statistical publications are composed of the *huji* population and the *changzhu* population. In order to compare this study's result using *changzhu* population GDP per capita data with results using official statistical materials, this study employs provincial real GDP per capita data. The five data sets are based on modified *changzhu* population data, the *China Statistical Yearbook*, the *55 Years*, the *60 Years*, and the *huji* population. The reason for using the *changzhu* population GDP per capita data is that the *changzhu* population better reflects regional migration.

The empirical results are summarized as follows: (1) Studies since the 1990s have over-estimated inter-province disparities, because their GDP per capita data are based on the *huji* population and the *changzhu* population; (2) inter-province disparities have decreased since 2005 because of decreases in inter-regional disparities and within-eastern-region disparities; and (3) the western region, which is the poorest region, has seen an increase in intra-regional disparities since 2002.

These results suggest that provincial GDP per capita statistics should be used more carefully. If this paper does not distinguish the two types of population, this study exaggerates

increases in regional disparities since the 1990s and this research may be misled to find decreases in inter-provincial disparities since 2005 by changes in data definition.

Regional disparities and inter-region disparities have decreased in China since the mid-2000s. The Chinese government has recognized the importance of regional disparities since 1995, and it launched a regional development program in 2000. Is there a causal relationship between decreases in regional disparities and regional development programs? The question to consider next is why China has experienced decreases in regional disparities since 2005.

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