Regional Inequality in Guangdong Province

Volume 2

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A Thesis Submitted for the Degree of Doctor of Philosophy

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August 2008

Chapter 9 Measurement of Regional Inequality within Guangdong

9.1 Introduction

This chapter attempts to measure regional inequality within Guangdong between 1980 and 2005, and to investigate the unbalanced regional development during the same period. This study adopts various economic and human indicators to measure the changing trend of regional disparity. This chapter intends to provide an in-depth overall estimation of regional economic development and spatial inequality within Guangdong during the reform period. In respect of the conventional administration boundaries of Guangdong, I have adopted two spatial frameworks for regional inequality analysis: the inter-regional and inter-county levels. As far as the inter-regional level is concerned, traditionally, Guangdong is divided into the Pearl River Delta Area (PRDA), Eastern, Western and Mountainous Guangdong. The second framework is the inter-county inequality which includes all county-level administrative units (counties, cities, and municipal districts). The majority of statistical data in this study was collected from both official and other published sources, such as statistical yearbook, official documents and government annual working reports. The subjective data was collected during the field research in Guangdong in autumn 2006.

The structure of this chapter falls into six main parts. Section Two examines regional income inequality within Guangdong between 1980 and 2005; due to differences regarding data availability and in order to make an objective comparison, the inequality analysis of Guangdong is based on the following two separate sub-periods: 1980-1990 and 1991-2005. Section Three concentrates on measuring spatial economic inequality through analysis of the Gini coefficient and coefficient of variation (CV); subjective interview data has also been analyzed in this section. Sections Four and Five analyze other issues important to reliable regional inequality measurement, including regional price differences and migration. Section Six compares the intra-regional inequality between Guangdong and China. Three representative provinces – Guizhou, Henan and Shandong – have been chosen for detailed comparison. Section Seven presents the regional inequality analysis of Guangdong in terms of human development. Finally, the chapter draws conclusions in Section Eight.

9.2 Measurement of Regional Economic Inequality

9.2.1 Inter-regional Economic Disparities

9.2.1.1 Inter-regional Economic Disparities 1980 – 1990

As far as the per capita income is concerned, the figures presented in Table 9.1 below show the per capita National Income (per capita NI) in all large regions within Guangdong during the period between 1980 and 1990, including the Pearl River Delta Area (PRDA), and Eastern, Western and Mountainous Guangdong. The growth of per capita NI in the PRDA increased dramatically during this period. The per capita NI in the PRDA was just 559 *yuan* in 1980; in 1985, the equivalent figure rose to 1138 *yuan*, which was two times higher than the equivalent figure in 1980. Furthermore, relative to the figure in 1980, the per capita NI of the PRDA jumped to 2234 *yuan* in 1990, nearly a fourfold increase; the annual growth rate of per capita NI between 1980 and 1990 was

around 15 percent in PRDA. In terms of the other regions in Guangdong, the per capita NI in those regions was significantly lower than in the PRDA. The average per capita NI in the Eastern region was just 1006 *yuan* in 1990, which was about half of the equivalent figure in the PRDA. In the Western region, the per capita NI had increased to 698 *yuan* in 1990, from about 265 *yuan* in 1980. During the 1980s, the average growth rates in Eastern and Western Guangdong were 14.2 and 8.1 percent respectively. By contrast, however, the average per capita NI in the Hills region was the lowest in Guangdong. The per capita GDP were only 659 *yuan* in 1990, which was about one third of the equivalent figure in the PRDA. The annual growth rate of per capita NI was 8.5 percent during the 1980s, which was almost the lowest figure in Guangdong. More significantly, the ratio of per capita income gap between the PRDA and Hills region had increased to 3.38:1 in 1990 from only 1.92:1 in 1980.

According to the figures presented in Fig 9.1 below, the income gaps among various regions within Guangdong increased slightly from 1980 to 1985; then the income gaps rose substantially from 1985 until 1990. Except for the PRDA, it illustrates that the per capita NI in all other regions was lower than the provincial average level of Guangdong. The per capita income coefficient of variation (CV) has also confirmed that regional income disparities had intensified during the 1980s, jumping to 0.505 in 1985, up by 42 percent from 0.355 in 1980; the CV further climbed to 0.557 in 1990 (see the increasing trend of CV in Fig 9.2 below). The data suggest that the economic development in the PRDA had been much faster than in all the other regions. The data also demonstrate that the regional distribution of income was quite unequal. As a result, the regional income inequality in Guangdong had widened during the 1980s.

Table 9.1: Per Capita National Income in Different Regions within Guangdong 1980-1990, (unit: yuan)

| Region	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Annual growth rate %
PRDA	559	632	727	788	943	1138	1220	1459	1837	1937	2234	15
Eastern Guangdong	271	301	318	321	380	461	512	599	782	873	1006	14.2
Western Guangdong	265	287	321	324	354	406	449	556	647	687	698	8.1
Mountainous Guangdong	291	308	337	347	383	425	451	512	594	618	659	8.5
Mean	346.5	382	425.7	445	515	607.5	658	781.5	965	1028.7	1149.2	11.4
Standard Deviation	123.06	144.54	174.08	198.29	247.36	306.92	325.46	392.36	508.09	532.61	640.54	
coefficient of variation	0.355	0.378	0.409	0.445	0.48	0.505	0.494	0.502	0.526	0.517	0.557	

Note:
1. The values in this table are calculated at the 1980 constant price;
2. The data of per capita NI in Shenzhen was excluded in the PRDA;
3. Based on the raw per capita NI in the various regions, this study calculated the annual growth rate during 1980s;
4. According to the territory boundary defined by the Provincial Government of Guangdong (the 2004 Economy Census of Guangdong), the PRDA includes Guangzhou (Conhua City excluded), Shenzhen, Zhuhai, Foushan, Huizhou, Dongguan, Zhongshan, and Jiangmen municipalities and their administrative cities, districts and counties; in addition, Zhaoqing District is also included in the PRDA. Eastern Guangdong includes Shantou, Shanwei, Chaozhou and Jieyang municipalities and their administrative cities, districts and counties. Western Guangdong covers Zhanjiang, Maoming and Yangjiang municipalities and their administrative cities, districts and counties. Mountainous Guangdong includes Shaoguan, Qingyuan, Yunfu, and Meizhou municipalities and their administrative regions; in addition, the majority of regions in Zhaoqing are also regarded as Mountainous Guangdong.

Source:
GSB (1991, various pages)

Fig 9.1: Per Capita NI in Different Regions within Guangdong 1980-1990, (unit: yuan)
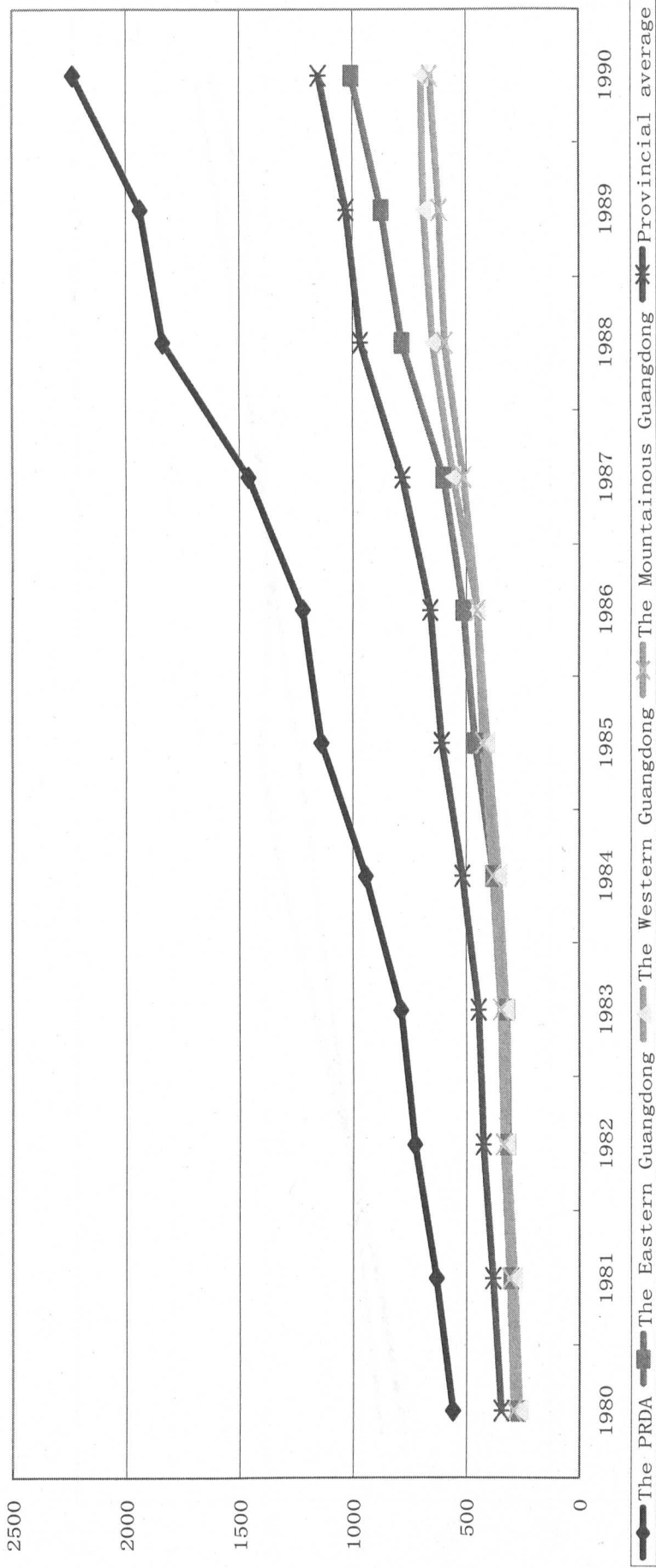
Note: Per capita GDP figures are based on the 1980 constant price; and the he data of per capita NI in Shenzhen was excluded in the PRDA.

Source: GSB (1991, various pages)

Fig 9.2: Coefficient of Variation for Per Capita National Income in the Various Regions within Guangdong 1980-1990 (Shenzhen excluded)

coefficient of variation   trend. (coefficient of variation)
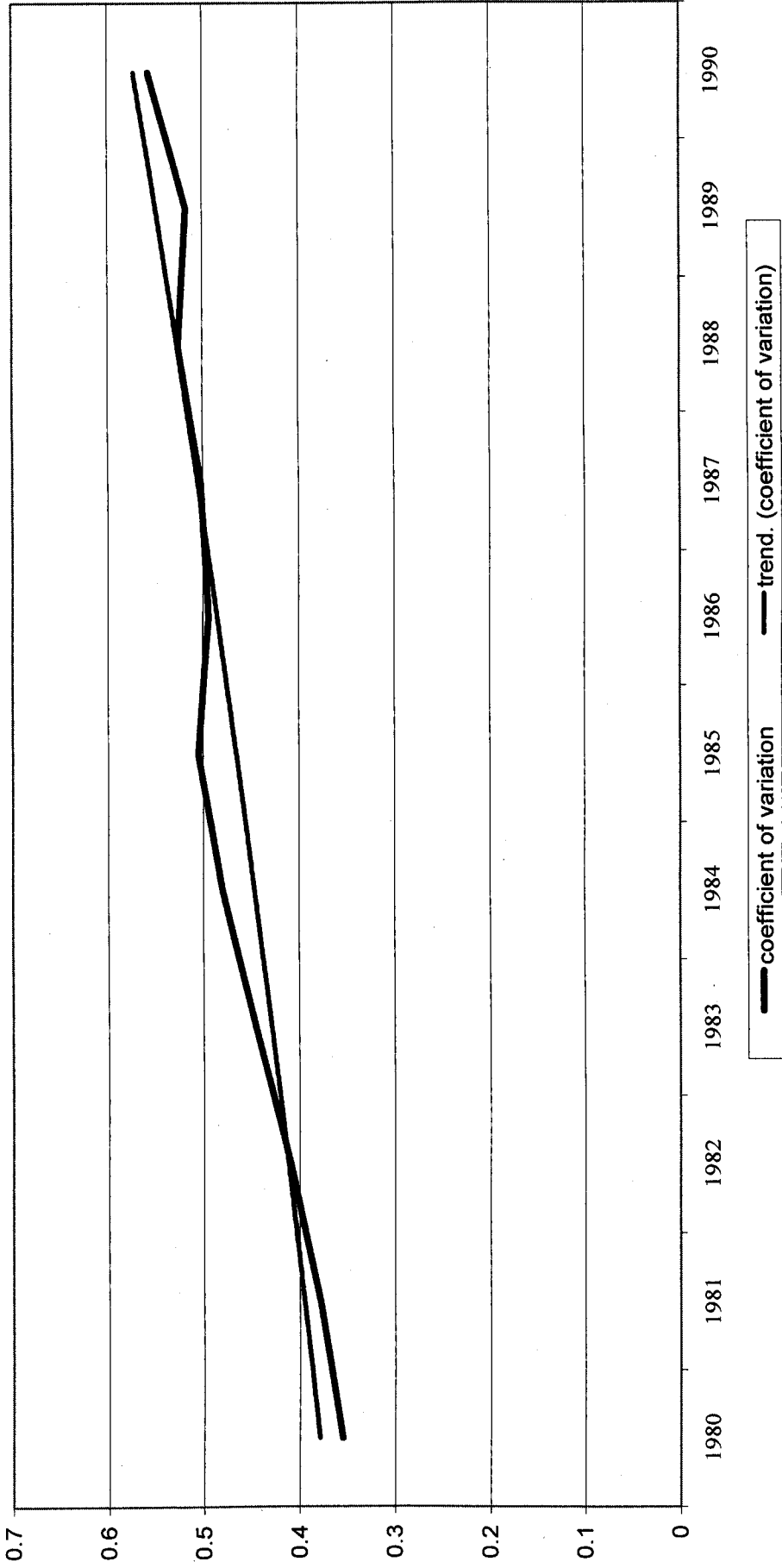
9.2.1.2 Inter-regional Economic Disparities 1991 – 2005

As far as per capita income in the period between 1991 and 2005 is concerned, according to the figures presented in Table 9.2 below, economic growth in the PRDA had been continuously strong and impressive; in 2005, the per capita GDP in the PRDA had arrived at 33684 *yuan* from just 4957 *yuan* in 1991. The 2005 per capita income was more than six times higher than the equivalent figure in 1991. The fast annual growth rate of per capita GDP in the PRDA had been maintained during 1990s, at around 15.3 percent. By contrast, relative to the PRDA, both the per capita GDP and annual growth rates in the other regions within Guangdong were very low. The average per capita GDP in the Eastern region jumped to 9690 *yuan* in 2005 from 1733 *yuan* in 1991, an increase by more than five times during this period. In terms of Western Guangdong, the 2005 per capita GDP was slightly higher than Eastern Guangdong (10369 *yuan*). The average growth rate in Eastern and Western Guangdong were 12.2 and 11.4 percent respectively during the 1990s. Compared to other regions, however, the average per capita GDP in Mountainous Guangdong was the lowest during this period. The per capita GDP was only 7385 *yuan* in 2005. The annual growth rate was 11.3 percent during the period between 1991 and 2005, which was also the lowest figure among regions within Guangdong. The ratio of income gap between the PRDA and Hills region had further increased during the 1990s, the ratio was up to 3.87:1 in 1998 from 3.29:1 in 1991; the ratio jumped to 4.56:1 in 2005. The figures illustrate that economic development in the PRDA had been much faster than in the other regions in Guangdong. According to the data presented in Fig 9.3 below, the income gaps among various regions within Guangdong increased steadily from 1991 to 1997; then rose dramatically from 1997 to 2005. Moreover, per capita GDP CV had increased dramatically from 1991 to 2005; the increasing figure of CV also confirmed that the spatial income disparities had widened during the previous decade. Per capita GDP CV had increased substantially between 1991 and 1993, rising to 0.594 in 1993 from 0.539 in 1991. After a short-term downward trend in 1994-1995, the CV started to increase again from 1995 until 2005. After addressing regional price differences, the CV was up to 0.7 in 2005 up by 25 percent from 0.559 in 1995 (see the changing trend of CV in Fig 9.4 below). The data presented in both Table 9.2 and Figs 9.3 and 9.4 demonstrates that the spatial distribution of economic growth in the regions within Guangdong has been unbalanced since 1991, regional economic inequality in Guangdong further widened during the 1990s.

Table 9.2: Per Capita GDP in Various Regions within Guangdong 1991-2005, (unit: yuan)

| Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average growth rate (%)
PRDA	4957	6335	7990	9314	10973	12352	13751	15138	16674	18440	20165	22045	25486	29263	33684	15.3
Eastern Guangdong	1733	2235	2698	3447	4136	4660	5239	5847	6295	6633	6864	7333	7951	8717	9690	12.2
Western Guangdong	2117	2413	2929	3672	4331	4594	5060	5503	5812	6352	6818	7454	8279	9136	10369	11.4
Mountainous Guangdong	1505	1785	2181	2548	3007	3302	3568	3906	4219	4486	4875	5328	5976	6627	7385	11.3
Mean	2578	3192	3949	4745	5611	6227	6904	7598	8250	8977	9680	10540	11923	13435	15282	12.4
Standard Deviation	1390.8	1829	2348.5	2671.1	3136.3	3518.2	4005.7	4414.1	4923.9	5525	6106.2	6695.9	7880	9187	10682	
coefficient of variation	0.539	0.572	0.594	0.563	0.559	0.565	0.58	0.581	0.596	0.615	0.63	0.635	0.661	0.683	0.7	

Note:

1. The values in this table are calculated at the 1991 constant price;
2. Based on the Regional Retail Price Survey of Guangdong, the figures of 2005 per capita GDP in various regions of Guangdong have been reevaluated;
3. Based on the raw per capita GDP of various regions, this study calculated the annual growth rate during the period between 1991 and 2005;
4. According to the territory boundary defined by the Provincial Government of Guangdong (the 2004 Economy Census of Guangdong), the PRDA includes Guangzhou (Conghua City excluded), Shenzhen, Zhuhai, Foushan, Dongguan, Zhongshan, and Jiangmen municipalities and their administrative cities, districts and counties; in addition, Zhaoqing District is also included in the PRDA. The Eastern Guangdong includes Shantou, Shanwei, Chaozhou and Jieyang municipalities and their administrative cities, districts and counties. The Western Guangdong includes Zhanjiang, Maoming and Yangjiang municipalities and their administrative cities, districts and counties. The Mountainous Guangdong includes Shaoguan, Qingyuan, Yunfu, and Meizhou municipalities and their administrative regions; in addition, the majority of regions of Zhaoqing are also regarded as the Mountainous Guangdong.

Source:

GSB (1992-2006, various pages)

Fig 9.3: Per Capita GDP in Various Regions within Guangdong 1991-2005, (unit: yuan)
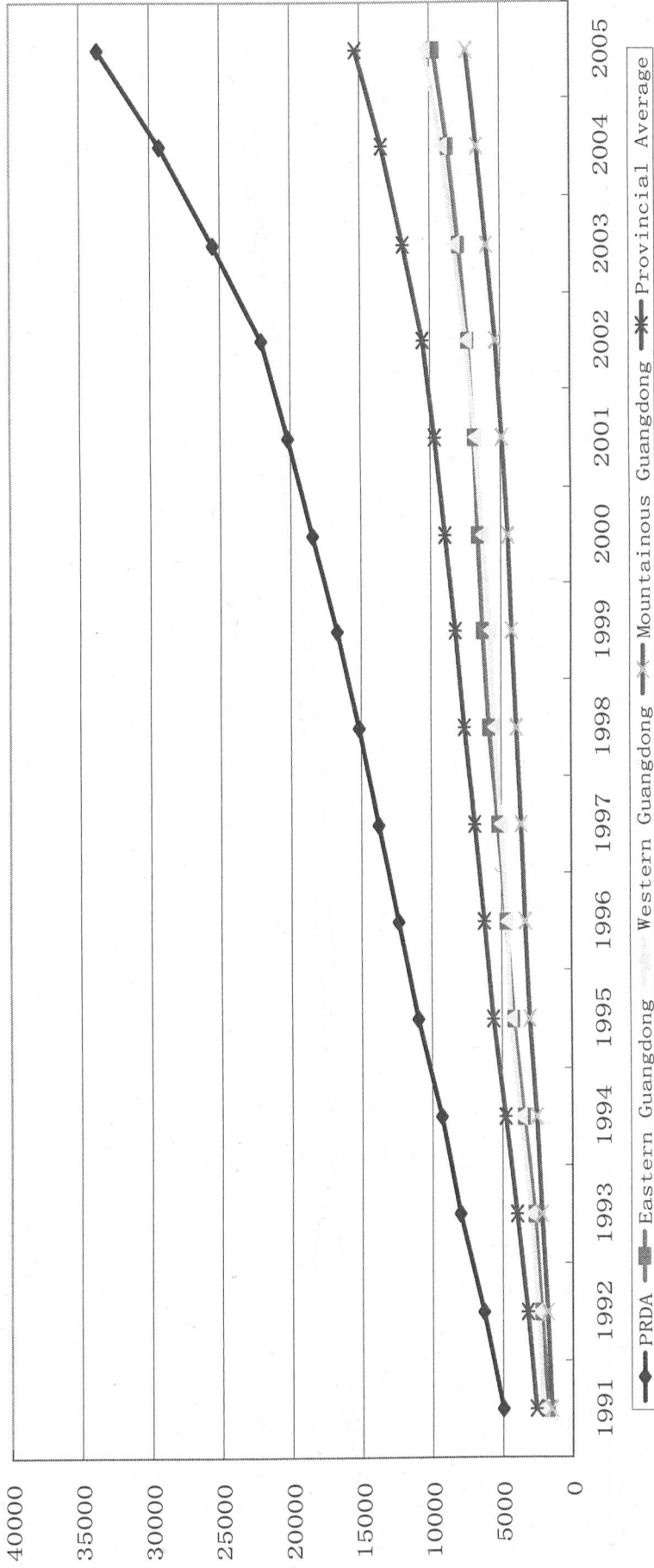

Note: The per capita GDP figures are based on the 1991 constant prices; based on Regional Retail Price Survey of Guangdong, the figures of 2005 per capita GDP in various regions of Guangdong have been readjusted.
Source:
GSB (1992-2006, various pages)

Fig 9.4: Coefficient of Variation for Per Capita GDP in Various Regions within Guangdong 1991-2005

coefficient of variation   trend. (coefficient of variation)
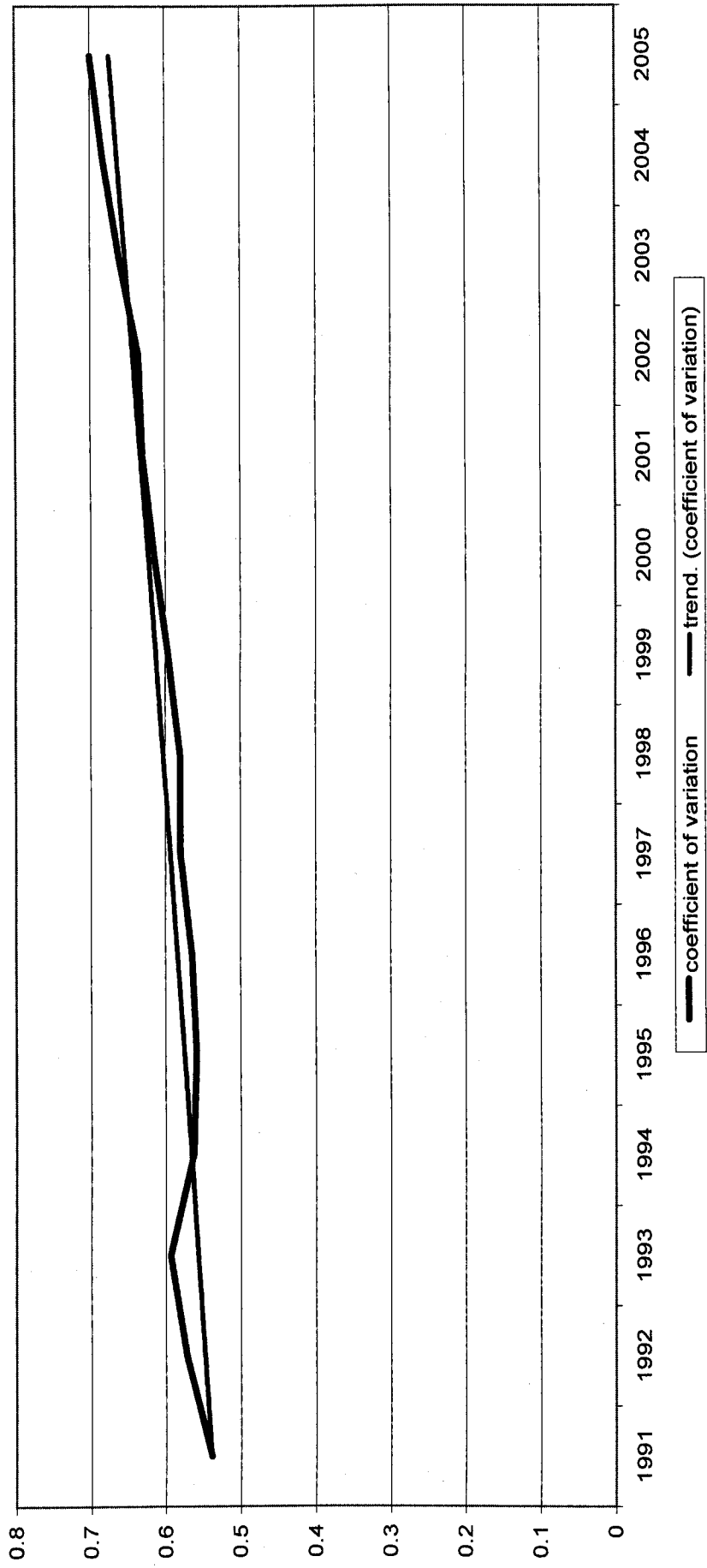
It is important to point out that three main conclusions can be drawn from the inter-regional inequality analysis of Guangdong. First, it is certainly true that every region within Guangdong had achieved some economic growth. Although its growth rate of per capita income was the slowest among the regions in Guangdong, the hills region had achieved economic development. Secondly, in terms of the PRDA, its economic development was indeed remarkable during the reform period; the PRDA was the only region which had higher per capita GDP than the average per capita GDP in Guangdong during the period between 1980 and 2005 (see Figs 9.1 and 9.3 above). Thirdly, at inter-regional level, owing to the rapid economic development in the PRDA, the gap of spatial income disparities within Guangdong had been worsening since 1980. The data presented earlier illustrates the increasing gaps of per capita income in various regions within Guangdong during the reform period. For example, the gaps between the PRDA and Eastern Guangdong and Mountainous Guangdong were 2.86 and 3.29 times respectively in 1991; the gap reached 2.78 and 4.11 times respectively in 2000. Moreover, these gaps jumped to 3.47 and 4.56 times in 2005. The inequality analysis of CV also suggests that the interregional economic disparity has intensified during the reform period, accompanying the rapid economic growth in Guangdong. The following section concentrates on the measurement of inter-county level income inequality. I measure and examine the average per capita NI and per capita GDP in the various county-level administrative units within Guangdong.

9.2.2 Inter-County Income Inequality within Guangdong

9.2.2.1 Inter-County Inequality 1980 – 1990

The figures demonstrated in Table 9.3 show the average per capita national income in various counties within Guangdong. On the one hand, District of Shenzhen, District of Zhuhai, District of Foshan, District of Jiangmen, and District of Gunagzhou were the five most developed regions in Guangdong in 1990, and had per capita NI of 12597, 7282, 5444, 3703 and 2756 *yuan* respectively (see Map 1 below for specific location). The average growth rates of per capita NI in these five richest counties were about 18 percent during the period between 1980 and 1990; the economic growth rates in the newly established Special Economic Zones of Shenzhen and Zhuhai were particularly impressive, at 27 and 27.1 percent respectively. On the other hand, Shixing, Deqing and Fogang were ranked in the middle three positions, which had average per capita national income of 767, 761 and 736 *yuan* respectively in 1990. The average growth rates of per capita national income in these three middle counties were about 9.2 percent between 1980 and 1990. By contrast, Longchuan, Xinfeng and Wuhua County recorded the lowest figures in Guangdong in terms of 1990 per capita NI; average per capita national incomes were only 355, 335 and 333 *yuan* respectively. Moreover, the actual economic growth rates in these three underdeveloped regions were also poor and significantly lower than other counties during this ten year period, at only 4, 4.4 and 5.1 percent respectively. According to the figures shown in Table 9.3, in 1980, the average per capita national income in the rich region Shenzhen District was about 9.5 times higher than the poor region of Huilai County. However, the average per capita national income in the rich region of Shenzhen District increased to more than 37 times higher than Wuhua County in 1990.

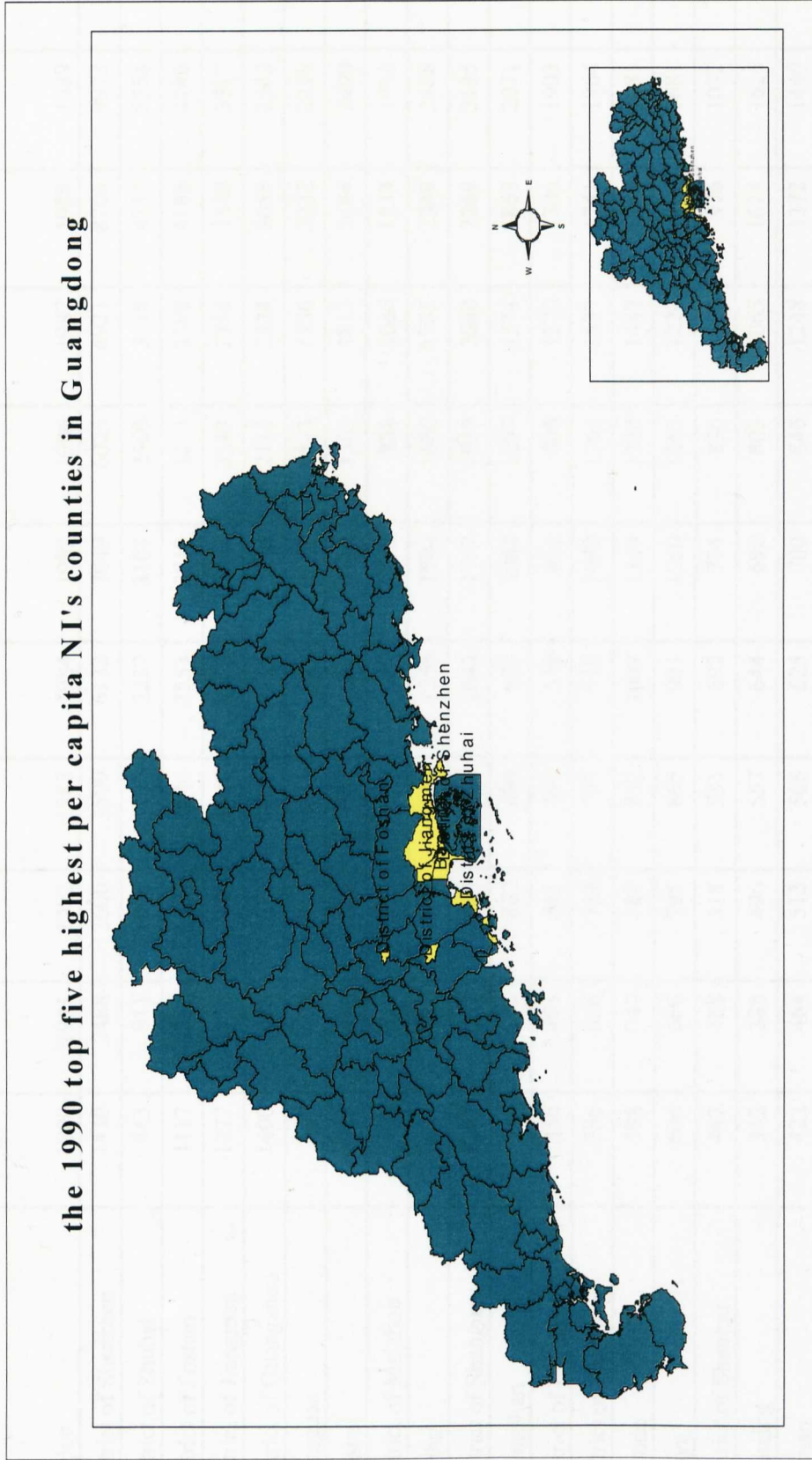*Map 9.1: The Five Counties in Guangdong with Highest Per Capita NI in 1990*

the 1990 top five highest per capita NI's counties in Guangdong

Table 9.3: Per Capita National Income in Counties within Guangdong 1980-1990, (unit: yuan)

Region	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Average growth rate (%)
District of Shenzhen	1430	2488	3600	3599	6132	7049	6025	6921	8706	9973	12597	27
District of Zhuhai	843	911	1006	1127	2237	3103	2560	3118	4737	5558	7282	27.1
District of Foshan	1117	1331	1534	1840	2353	2810	3013	3388	4183	4196	5444	17.4
District of Jiangmen	1277	1420	1744	1848	2080	2234	2343	2714	3300	3317	3703	11.4
District of Guangzhou	1400	1488	1576	1695	1813	2123	2113	2334	2655	2542	2756	7.1
Dongguan	560	608	755	831	929	1158	1443	1756	2232	2278	2732	17.4
Sanshui	425	440	563	653	831	1110	1363	1813	2484	2490	2576	20.4
District of Meizhou	496	510	521	562	680	857	988	1066	1539	1986	2525	18.3
Nanhai	667	783	886	1031	1256	1504	1680	1985	2349	2168	2524	14.4
District of Shaoguan	1207	1337	1400	1501	1643	1757	1939	2068	2264	2195	2315	6.7
Zhongshan	534	751	862	890	902	1064	1297	1574	1865	2071	2292	16
District of Huizhou	356	455	505	494	539	691	806	1270	1706	1903	2258	21.7
District of Zhaoqing	586	666	732	797	910	1098	1261	1537	1741	1964	2201	14.1
Shunde	598	747	787	852	1009	1349	1328	1447	1840	1881	2086	13.8
Panyu	606	666	795	865	981	1260	1265	1220	1402	1681	1929	12.6
District of Shantou	447	488	518	531	692	774	836	865	976	1032	1922	17.6
Gaoming	342	388	496	557	644	696	803	1065	1614	1624	1860	19.1
Heshan	422	464	513	568	625	700	846	1248	1372	1440	1630	14.9
Xinhui	422	459	526	568	627	808	1000	1213	1396	1467	1583	14.3
Huiyang	327	337	347	350	347	377	415	690	800	940	1426	17.5
Doumen	411	558	640	734	782	934	1075	1088	1318	1377	1404	13.4

Huadu	434	502	634	644	771	855	806	789	1297	1363	1319	13.2
Kaiping	382	368	457	410	456	592	647	878	953	1034	1289	13.7
District of Shanwei	219	270	251	256	322	530	551	741	1088	1189	1287	21
District of Zhanjiang	481	463	502	520	596	695	769	974	1175	1191	1265	10.4
Meixian	257	270	293	320	379	482	563	677	979	1101	1256	17.6
Gaoyao	340	385	458	473	642	795	992	1064	1287	1179	1218	14.2
Taishan	355	383	436	469	567	666	779	835	1035	1110	1183	12.9
Sihui	330	356	437	456	531	649	762	887	1098	1117	1179	13.8
Fengkai	385	374	434	399	515	600	663	822	942	1106	1161	12.2
Boluo	301	364	351	335	410	492	543	666	1034	1106	1108	15
Yunfu	252	295	327	361	422	500	573	701	816	928	1097	15.9
Dianbai	258	259	261	274	302	396	482	764	962	1091	1092	16.6
Enping	380	386	448	503	573	607	703	939	1018	1176	1042	11.1
Chaozhou	279	310	345	352	401	510	542	664	830	974	1010	14
Chenghai	231	250	337	310	382	479	532	668	801	906	965	15.9
Huidong	350	391	409	387	441	488	547	630	728	771	918	10.3
Xinxing	320	314	374	380	443	484	577	652	779	815	892	11
Conghua	267	265	324	359	394	431	415	534	628	750	890	13.1
Pingyuan	276	350	347	359	423	465	492	622	918	961	868	13.1
Zengcheng	349	350	425	410	463	440	446	564	661	695	816	9.3
Liannan	269	290	341	315	398	428	483	591	703	812	803	11.1
Jiexi	210	248	244	259	310	321	367	330	481	482	801	16.1
Shixing	400	426	431	455	443	470	486	533	653	679	767	6.8
Deqing	363	369	388	387	585	556	495	555	649	750	761	8.7

Fogang	234	251	296	339	361	450	488	580	647	753	736	12.3
Lianping	224	230	240	246	245	283	315	455	647	681	734	13.5
District of Heyuan	241	319	390	465	454	456	379	458	632	681	724	12.7
Yunan	329	373	407	390	437	475	596	669	730	706	717	8.4
Lechang	381	410	494	532	573	617	649	672	709	741	694	6.3
Guangning	311	314	328	307	355	382	423	568	661	637	693	8.8
Luoding	224	230	256	281	343	372	464	512	587	644	667	11.7
Xinyi	258	263	315	314	327	380	422	492	620	655	662	10.2
Suixi	289	318	353	364	388	415	461	523	619	639	654	8.6
Qujiang	232	261	317	353	404	434	475	555	592	625	646	10.8
Nanxiong	280	296	309	340	377	419	496	597	657	620	644	8.9
Renhua	347	341	333	418	445	518	537	573	631	616	605	5.9
District of Qingyuan	223	238	239	280	305	341	353	399	543	597	593	10.6
Lianjiang	238	281	300	294	350	391	392	483	552	556	577	8
Jieyang	195	244	258	238	291	316	333	427	504	572	575	11.9
Yingde	288	303	324	345	366	390	415	444	474	506	565	7
Yangchun	209	250	292	298	300	347	412	495	564	592	565	11.4
Zijin	156	145	168	192	289	334	320	398	480	541	563	14.6
Jiaoling	248	251	262	276	290	331	356	389	508	536	561	8.7
Lianshan	441	419	467	482	499	517	440	441	495	494	546	2.4
Longmen	325	304	458	396	328	377	368	461	538	567	543	6.9
Ruyuan	461	458	499	490	501	484	460	534	620	541	528	1.7
Xuwen	248	305	353	335	349	397	418	444	388	453	521	8.2
Heping	217	232	228	254	293	313	329	366	438	479	515	9.1

	214	244	208	207	254	272	210	237	281	291	506	11.3
Haifeng	218	225	229	217	258	290	299	383	461	476	500	9
Raoping	165	194	231	234	249	262	263	294	392	421	485	11.7
Dapu	217	213	266	265	267	304	326	396	442	466	484	15.6
Wuchuan	242	268	296	320	349	389	406	427	494	485	475	7.1
Lianxian	192	241	203	184	223	247	272	336	449	476	474	10.4
Chaoyang	301	307	330	325	328	382	405	434	465	447	474	4.8
Xingning	240	249	260	224	222	293	359	367	449	444	455	7.4
Lufeng	239	263	302	308	329	438	482	506	505	442	444	6.9
Wengyuan	315	355	364	299	349	372	399	446	447	459	440	3.4
Yangshan	150	160	167	160	219	248	284	363	433	476	438	12
Huilai	186	210	247	244	285	307	338	371	477	510	430	10.2
Huazhou	156	162	173	176	197	228	250	305	386	422	426	10.8
Puning	197	201	196	197	219	247	294	357	400	419	416	8
Huaiji	221	262	265	297	269	319	329	339	426	424	415	7
Nanao	262	228	259	257	273	301	340	347	400	405	401	4.6
Gaozhou	195	200	204	189	175	283	222	272	343	375	391	9.1
Fengshun	172	179	189	174	171	204	237	289	307	330	367	8.1
Luhe	246	279	287	293	263	280	256	281	300	308	355	4
Longchuan	219	251	269	267	279	313	305	326	341	324	335	4.4
Xinfeng	204	196	211	206	212	228	232	271	290	325	333	5.1
Wuhua	370.1	416.2	473.4	495.1	593.8	692.6	726.9	852.7	1048	1117	1265.6	
Mean	255.6	340.04	444.6	468.5	722.6	849.7	768.2	884.1	1133.1	1260.5	1599.8	
Standard Deviation	0.69	0.817	0.939	0.946	1.22	1.23	1.06	1.04	1.08	1.13	1.26	
coefficient of variation												

Note:

1. The calculation of per capita NI is based on the 1980 constant price;

2. Some necessary readjustment regarding counties' per capita income has been made in order to consistently measure the actual economic growth of various counties within Guangdong.

3. In terms of the annual growth rate, this study calculated the average growth rates in various counties within Guangdong during the 1980s;

4. A few counties were officially established after 1985; in order to make a fair and reliable comparison, the per capita national incomes of areas such as Jiedong, Yangdong, and Yangxi are not included in this Table;

5. Due to the missing comparable annual growth rate between 1980 and 1983, the per capita NI in District of Maoming was excluded from this Table;

6. The equivalent figures in Shenzhen District were included in the calculation of per capita national income coefficient of variation;

7. In terms of relative annual growth rates, this study calculated the average growth rate of per capita NI in the counties of Guangdong between 1980 and 1990.

Source:

GSB (1991, various pages)

9.2.2.2 Inter-County Economic Inequality 1991 – 2005

The figures presented in Table 9.4 below demonstrate the average per capita GDP in counties within Guangdong during the period between 1991 and 2005. In terms of the 2005 average per capita GDP, the figures show that Districts of Foshan, Shenzhen, Dongguan, Huizhou and Shunde were the five richest counties in Guangdong, with average per capita GDP of 55706, 54901, 52054, 51197 and 50451 *yuan* respectively. The average growth rates of per capita GDP in these five most developed counties were nearly 15 percent between 1991 and 2005. In addition, Chaoan, Luoding, Xinyi, Fengkai and District of Qingyuan ranked in the middle levels in terms of per capita GDP; the equivalent figures were 8641, 8599, 8409, 8356 and 8340 *yuan* respectively in 2005. The average growth rate of per capita GDP was about 13 percent in these five middle-level regions from 1991 to 2005.

By contrast, however, Lufeng, Xinning, Fengshun, Liannan and Wuhua were probably the poorest counties in Guangdong in terms of the per capita GDP; the relative per capita GDP were only 2970, 2806, 2686, 2637 and 1790 *yuan* in 2005. The growth rate in these five regions was much lower than the rich and middle level counties within Guangdong, at about 8 percent over the last 15 years. Moreover, in 1991, the data shown in Table 9.4 demonstrates that the average per capita GDP in the richest and poorest county District of Shenzhen and Longchuan, were 12274 and 664 *yuan* respectively; the Shenzhen figure was about 18 times that of Longchuan; in 1998, the average per capita GDP in the rich region Shenzhen District and the poor region Wuhua County were 29905 and 1207 *yuan* respectively. The income gap reached nearly 25 times. More significantly, in 2005, the average per capita GDP in Fonshan District jumped to 55706 *yuan*, while the equivalent figure in Wuhua was only 1790 *yuan*; it suggests that the gap arrived at a new peak (about 31 times) between the rich and poor regions within Guangdong.

Table 9.4: Per Capita GDP in Counties within Guangdong 1991-2005, (unit: yuan)

Region Name	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Average growth rate (%)
District of Foshan	12130	15671	16893	18649	22826	24674	26623	27767	28822	30176	31292	35297	40626	47288	55706	11.7
District of Shenzhen	12274	14421	17117	19325	22011	24784	27411	29905	33045	36052	37926	40391	43420	49194	54901	11.3
Dongguan	5636	5934	7197	8514	10489	12009	13978	16549	19279	22440	26209	30664	36060	43596	52054	17.2
District of Huizhou	6159	8240	11272	13379	16028	19634	22127	24715	27606	30891	32311	34023	39568	45067	51197	16.6
Shunde	5030	6715	8957	10649	12853	15834	18367	20626	22544	25226	29211	32248	36794	42828	50451	18.1
Panyu	4333	6672	10308	11988	13726	16100	17710	20366	22422	25247	27872	30714	35075	40827	46624	20.1
District of Guangzhou	8836	10134	11593	13100	14986	16499	18165	20054	22400	25222	27845	30685	35042	40788	46579	12.6
Nanhai	5531	7599	9703	10508	12620	14500	16660	18992	20891	23230	26807	29809	33326	38791	45696	16.5
Zhongshan	4546	5700	7324	9301	10593	11832	13322	14893	16322	18003	20577	23704	27591	33357	40963	17.1
Zengcheng	1965	2910	5678	8238	11297	12562	15564	17462	19225	19859	21924	24160	27590	31618	36740	20.6
District of Zhuhai	8911	12190	11958	12615	14128	15371	15939	16449	17732	19948	20985	24405	27797	30882	34186	10.8
Gaoming	2715	4048	5254	6683	8126	9791	11729	13136	14935	17025	18795	20599	24018	28061	33056	19.8
District of Zhaoqing	4572	5943	7523	8937	10500	12190	13640	15222	17185	19023	20221	22425	25228	28356	32269	15.1
District of Jiangmen	8372	9460	10765	11303	12840	13469	14371	15463	17055	18630	20213	21769	24054	27301	31314	9.9
Sanshui	4874	6711	8965	9700	10505	10599	11584	12047	13504	15070	16637	19348	22791	26528	31250	14.6
Huadu	2484	4324	6274	8055	8876	9683	11338	12675	14221	16012	17677	19480	22246	25894	29571	20.4
District of Shaoguan	6710	7279	9108	10431	12014	12906	13757	14912	16343	17764	19842	21766	25292	26506	27937	11.2
Huiyang	3225	4273	6238	7392	9358	10284	11991	13549	15052	16331	18094	19957	21054	23980	27241	16.9
Doumen	4500	5130	6735	7112	7261	7769	8475	9263	9661	11303	11777	14685	20250	22497	24905	13.4
District of Maoming	4610	4771	5419	6540	8011	8155	8856	9272	9540	12087	13017	14318	15935	18325	21733	12.1
Xinhui	2964	3832	4862	6412	7514	8212	8639	9278	10205	11347	12606	14118	16066	18234	20915	15.2
District of Yangjiang	2393	3209	4169	6725	7620	8061	9141	10320	11269	11978	13415	14997	16781	17771	20667	17.4
Heshan	2818	3866	5393	6870	8202	9071	9479	10294	11210	12431	13388	14686	16683	18217	20185	15.5

	1925	2604	3656	4723	6394	7564	8691	9838	10811	11773	13009	14101	15666	17436	19406	18.4
Gaoyao	1925	2604	3656	4723	6394	7564	8691	9838	10811	11773	13009	14101	15666	17436	19406	18.4
Sihui	2677	3177	4088	5253	6361	6704	7535	8393	9299	10321	11611	12946	14564	16267	18983	14.4
Kaiping	2719	3458	5328	6334	7854	8710	9537	10223	11224	12234	12968	14251	15376	16652	17751	14.9
District of Yunfu	2845	3854	5669	6791	7116	7265	7272	7650	7772	8424	10347	12158	13726	15812	17614	13.2
Huidong	2464	3080	4022	5228	6273	6919	7873	9093	10138	11232	12231	13050	14381	15819	17559	15.3
District of Zhanjiang	3744	4253	4869	5745	6882	7618	8638	9087	9377	10342	10941	11684	13261	14878	16470	11.2
District of Chaozhou	n.a	4560	4851	5957	6951	7673	8586	9272	9902	10614	10987	11778	12908	14185	15547	10
District of Shantou	4305	5148	6522	7604	8866	9628	10494	11155	11277	11209	11511	12213	12762	14012	15469	9.8
District of Meizhou	3099	3430	3419	3757	5044	5246	5329	5568	6425	6427	7230	8762	10742	14297	15312	10.4
District of Jieyang	1367	2231	2862	3940	5460	6519	7614	8740	9710	10409	10991	11815	12972	13828	15183	16.4
Boluo	1785	2106	2883	3664	4627	5566	6517	7416	8165	8867	9771	10718	11875	13513	15121	16.7
Deqing	1563	2049	2567	3370	4637	5522	6239	7056	7923	8691	9586	10640	11576	12884	14816	17.7
Conghua	2143	2511	2900	3741	4474	4836	5667	6857	8269	9178	10132	11165	12750	13336	14403	14.7
District of Heyuan	2453	3037	3584	4071	4674	4962	5100	5074	5063	5331	5960	7140	9132	10821	13526	13.2
Enping	2632	3392	4311	5022	6136	7657	6983	6996	7422	7852	8566	9242	10009	10919	12252	12
Taishan	2254	2474	3134	3867	4624	5317	6098	6719	7431	8270	8848	9821	10066	10921	12188	13
District of Shanwei	1668	1923	2536	3784	3996	4371	4681	5238	5709	6102	6535	7057	7903	9878	11982	13.3
Dianbai	1382	1619	2514	3966	4946	5430	6135	6766	7138	7416	7734	8406	9255	10087	11278	17.2
Chenghai	1583	1788	2045	2325	2969	3634	4386	5293	5949	6549	7282	7908	8675	9525	10515	14.6
Puning	977	1869	2503	3447	4541	5444	6516	7584	7758	7726	8004	8484	9154	9144	9940	14.7
Jiedong	n.a	1357	1742	2745	3521	4098	4893	5622	6172	6604	7039	7588	8331	8539	9487	16.8
Xinxing	2162	2544	2951	3325	3388	3787	4226	4673	5056	5435	5842	6274	7102	7982	9100	11.3
Huazhou	1550	1872	2471	2967	3521	3792	4258	4696	5057	5613	6146	6705	7368	8031	8858	13.4
Gaozhou	1382	1683	2334	2807	3230	3850	4431	4976	5473	5817	6264	6834	7544	7921	8776	14.4
Chaoan	2040	2031	2412	2969	3022	3547	4001	4493	4919	5238	5725	6137	6726	7613	8641	11.9
Luoding	1650	2280	2961	3707	4181	4565	4692	5100	5370	5659	5902	6238	6992	7719	8599	13.6
Xinyi	882	1033	1594	2032	2621	3132	3733	4177	4720	5116	5627	6172	6801	7549	8409	18

Fengkai	1929	2372	2988	3367	3686	4128	4507	4984	5352	5512	5815	6251	6876	7659	8356	11.2
District of Qingyuan	1624	1870	2632	2810	3405	3217	3429	3456	3583	3855	4063	4318	5224	6242	8340	13
Longmen	1359	1598	2473	4072	4362	4449	4506	4830	5187	5467	5669	5958	6559	7339	8308	12.8
Meixian	1680	2027	2470	2781	3187	3626	3843	4192	4548	4880	5577	6045	6764	7521	7972	11.8
Renhua	1976	2157	2446	2849	3190	3486	3799	4194	4550	4932	5287	5683	6279	6888	7824	10.3
Haifeng	1380	1551	2014	2590	2900	3274	3313	3770	4211	4585	4997	5476	6105	6758	7805	13.4
Nanao	1775	2316	2790	3373	4148	4392	4493	4861	5235	5575	5931	6304	6808	7141	7591	11.2
Yangdong	1123	1443	1685	2082	2456	2699	2979	3422	3918	4345	4709	5250	5817	6474	7341	14.5
Yangxi	1290	1551	1774	2300	2737	2879	3115	3429	3737	4021	4427	4918	5503	6256	6976	12.9
Guangning	1403	1802	2585	2964	3020	3485	3826	4273	4508	4458	4656	5093	5373	5937	6590	12.1
Yunan	1540	1869	2336	2616	2958	3315	3510	3839	4030	4223	4396	4668	5200	5657	6415	10.9
Chaoyang	1001	1360	1707	2758	3676	4447	5296	6318	6829	6733	5184	5194	5214	5724	6320	10.9
Pingyuan	1099	1340	2014	2348	3168	3320	3462	3714	3951	4184	4476	4780	5191	5715	6121	9.9
Jiaoling	1642	1963	2241	2648	2870	3148	3273	3547	3820	3961	4293	4687	5183	5670	6033	9.8
Jiexi	991	1132	1521	1828	2394	2810	3164	3518	3764	3993	4260	4558	5022	5288	5838	12.7
Lianping	863	1001	1188	1416	1717	1935	2174	2428	2699	2982	3289	3677	4268	4711	5805	14.6
Raoping	1295	1484	1826	2183	2377	2731	3025	3360	3659	3896	4116	4412	4835	5178	5608	11.1
Luhe	848	974	1132	1291	1465	1995	2232	2622	2839	3000	3324	3716	4154	4864	5603	14.6
Shixing	1632	1692	1917	2150	2429	2628	2859	3139	3311	3549	3861	4169	4698	5200	5595	9.2
Leizhou	1559	1700	2539	2859	3053	3306	3530	3844	3882	3944	4129	4442	4806	5103	5568	7.1
Yangchun	1290	1687	2071	2224	2435	2651	2701	2819	3067	3220	3534	3912	4350	4967	5434	11
Ruyuan	1230	1431	1628	1872	2046	2213	2416	2667	2944	3250	3614	3964	4598	5535	5392	11.2
Nanxiong	1629	1694	2283	2408	2545	2611	2749	2979	3247	3500	3759	4048	4501	4906	5352	9.1
Qujiang	1470	1641	1846	2228	2526	2854	3247	3571	3810	3943	4100	4374	4842	5074	5348	9.7
Huaiji	1070	1236	1525	1855	2333	2829	3219	3611	3769	3644	3742	4048	4262	4632	5165	12.2
Xuwen	1564	1814	2006	1977	2338	2359	2573	2897	3076	3128	3296	3592	3933	4475	4891	8.6
Fogang	1051	1196	1394	1664	1803	1923	1946	1994	2139	2314	2554	2834	3205	3730	4745	11.5

Lianzhou	1186	1336	1584	1743	1964	2138	2234	2372	2542	2719	2920	3168	3456	3798	4667	9.8
Dongyuan	1114	1193	1302	1519	1512	1564	1660	1830	2069	2337	2689	3052	3503	3912	4554	10.7
Suixi	1946	2004	2322	2475	3064	3051	3078	3256	3295	3298	3403	3617	3870	4117	4528	6.4
Qingxin	1195	1434	1687	1705	1885	1999	2106	2194	2336	2490	2557	2825	3059	3631	4433	10
Longchuan	664	853	1003	1176	1327	1479	1603	1784	2033	2256	2538	2774	3245	3670	4279	14.3
Xinfeng	1017	1226	1488	1763	2009	2143	2308	2492	2696	2900	3158	3379	3706	3995	4242	10.8
Lianjiang	1560	1767	1994	2053	2206	2382	2555	2741	2894	2966	3111	3319	3630	3880	4237	7.4
Yingde·	1387	1703	1835	1956	2398	2484	2548	2634	2739	2706	2719	2751	2993	3450	4210	8.5
Wuchuan	1248	1433	1860	2140	2401	2741	2921	3157	2844	2761	2901	3156	3427	3708	4160	9.3
Lechang	1415	1546	1818	1990	2079	2158	2261	2421	2583	2727	2874	3095	3426	3905	4108	7.9
Lianshan	1541	1827	1828	1807	2096	2366	2408	2463	2591	2697	2829	3046	3228	3502	3883	7.6
Huilai	1183	1307	1435	1832	2147	2346	2575	2739	2903	2984	3004	3082	3319	3392	3727	8.7
Dapu	1010	1275	1628	1890	2027	2128	2198	2356	2480	2564	2730	2874	3124	3336	3546	9.6
Heping	700	783	870	918	1031	1100	1411	1587	1786	1994	2193	2440	2774	3106	3454	12.2
Yangshan	1094	1310	1417	1496	1820	1918	1908	1961	2070	2163	2271	2445	2687	2953	3393	8.6
Zijin	923	1028	1098	1172	1276	1401	1482	1639	1797	1922	2125	2292	2564	2799	3158	9.2
Wengyuan	1127	1203	1436	1497	1571	1635	1821	1963	2143	2239	2270	2428	2690	2872	2984	7.3
Lufeng	863	932	1006	1114	1364	1471	1593	1741	1883	1975	2032	2225	2434	2740	2970	9.3
Xingning	864	985	1256	1415	1518	1606	1703	1830	1959	2082	2244	2401	2573	2783	2806	8.9
Fengshun	762	944	1108	1277	1407	1461	1469	1577	1676	1751	1864	2003	2195	2482	2686	9.6
Liannan	1123	1348	1481	1595	1587	1617	1602	1605	1694	1763	1889	2006	2162	2313	2637	6.4
Wuhua	667	791	958	1075	1118	1167	1170	1207	1279	1310	1395	1487	1597	1697	1790	7.4
Mean	2481.8	3055.7	3806.8	4512	5290.1	5882.9	6492.8	7139.3	7777.3	8459	9173.7	10099	11375	12850	14607	
Standard Deviation	2253.5	2795.05	3299.1	3733	4397.7	4926.3	5501.1	6051.5	6669.3	7405.8	8101.1	8974.4	10253	11891	13797	
coefficient of variation	0.908	0.91	0.86	0.827	0.831	0.837	0.847	0.848	0.858	0.875	0.883	0.89	0.901	0.925	0.945	

Note:

1. The per capita GDP figures are based on the 1991 constant price calculation;

251

2. The figures of 2005 per capita GDP have been re-evaluated according to Regional Retail Price Survey of Guangdong 2006;

3. Due to the quality of Chinese statistics, a few figures of per capita GDP in some counties were inconsistently announced by the government in the various statistical yearbooks; these limited figures have been readjusted in order to objectively reflect the actual economic growth of various regions within Guangdong and make fair income comparison, consistent with their relevant annual growth rate between 1991 and 2005; regions affected include Yangxi, Yangdong, District of Shenzhen, Xingning, and Wuhua.

4. In terms of the relative annual growth rate, this study calculated the average growth rate of per capita GDP in all counties in Guangdong between 1991 and 2005.

Source:

1. Guangzhou Statistical Bureau (1992-2006, various pages)

2. Shenzhen Statistical Bureau (1992-2005, various pages)

3. GSB (1992-2006, various pages)

In general, based on the two separate periods of inequality analysis, the findings of this study illustrate that the income gap between various regions within Guangdong was enormous; regional development within Guangdong has been quite unbalanced since 1980. The average growth rates of both the poor and middle level regions are significantly lower than the rich regions in Guangdong. Moreover, statistical data suggest that this unequal regional development has been getting much worse since the implementation of 'reform and open-door' policy by the Chinese government in the late 1970s. To some extent, relative to the pre-reform period, although all regions within Guangdong have achieved some economic development since the early 1980s, the pace of that development has not been uniform, and the economic benefits of rapid development in Guangdong during the reform period have not been shared equally by all regions. The data presentation of this study shows that considerable income variations were found even within such a developed and rich province: as exemplified by the developed PRDA and the under-developed peripheral and hill regions.

In order to clearly demonstrate the real extent of spatial income inequality within Guangdong and provide vivid presentation, the Geographic Information Systems[52] (GIS) have been adopted in this study. The four digital maps below show the distribution of per capita income in the different counties within Guangdong in the selected year during the reform period. This study has decided to draw three income per capita levels to analyze the regional income distribution within Guangdong, the so called 'benchmark income'. The first level of benchmark income is the income lower than the average per capita NI or GDP among the counties within Guangdong in the selected year. Within this level it is suggested that regions are economically poor and underdeveloped, and have generally low income per capita: it is referred to as 'the poor club'. The second level of benchmark income is the income higher than the county's average per capita NI or GDP, which was ranked in the twentieth income position in Guangdong; any region within this income level could be regarded as a rich county with high income per capita, regarded as 'the rich club'. The third level of benchmark income is the county within the income level between the provincial average and the top twenty counties' average per capita income; which indicates the middle-developed level region with moderate income per capita. Defining these three levels of benchmark income, I believe, can reflect the general regional economic development and real extent of spatial economic disparities within Guangdong.

In order to enhance the map reading quality, the demonstration of regional income inequalities within Guangdong presented in the following maps follows this order: from high-income regions (the rich club) to low-income regions (the poor club), and the maps use a format of slow colour change: from dark-coloured areas (the rich regions) to light-coloured areas (the poor regions).

Map 9.2 shows that regional economic development was relatively even and the regional income distribution within Guangdong was still quite equal in the early 'reform and open door' period. In 1980, there were numerous rich counties with high income per capita in the peripheral and hill regions, such as Ruyuan, Districts of Meizhou, Shantou, Maoming, Yangjiang and Zhanjiang. As far as Western Guangdong is concerned, the Districts of Maoming, Yangjiang and Zhangjiang. In terms of Northern Guangdong, the Districts of Meixian and Shantou were also included. More significantly, in terms of Mountainous

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Guangdong, there are two rich regions (Ruyuan and Lianshan) with quite high income per capita. In addition, there are some counties within the hill region which had achieved the middle developmental level. However, most of the rich counties were located within the PRDA.

Map 9.3 suggests that the regional income distribution of per capita NI within Guangdong had become unequal by 1990. There were only a few counties outside the PRDA which were the rich regions with high income per capita, such as Qujiang and the Districts of Meizhou, Shantou, and Maoming. The uneven regional economic development within Guangdong had been continually getting worse until the year 2000; as shown in Map 9.4, there was only one county located in the hill region that had high per capita GDP: the District of Shaoguan. Many regions traditionally within the 'rich club' had fallen into the middle income level like the Districts of Zhanjiang and Shantou. The majority of rich counties were within the PRDA; the middle ranking counties were also either located within or adjunct to the PRDA.

In 2005, there were only two regions outside the PRDA which occupied the 'rich club'; one in the coastal area of Western Guangdong (District of Maoming), another in Mountainous Guangdong (District of Shaoguan). It is clear that almost all of the counties within the PRDA were within the 'rich club,' with relatively high GDP per capita (see Map 9.5 below). Map 9.5 illustrates that the spatial income distribution between the rich and poor regions had become extremely unequal by 2005. It suggests that the economic growth in PRDA was much faster than in the other regions in Guangdong; not only the Hills region but also Western and Northern Guangdong. The majority of wealth was concentrated in the PRDA and a significant amount of the total GDP was produced in this area. It is certainly the case that economic and social development in the peripheral region has not developed as quickly as in the PRDA. The GIS analysis demonstrates that the unbalanced regional development in this province has indeed intensified; and the spatial economic disparities between the rich and poor regions have steadily getting larger during the reform period.

Map 9.2: Distribution of Per Capita National Income in Counties within Guangdong, 1980 (unit: yuan)

422 - 1430 yuan
371 - 421 yuan
0 - 370 yuan
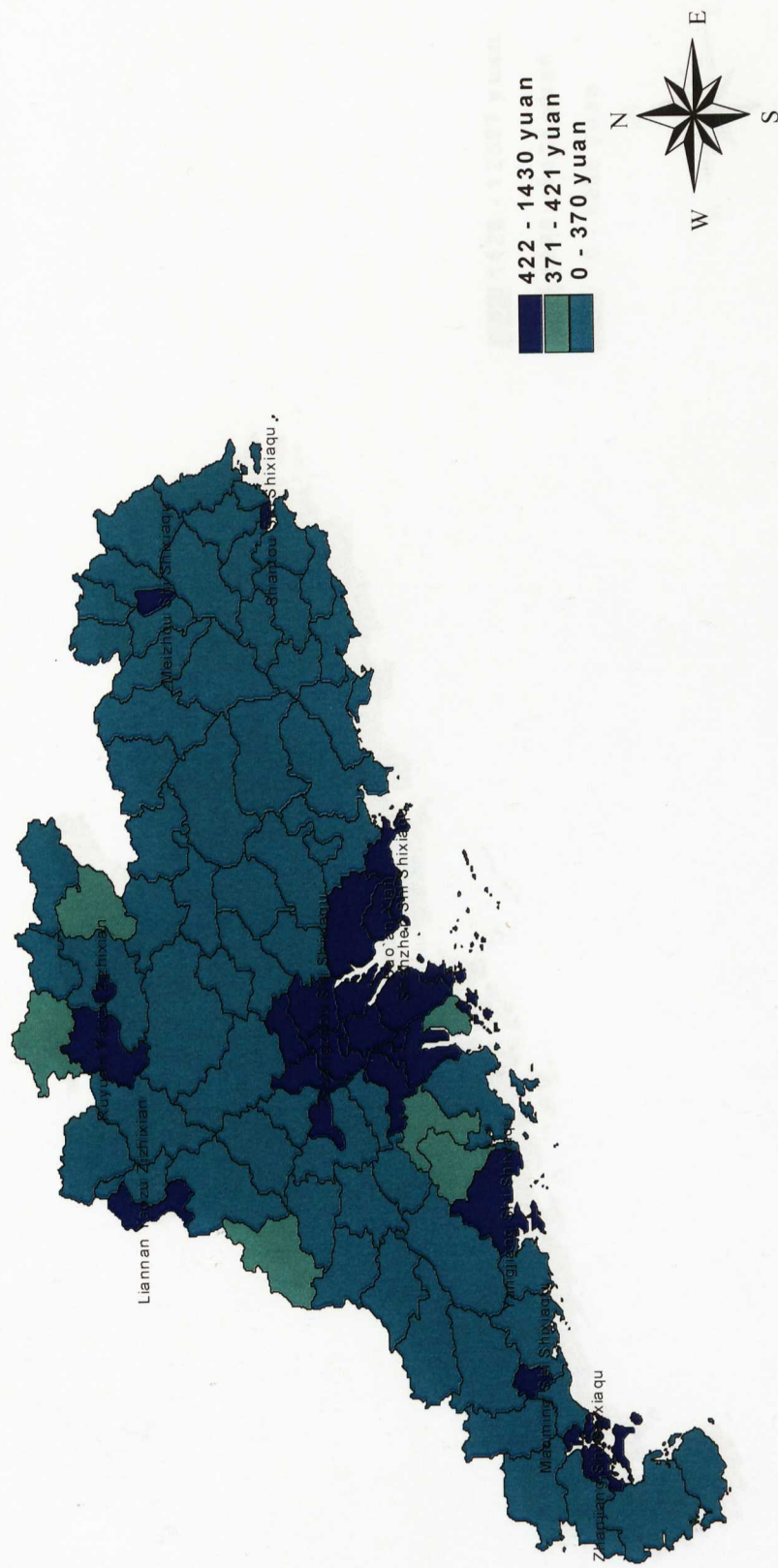
Map 9.3: Distribution of Per Capita National Income in Counties within Guangdong, 1990 (unit: yuan)

1426 - 12597 yuan

1266 - 1425 yuan

0 - 1265 yuan
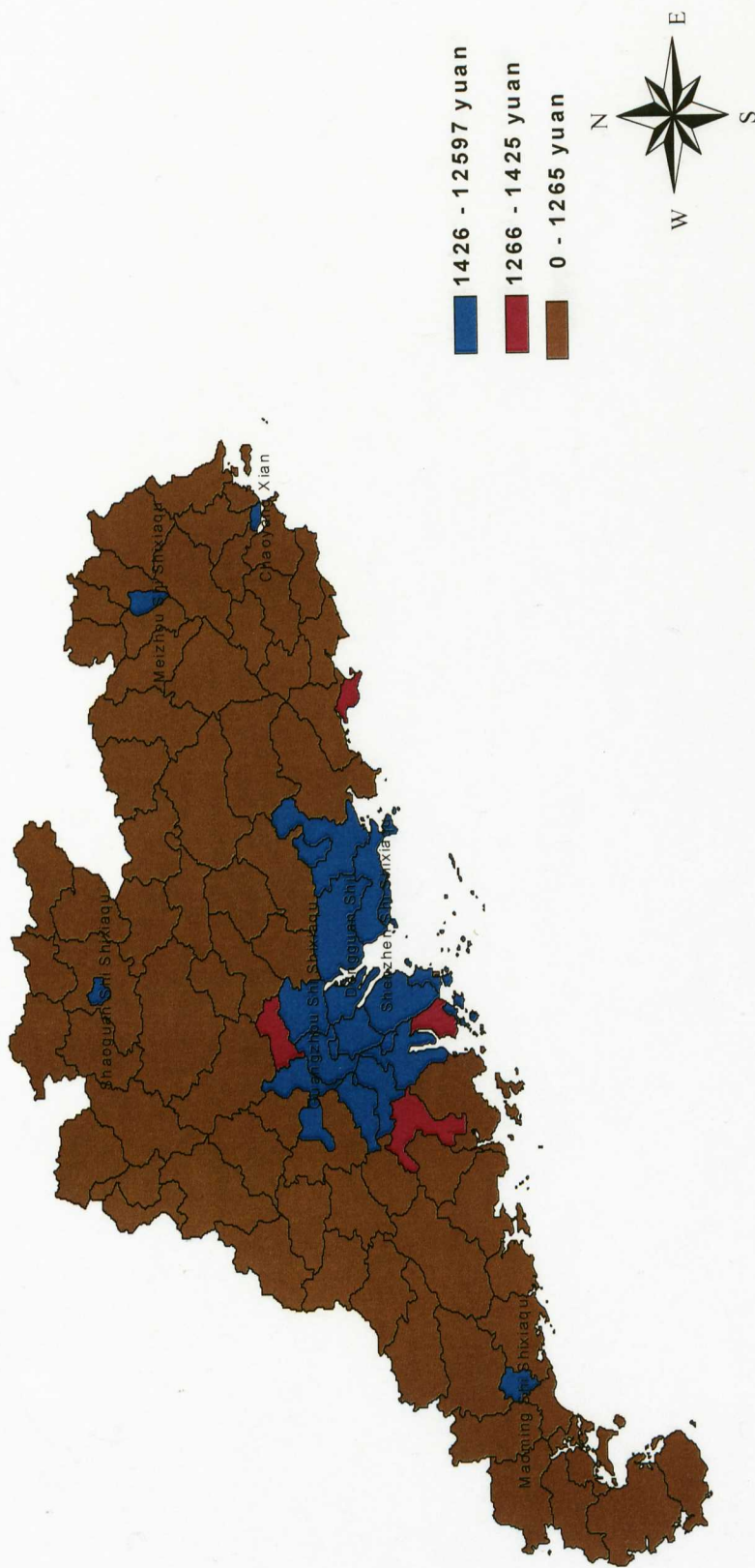
Map 9.4: Distribution of Per Capita GDP in Counties within Guangdong, 2000 (unit: yuan)

12234 - 36052 yuan

8460 - 12233 yuan

0 - 8459 yuan
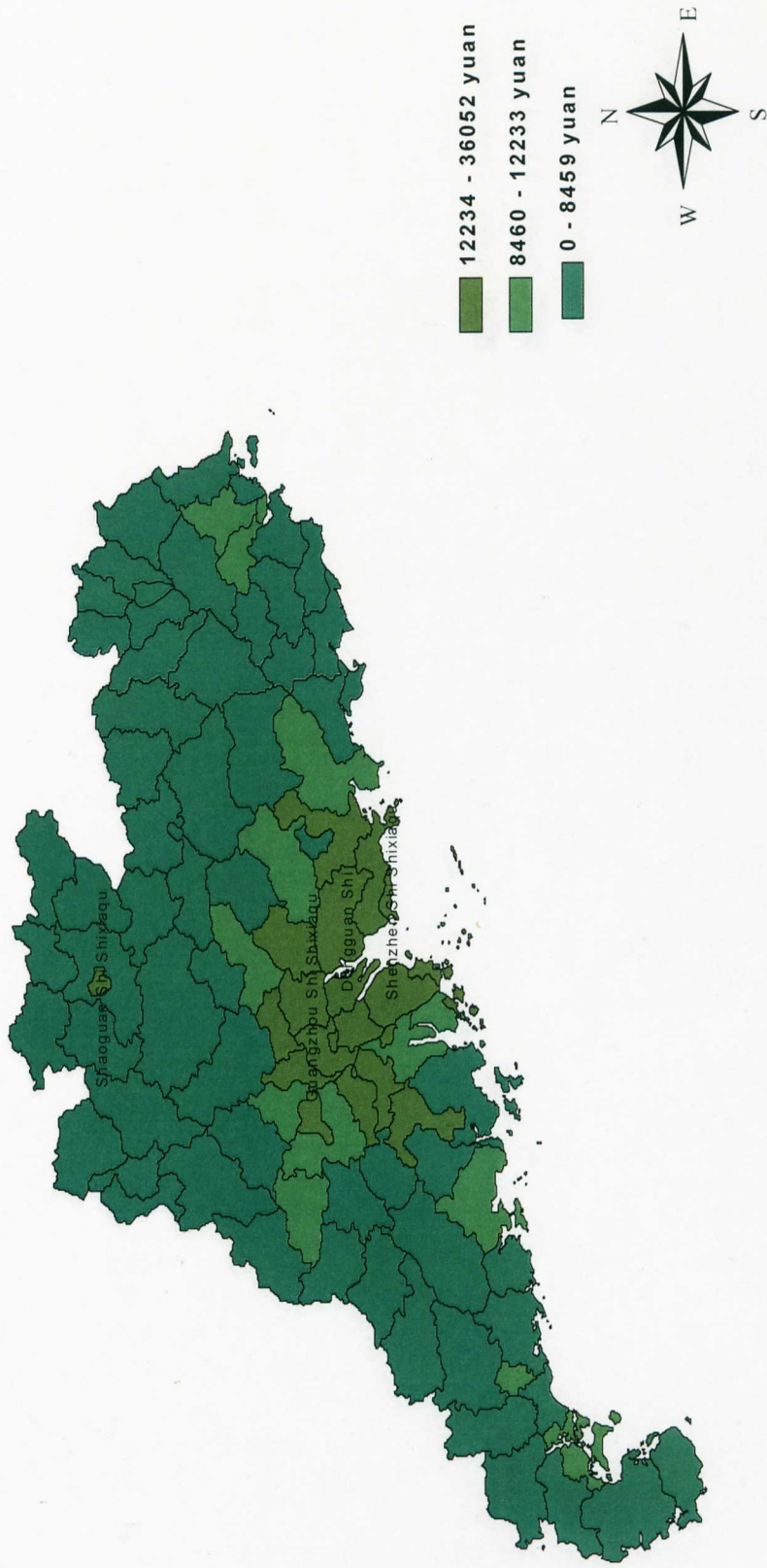
Map 9.5: Distribution of Per Capita GDP in Counties within Guangdong, 2005 (unit: yuan)

21733 - 55706 yuan

14608 - 21732 yuan

0 - 14607 yuan
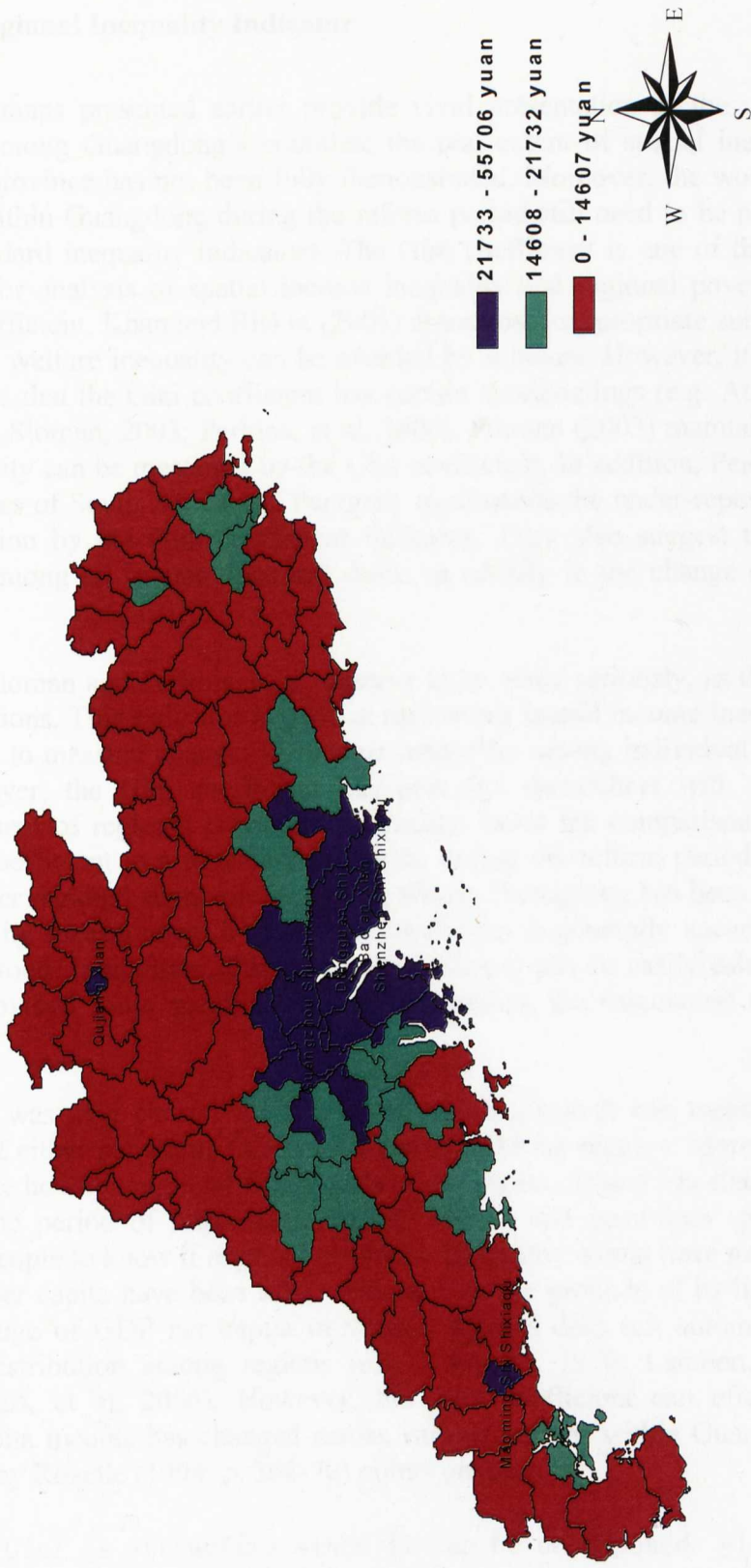
9.3 Measurement of Regional Income Inequality within Guangdong

9.3.1 Overview of Regional Inequality Indicator

Although the digital maps presented earlier provide vivid presentation of the unequal income distribution among Guangdong's counties; the real extent of spatial inequality within this southern province has not been fully demonstrated. Moreover, the worsening regional disparities within Guangdong during the reform period still need to be properly measured by the standard inequality indicators. The Gini coefficient is one of the most attractive indicators for analysis of spatial income inequality and regional poverty. By adopting the Gini coefficient, Khan and Riskin (2001) argue that inappropriate subjective judgements of human welfare inequality can be avoided by scholars. However, it is also important to recognize that the Gini coefficient has certain shortcomings (e.g. Atkinson, 1970; Lambert, 1985; Sloman, 2003; Perkins, et al, 2006). Sloman (2003) maintains that not all kinds of disparity can be measured by the Gini coefficient. In addition, Perkins, et al, (2006) cite the cases of South Africa and Paraguay to illustrate the under-reporting of true income distribution by the Gini coefficient indicator. They also suggest that the income distribution among all groups does not show up equally in the change of Gini coefficient.

These criticisms by Sloman and Perkins, et al, deserve to be taken seriously, as the Gini coefficient has limitations. This indicator is good at measuring spatial income inequality, but it lacks the power to measure changes in income inequality among individual groups of population. However, the Gini coefficient has provided researchers with a good benchmark measurement of regional economic inequality. From the comparison of per capita income Gini coefficient in a time-series analysis during the reform period, it can clearly be seen whether regional economic inequality within Guangdong has been getting larger or not. Inequality measurement by the Gini coefficient is generally accurate and can be clearly understood. In addition, this inequality indicator can be easily calculated. Fields (2001) has provided some specific discussion regarding the calculation of Gini coefficients.

The Gini coefficient was also chosen for this study also because it can measure the income distribution of either per capita GDP or NI across different regions. Moreover, it can be used to indicate how the regional distribution of per capita income has changed in Guangdong during the period of implementation of 'reform and open-door' policies. Therefore, it allows people to know if regional economic inequality would have narrowed or intensified. GDP per capita have been often criticized on the grounds of its inherited insensitivity; the change of GDP per capita in various regions does not automatically reveal the income distribution among regions (e.g. Atkinson, 1970; Lambert, 1985; Sloman, 2003; Perkins, et al, 2006). However, the Gini coefficient can effectively illustrate how per capita income has changed across various regions within Guangdong. The study conducted by Rozelle (1994, p. 368-70) points out that,

Analytically, the Gini is attractive since it can be decomposed, yielding an intuitive interpretation of the elements making up the contribution of each income source to inequality, and, by carefully choosing the decomposition procedure, one can examine the effect of a marginal change in

income source on overall inequality.

However, it is important to note the following point. Ray's study (1998) suggests that the results of Gini coefficient and CV might contradict each other when both curves of Lorenz's analysis cross. Ray (1998, p. 190) further states that,

In such situations, we should probably not rely entirely on one particular measure of inequality, but rely on a whole set of measures. It may be a good idea to simply study the two Lorenz curves as well.

Therefore, considering the limitations of Gini coefficient, I also decided at the same time to measure the real regional income inequality within Guangdong by adopting the CV. In order to produce unambiguous trends of regional income inequality and analyze the unbalanced economic development within Guangdong since 1980; this study has used the two most widely used indicators for inequality analysis: the Gini coefficient and coefficient of variation (CV). Based on the statistical data presentation of per capita income shown in Tables 9.3 and 9.4, I calculated the per capita NI and GDP's CV and Gini coefficient for the counties within Guangdong during the two separate sub-periods of 1980-1990 and 1991-2005. The standard deviation (SD) and mean which are used for the calculation of CV have been population-weighted. By employing these two inequality indicators, the reliability and quality of the analysis of regional economic inequality can be guaranteed. If both the Gini coefficient and CV for per capita income had been increasing from 1980 to 2005, it is justified to argue that the regional economic disparities within Guangdong have intensified during the reform period. The previous section has emphasized inter-regional economic inequality; the following section concentrates on measuring the inter-county level inequality in Guangdong.

9.3.2 Measurement of Inter-county Inequality within Guangdong 1980 – 1990

According to the figures presented in Table 9.5 below, per capita NI Gini coefficients steadily increased from 1980 to 1990; the Gini coefficient was 0.44 in 1990, up by 50 percent from 0.292 in 1980. In particular, between 1982 and 1985, the Gini coefficient dramatically increased to 0.401 in 1985, up by 19 percent from 0.337 in 1982; successful agricultural and economic reform, and the emergence of TVEs within the PRDA might be the main causes contributing to the widening spatial income inequaltiy within Guangdong during this period. The per capita NI Gini coeffecnt displayed a slightly downward trend between 1985 and 1986, decreasing to 0.391 in 1986 from 0.401 in 1985. After 1986, the growth rate of Gini coefficient started to increase again, at 0.44 in 1990, it was up by 12.5 percent from 0.391 in 1986. The relatively fast increase of Gini coefficient between 1986 and 1990 is probably due to the more state-oriented preferential policies offered to the PRDA[53]; which might have signifcantly stimulated economic development in this region.

The general changing trend of per capita NI CV was consistent with the Gini coefficient (see Table 9.6). The CV increased significantly from 1980 to 1985, which at 1.23 in 1985, was up by 78 percent from 0.69 in 1980; in particular, the CV rose about 29 percent between 1983 and 1984. The rural economic reform and the emergence of TVEs within the PRDA had probably caused the sharp increase of CV during 1983 and 1985. However,

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[53] In 1985, the PRDA was declared a "Coastal Economic Development Zone" by the State Council of China.

the CV value of per capita NI displayed a short-term downward trend between 1985 and 1987, decreasing to 1.04 in 1987 from 1.23 in 1985. The declining CV might be because rural economic reform had spread to the periphery in Guangdong and more TVEs developed in this region, which might have helped to narrow the gap of regional economic inequality. After 1987, the CV rose again until 1990: when it reached 1.26.

The figures presented in Tables 9.5 and 9.6 illustrate that both the Gini coefficient and CV had increased significantly with the rising of overall per capita NI in Guangdong between 1980 and 1990, and both had shown similar increases in trends during the same period (see Fig 9.5 below). In addition, the figures presented in Table 9.5 demonstrate that the per capita NI share by the bottom ten percent of counties had decreased year by year since 1980; for example, in 1980, the figure was 4.7 percent, while this figure was down by 56 percent to 3 percent in 1990; meanwhile, the per capita NI share by the top ten percent counties had increased dramatically during the same time from 27.6 percent in 1980 to 37.1 percent in 1990.

Table 9.5: Gini Coefficient for Per Capita National Income in Guangdong's Counties, 1980-1990 (Shenzhen included)

Year	Gini coefficient	Bottom ten percent National Income share (%)	Top ten percent National Income share (%)
1980	0.292	4.7	27.6
1981	0.315	4.4	30.1
1982	0.337	4	31.5
1983	0.351	3.8	32.3
1984	0.391	3.5	36.5
1985	0.401	3.6	37.2
1986	0.391	3.4	34.4
1987	0.392	3.4	34.1
1988	0.407	3.2	34.9
1989	0.41	3.2	34.6
1990	0.44	3	37.1

Table 9.6: CV for Per Capita National Income in Guangdong's Counties, 1980-1990 (Shenzhen included)

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Mean	370.1	416.2	473.4	495.1	593.8	692.6	726.9	852.7	1048	1117	1265.6
Standard Deviation	255.6	340.04	444.6	468.5	722.6	849.7	768.2	884.1	1133.1	1260.5	1599.8
Coefficient of Variation	0.69	0.817	0.939	0.946	1.22	1.23	1.06	1.04	1.08	1.13	1.26
Gini Coefficient	0.292	0.315	0.337	0.351	0.391	0.401	0.391	0.392	0.407	0.41	0.44

Fig 9.5: Gini coefficient and CV for Per Capita National Income in Guangdong's Counties, 1980-1990 (Shenzhen included)

coefficient of variation — Gini coefficient — trend. (coefficient of variation) — trend. (Gini coefficient)
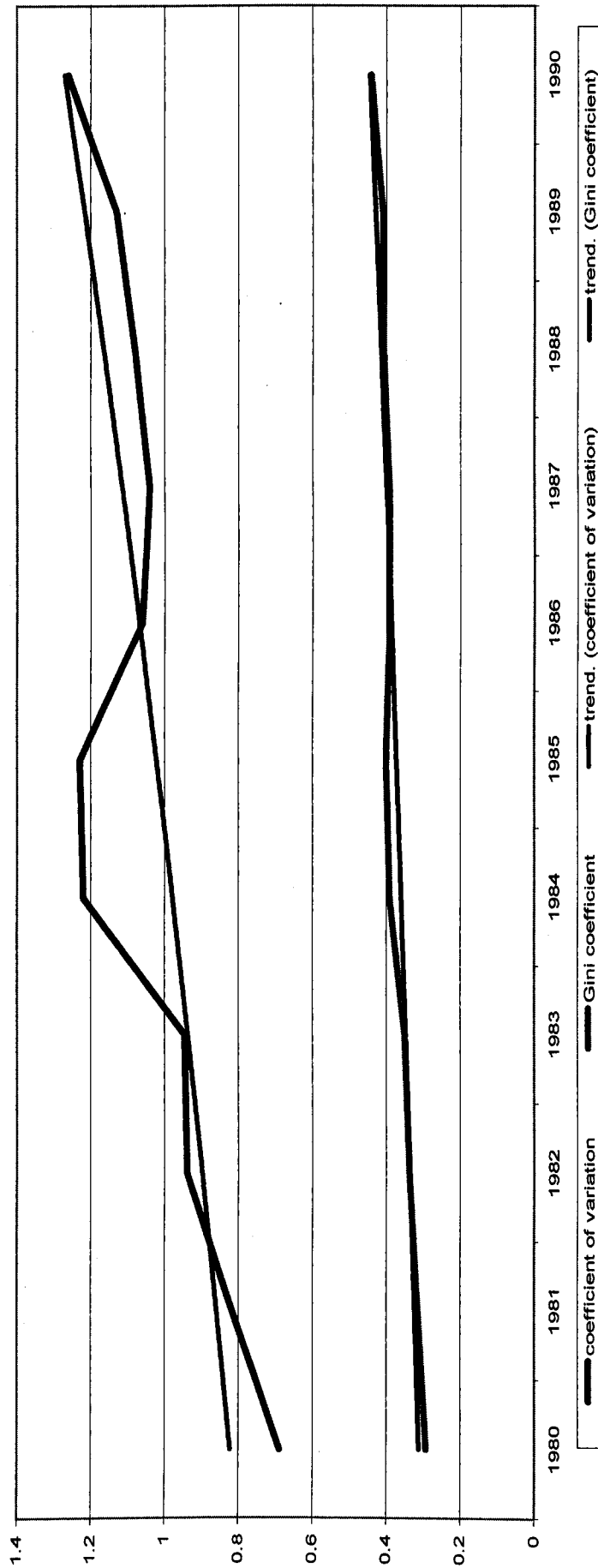
Significantly, in the figures presented in Table 9.3 earlier, the per capita national income in Shenzhen District demonstrated an unusual increasing trend during the period between 1980 and 1990. The per capita NI of Shenzhen had been much higher than other counties within Guangdong during this period. The per capita national income in Shenzhen District had been more than twice as high as the equivalent figures in Zhuhai District, another Special Economic Zone in Guangdong, during the same period. In some years, the figures were even three times higher than Zhuhai District, for example, 1982, 1983 and 1984. The District of Zhuhai ranked second highest among counties within Guangdong in terms of per capita NI. Therefore, the relatively high per capita NI in District of Shenzhen was extremely unusual during the early 'reform and open-door' period.

The first reason is probably that Shenzhen was originally a small fishing village in the pre-reform period; which was suddenly transformed into a modern and fast developing municipality by the mid-1980s. Secondly, there was a population of only about 310 thousand residing in Shenzhen before it became a Special Economic Zone by decision of the State Council of China in 1979. Most of this population made a living from fishing (He, 1991). Thirdly, since the official establishment of the 'Shenzhen Special Economic Zone', this zone dramatically changed and developed. Apparently, Shenzhen enjoyed many state-oriented preferential development policies, foreign and domestic investment and governmental subsidies. Due to the favourable state legislation and inherited geographical advantage, the actually utilized FDI in Shenzhen jumped to 271 million US$ in 1989, up by 11.6 times from only 23.3 million US$ in 1980. Moreover, the total amount of export trade value in 1989 (2.17 billion US$) was more than 232 times higher than the equivalent exporting figure in 1979 (He, 1991). In addition to that,

The central government has offered Shenzhen a series of unique economic development policies and special regulation; at the same time, the central government has provided greater autonomy to Shenzhen in terms of economic management system and economic reform, such as the tax, land use, foreign capital, bank credit, labour, and immigration. (He, 1991, p. 24)

Last but not least, attracted by the relatively high labour wages and greater job opportunities, many migration workers from various regions in China have moved into Shenzhen since 1979. This contributed significantly to the rapid economic growth in Shenzhen. For example, relative to the original population of 310 thousand in 1978, there were a total of 1.91 million people in Shenzhen by 1989. However, it is important to note that the natural population growth of Shenzhen was just 42 thousand during the period from 1979 to 1989. Therefore, the share of migration population had accounted for about 81.9 percent of the total increase of population in Shenzhen (He, 1991). Relative to other special economic zones in China, the data demonstrated in Table 9.7 suggests that the annual population growth rate in Shenzhen was notably high (34.6 percent); the equivalent growth rate in Zhuhai was only about one third of Shenzhen (11.1 percent). But because these migrants were not given residential status as 'registered population of Shenzhen', calculation of their per capita national income was excluded although migrants made up a significant proportion of the population. As Khan, Griffin, and Riskin (1999, p. 298) state, "Floating population, people who have migrated to the cities but have not been given the status of legal urban residents or the entitlements enjoyed by legal residents." In my opinion, these causes discussed above can be used to explain why

the District of Shenzhen had such a high per capita national income among regions within Guangdong. It is logical to expect that the per capita national income in Shenzhen would have been much lower if these floating migrant workers had been included in the official calculation[54].

Table 9.7: Total Population in the Special Economic Zones of China 1980-1989 (unit: 10 thousand)

Region	1980	1982	1984	1986	1988	1989	Annual growth rate %
Shenzhen	8.41	12.86	19.14	25.74	32.19	36.2	34.6
Zhuhai	12.7	13.39	14.44	16.51	19.07	21.6	11.1
Shantou	69.16	72.3	74.64	77.41	80.11	81.44	3.3
Xiamen	49.17	50.9	53.26	55.84	57.95	59.01	3.7

He (1991, pp. 525-31)

As a result of these factors, from my point of view, it is quite unfair and inappropriate to measure the real spatial inequality within Guangdong (CV and Gini coefficient) in the early 'reform and open-door' period, and to include District of Shenzhen's unusually high data. This might seriously distort the real extent of spatial income inequality within Guangdong. The unusual high per capita NI in Shenzhen would have dramatically stimulated the increase of per capita national income CV and Gini coefficient during the 1980s. In order to eliminate the potential regional bias and objectively measure the real trend of spatial inequality during the early reform period, it is essential to address the unusual case of Shenzhen. This study decided to recalculate the per capita national income CV and Gini coefficient for counties within Guangdong between 1980 and 1990, but to exclude the District of Shenzhen. The revised figures demonstrate that District of Shenzhen's unusual per capita NI had significantly affected the trends of both CV and Gini coefficient during 1980s; it caused large up and down fluctuation of Gini coefficient and CV, as shown in Fig 9.5. The figures of CV which excluded District of Shenzhen were significantly lower than the equivalent figures which included Shenzhen. For example, in 1984, the per capita NI CV was down to 0.797 by 53 percent from 1.22 when the figure of Shenzhen was excluded. In 1985, the per capita NI CV was down to 0.838 by 46 percent from 1.23 when the figure of Shenzhen was excluded. (See Table 9.8 and Fig 9.6 below)

After we eliminated the per capita income in Shenzhen, both the Gini coefficient and CV had shown a clearer and steadily upward trend during the 1980s. According to the figures presented in Fig 9.6, we found that the per capita NI Gini coefficient had steadily increased from 1980 to 1990. The Gini coefficient was 0.385 in 1990, up by 44 percent from 0.267 in 1980. In particular, from 1983 to 1985, the Gini coefficient increased by about 11 percent. This is probably due to the more successful rural economic reform and the emergence of TVEs within PRDA which might have widened the spatial inequaltiy in

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[54] Nevertheless, even the precise numbers of permanently registered population in the regions within Guanagdong published by official statistics departments are inconsistent. Understandably, there was great difficulty in estimating the exact number of these floating workers in Shenzhen during the early 'reform and open-door' period. Except for odd years like 1990 and 2000, for which the total population data can be calculated from official population census yearbooks, the annual total population, including both registered population and migrant population have not been collected or published by either central or local statistics bureaus of China since 1978. Owing to these obstacles in calculating the real number of migration population, I have not been unable to calculate annual per capita GDP in Shenzhen, based on total population, since 1980.

Guangdong, The Gini coefficient experienced a relatively slow increase between 1985 and 1987. It only increased to 0.344 in 1987 from 0.342 in 1985. In the short period of 1988/89, the Gini coefficient showed a slightly decreasing trend. After 1989, the Gini coefficient started to dramatically increase again, to about 0.385 in 1990, up by 6.9 percent from 0.36 in 1989. My finding is not consistent with some previous research regarding the intra-regional inequality analysis within other Chinese provinces. For example, Wei (2000) argues that the intra-regional inequality did not change significantly in various regions within Jiangsu, such as Sunan and Subei during the 1980s.

As far as the changing trend of per capita NI CV is concerned, there has been a visible fluctuating upward trend from 1980 to 1990. The CV increased dramatically from 1980 to 1985, which was 0.838 in 1985, up by 31 percent from 0.64 in 1980. However, from 1985 to 1987, the CV experienced a short-term downward trend; down to 0.777 in 1987. The declining CV might be because rural economic reform had spread into the periphery in Guangdong, which might have contributed to the reduction of regional income inequality. After 1987, the CV rose dramatically again until 1990. The CV rose to 0.934 in 1990. Accompanying the increase of per capita NI in Guangdong between 1980 and 1990, the figures presented in Fig 6 illustrate that both the Gini coefficient and CV had increased substantially. Both the Gini coefficient and CV had shown similar increasing trends during 1980 and 1990.

Table 9.8: CV and Gini Coefficient for Per Capita National Income in Guangdong's Counties, 1980-1990 (Shenzhen excluded)

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Mean	358.2	392.9	438.2	460.2	531.6	621.2	667.4	784.5	961.9	1017.4	1138.3
Standard Deviation	256.4	341.1	446.2	470.1	725.5	853	770.7	886.9	1136.6	1264.8	1605.7
coefficient of variation	0.64	0.665	0.68	0.729	0.797	0.838	0.79	0.777	0.826	0.831	0.934
Gini Coefficient	0.267	0.276	0.289	0.307	0.328	0.342	0.343	0.344	0.361	0.36	0.385

Fig 9.6: CV and Gini Coefficient for Per Capita National Income in Guangdong's Counties, 1980-1990 (Shenzhen excluded)

coefficient of variation   Gini coefficient   trend. (coefficient of variation)   trend. (Gini coefficient)
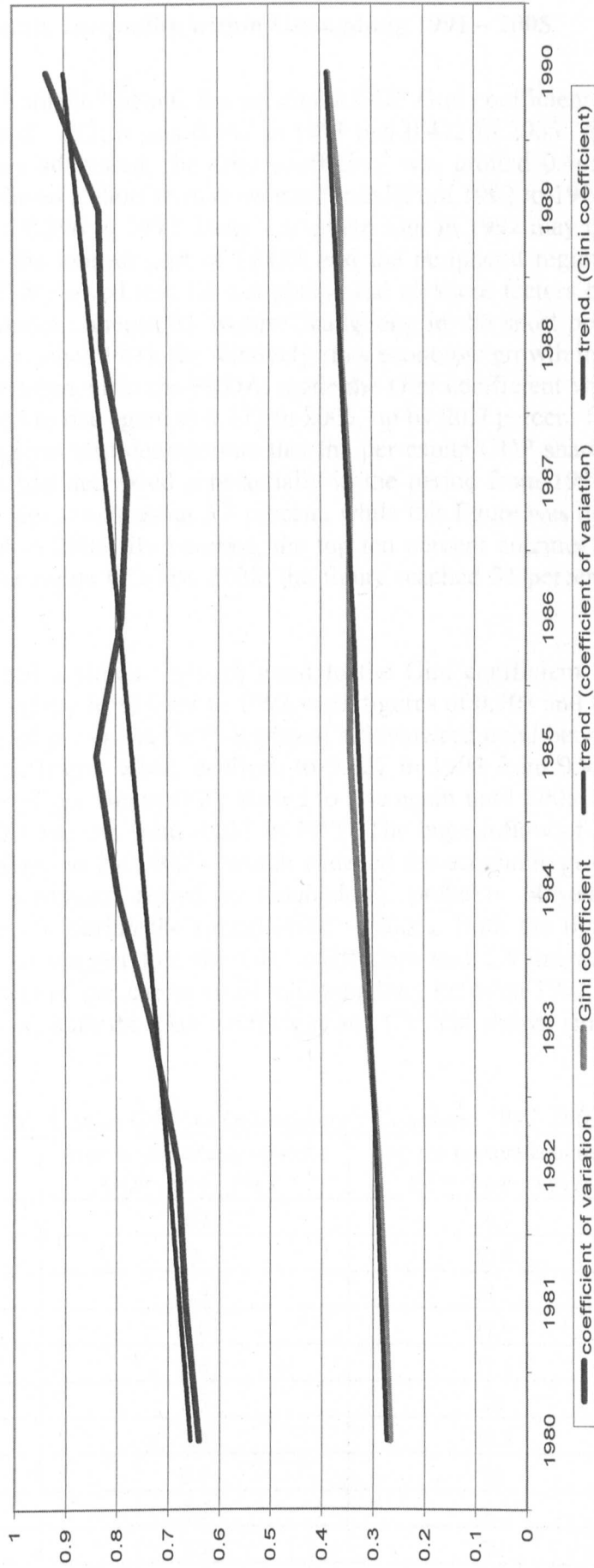
9.3.3 Measurement of Inter-county Inequality within Guangdong 1991 – 2005

According to the data shown in Table 9.9 below, the per capita GDP Gini coefficient had steadily increasaed from 1991 and 2005; it was 0.367 in 1991 and 0.472 in 2005 (After the issue of price difference was addressed, the Gini coefficient was around 0.465 in 2005). The Gini coefficient displayed a short-term downward trend from 1992 to 1994; it was down to 0.391 in 1994 from 0.396 in 1992. Deng's southern tour in 1992 may have stimulated economic growth in the interior part of PRDA and the peripheral region in Guangdong. In addition, more FDI flowed into the periphery; and all these factors have helped to reduce the spatial economic inequality within Guangdong in the short period between 1992 and 1994. However, since 1994, the relatively slow economic growth in the peripheral region, and rapid development in the PRDA, made the Gini coefficient widen again. The Gini coefficient started to rise again to 0.472 in 2005, up by 20.7 percent from 0.391 in 1994. Moreover, the figures also demonstrate that the per capita GDP share by the bottom ten percent counties had decreased substantially in the period from 1991 to 2005. For example, in 1991; the figure was about 3.3 percent, while this figure was down by 65 percent to only 2 percent in 2005. By contrast, the top ten percent counties had accounted for the majority of per capita GDP by 2005; the figure reached 31 percent in 2005 from 26.7 percent in 1991.

Per capita GDP CV demonstrated a similar upward trend to the Gini coefficient (see Table 9.10). The CV increased slightly from 1991 to 1992, with figures of 0.908 and 0.91 respectively. Then the CV value of per capita GDP displayed a downward trend between 1992 and 1994, like the Gini coeffcient, which declined to 0.827 in 1994 from 0.91 in 1992. From 1995, the CV value of per capita GDP started to rise again until 2005. The CV was 0.94 in 2005, up by 13.1 percent from 0.831 in 1995. The huge inflow of FDI and favourable state policies offered to the PRDA, which widened the economic growth gap between PRDA and the peripheral region in Guangdong, probably played an important role in increasing the CV during the period (1995 – 2005). Both the figures presented in Tables 9.9 and 9.10 suggest that the Gini coefficient and CV increased significantly with the rapid growth of per capita GDP in Guangdong between 1991 and 2005. According to Fig 9.7 below, both the Gini coefficient and CV had shown similar upward trends from 1991 to 2005.

Table 9.9: Gini Coefficients for Per Capita GDP in Guangdong's Counties, 1991-2005

Year	Gini coefficient	Bottom ten percent counties GDP share （%）	Top ten percent counties GDP share （%）
1991	0.367	3.3	26.7
1992	0.396	3	30.6
1993	0.395	2.9	29.3
1994	0.391	2.8	27.8
1995	0.397	2.6	27.5
1996	0.403	2.5	28
1997	0.412	2.4	28.3
1998	0.411	2.4	28
1999	0.418	2.3	28.5
2000	0.426	2.3	29

2001	0.434	2.2	29.3
2002	0.435	2.2	29.1
2003	0.444	2.1	30
2004	0.452	2.1	30.4
2005	0.465	2	31

Table 9.10: CV and Gini Coefficients for Per Capita GDP in Guangdong's Counties, 1991-2005

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Mean	2481.8	3055.7	3806.8	4512	5290.1	5882.9	6492.8	7139.3	7777.3	8459	9173.7	10099	11375	12850	14607
Standard Deviation	2253.5	2795	3299.1	3733	4397.7	4926.3	5501.1	6051.5	6669.3	7405.8	8101.1	8974.4	10253	11891	13797
coefficient of variation	0.908	0.91	0.86	0.827	0.831	0.837	0.847	0.848	0.858	0.875	0.883	0.89	0.901	0.925	0.94
Gini coefficient	0.367	0.396	0.395	0.391	0.397	0.403	0.412	0.411	0.418	0.426	0.434	0.435	0.444	0.452	0.465

Note: the issue of regional price difference has been addressed in the calculation of the 2005 Gini coefficient and CV

Fig 9.7: CV and Gini Coefficients for Per Capita GDP in Guangdong's Counties, 1991-2005

coefficient of variation ▬ Gini coefficient ▬ trend. (coefficient of variation) ▬ trend. (Gini coefficient)
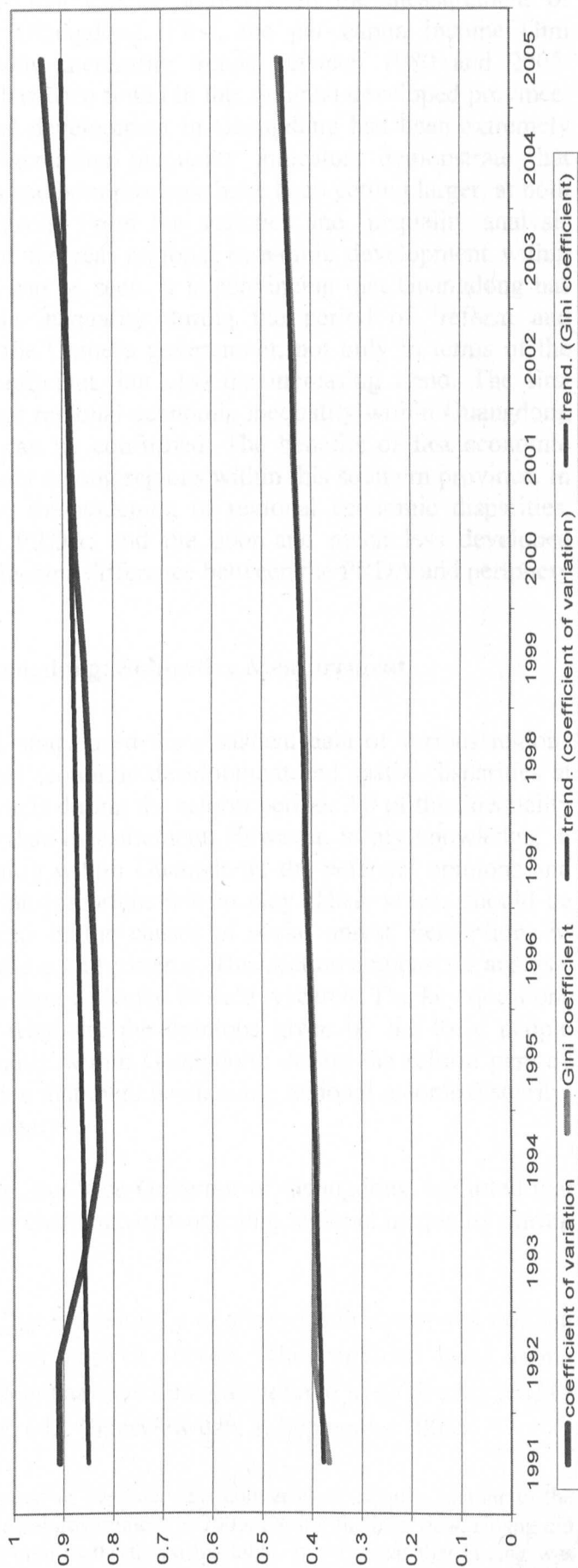
There are some general conclusions that can be drawn from the measurement of inter-county level inequality within Guangdong. First, the per capita income Gini coefficient and CV had been showing increasing trends between 1980 and 2005. Significant regional income variation has been found in this rich and developed province. Therefore, it suggests that the regional development in Guangdong had been extremely uneven during the reform period. Increasing inequality indicators demonstrate that regional income disparities within this southern province have been getting larger, at both the inter-regional and inter-county levels. From the statistics and inequality analysis presented earlier, a clear overview of the real regional economic development within Guangdong during the reform period can be seen. It is convincing that Guangdong has been facing serious regional income inequality during the period of 'reform and open-door' policies implemented by the Chinese government, not only in terms of the absolute figures of CV and Gini coefficient, but also the increasing trend. The first Hypothesis proposed by this study: that regional economic inequality within Guangdong has been getting worse since 1980, can be confirmed. The benefits of fast economic growth have not been distributed equally among regions within this southern province. In fact, the reform policies have led to the widening of regional economic disparities, resulting in the rich and developed PRDA: and the poor and much less developed peripheral region. The sharp regional income difference between the PRDA and periphery is notable.

9.3.4 Regional Inequality within Guangdong: Subjective Measurement

In the sections discussed earlier, this study used the statistical data of various regions within Guangdong to measure regional economic development and spatial disparities at both inter-regional and inter-county levels during the reform period. All of this inequality analysis can be regarded as objective data measurement. However, to my knowledge, in studying the issue of regional inequality within Guangdong, the personal opinions and perceptions of the local people have an important role to play. Their voices should be heard and taken into account. In terms of the causes of social unrest, perceptions of regional disparity are as important as the actual patterns. This section emphasizes analysis of regional inequality using subjective data collected in field research. The key questions I am keen to investigate are these: what are the opinions given by the local people regarding the issue of regional inequality within Guangdong during the reform period? Do the local people of Guangdong agree that there is widening regional income disparity: as demonstrated in the statistical data analysis?

During the interview session[54], Huang, the Vice-Governor of Guangdong, admitted that Guangdong has been facing the serious challenge of worsening regional inequality during the reform period. He states that,

Although Guangdong has been making remarkable economic achievements during the reform decades, in terms of per capita income, the regional gaps among the PRDA, Eastern, Western, and Mountainous Guangdong have also dramatically intensified during the same period. (Interview data 1, September 2006)

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[54] To some extent, Huang's opinion expressed in the interview conversation is quite similar to the annual working report of Guangdong provincial government in 2005. During the interview, Huang did not refer to any book; however, he had written materials on his table. It was clear that Huang was serious about this interview and well prepared.

He further adds that,

This is the tough fact that Guangdong must face today; the regional disparity is indeed enormous. (Interview data 1, September 2006)

Huang is a realistic and practical government officer. Although he attempted to demonstrate an overall picture of fast economic growth and huge economic achievement of Guangdong during the last two decades, in areas such as export growth, FDI, per capita GDP; he did not intend to hide the darker side of Guangdong during the interview. Huang's argument might still underestimate the real degree of regional economic disparities; nevertheless, his opinion is reasonable. Guangdong is one of the richest and most developed provinces in China; per capita GDP had increased significantly from around 185 *yuan* in 1978 to 19707 *yuan* in 2005, which suggests that the per capita GDP in 2005 was more than 100 times higher than the equivalent figure in 1978. However, it is important to note that the PRDA is the only region which has had per capita income above the provincial average of Guangdong; the per capita incomes in the other regions were much lower than the provincial average, let alone than the equivalent figure of PRDA. Relative to the PRDA, the periphery has recorded slower economic growth rates since 1978. More than 80 percent of the total GDP, 80 of the industrial output value and 87 percent of tax revenue in Guangdong, in 2005, were produced within the PRDA, whose size (4.17 square kilometres) accounts for only about one-fifth of total land area of Guangdong (20.1 square kilometre). The Director of the Guangdong Economic and Trade Committee claims that the gross industrial output value in the PRDA and the periphery were 7379 million and 1260 million *yuan* respectively in 2005 (Interview data 2, September 2006). This suggests that the industrial development in the PRDA is nearly six times that of the periphery. Moreover, the 2005 Government Annual Working Report of Gaungdong (2005) clearly suggests that the regional development gaps among the PRDA, Western, Eastern and Mountainous Guangdong have been getting worse during the last two decades. Furthermore, the Director of the Guangdong Agricultural Commission also admits that the spatial inequality within Guangdong is enormous. (Interview data 3, September 2006)

According to the Eleventh Five Year Plan for National Economy and Social Development published by Meizhou municipal government (2006, p. 9), "the regional inequality between Meizhou and the PRDA is getting worse, and the situation of slow economic growth and widening regional inequality have not been substantially improved since the 1978." An economic scholar from the Social Science Academy of Guangdong claims that Guangdong has failed to achieve balanced regional development (Interview data 4, September 2006). During the field research trip in autumn 2006, I visited some counties, townships and villages in the hills region; I found that there were still significant numbers of people living in very poor conditions. Deng was a farmer from Nangang, a northern village located in Wuhua, and in his house, there were only three broken chairs, one rickety table, one bed and some basic agricultural tools. In fact, he has not got a television which is basic family entertainment for many ordinary residents in Guangdong today. Deng's family has a total of six people; he was allocated 1.5 mu paddy fields and 10 mu mountainous fields. But the land is calcareous and thus not suited to agriculture. He says that the average net income for his family was about 3000 *yuan* in 2005 (Interview data 5, October 2006). As far as his family is concerned, owing to his poor health and four young children, there is no migrant remittance in his case. Nangang has a total 1,286 registered

population; around 70 percent of people are living in similar situations to Deng. Deng's family is not so unusual in the poor regions within Guangdong; his poor economic condition is dramatically different from that of most people living in the PRDA.

Dongshan, another small village with a total population of 210 is located in Wuhua County. In order to get clean drinking water, local people need to walk about one hour every day. Moreover, the children in Dongshan need to walk more than two hours to go to school every day, because the school is located at the bottom of a hill. These people are living in such an unfavourable natural environment, facing extreme difficulties in transport, health care and education, with no access to modern electrical equipment, for example, TV, fridge, and washing machine. The primary school in this village has no equipment for sports or modern communication facilities like Internet[55]. According to the 2005 Government Report of Guangdong (2005), there are still 4.5 million people living in poverty in Guangdong, and around 700 thousand urban and rural populations have not yet been included in the basic working and health insurance system. The huge spatial economic growth gap is not only reflected in absolute differences per capita income, but also in basic human development, public goods and services provision. The regional gap of economic and social development in Guangdong is striking. Personally, it is actually hard for me to believe there are still so many people living near or under the poverty line in one of the richest and most prosperous provinces in China. In terms of Guangdong, the extreme polarization trend among various regions is notable; it seems to be the fact that some regions are rich and developed like Hong Kong, while other regions are poor and under-developed like Guizhou. Guangdong should have done much better in tackling the issue of regional inequality. The economically poor regions should have developed faster as their people deserve a better life after two decades of 'reform and open-door' in Guangdong.

In order to collect and analyze personal opinions, two small surveys were conducted during the field research. Survey One was conducted in September 2006, and included seven governmental officials and two academic scholars.[56] Survey Two was carried out in September-October 2006, and involved 45 local participants, all of whom were selected from the three targeted regions. In terms of Survey One, as presented in Fig 9.8, all the interviewees chose the first answer, arguing that regional economic inequality within Guangdong has widened since the beginning of the 1980s; no respondents selected the second or third answer. As far as Survey Two, shown in Fig 9.9 is concerned, only two participants (2 percent) believed that regional disparities had been narrowed; the majority of interviewees (98 percent) shared the opinion that regional disparity within Guangdong had widened. More significantly, as far as the second question is concerned, one interviewee (11 percent) in Survey One thinks that the regional gaps within Guangdong were too small (see Fig 9.10). In Survey Two, four respondents (9 percent) shared this view, and another three respondents (or 6 percent) claimed that the gap was

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[55] Dongshan has been facing financial hardship for many years. Local tax revenue was too low to even provide basic public goods and services to local residents, let alone develop village economies by investing in the necessary infrastructure.

[56] The seven governmental officials included the Vice-Governor of Guangdong, Director of the Guangdong Economic, Trade and Planning Committee; Vice-Director of the Guangdong Transportation Commission; Director of the Guangdong Agriculture Commission; Party Committee Secretaries or Directors in the three targeted counties (Yuexiu District, Meixian and Wuhua Counties); two academic scholars; one from the Social Science Academy of Guangdong and another from the Sun Zhongshan University.

just right, neither too large nor too small (see Fig 9.11). In Survey Two, 85 percent of respondents argued that the regional gap between the poor and rich regions was too vast. It is important to note the following points. The majority of interviewees in both Survey One and Two share the belief that Guangdong has been facing serious unbalanced regional development and widening spatial inequality during the 'reform and open-door' period. This view is shared not only by officials and academic scholars, but also more significantly, by ordinary local residents. The findings of this section are consistent with the objective inequality analysis presented earlier by the CV and Gini coefficient indicators; both the objective and subjective data presented in this study suggest that regional economic disparities have been getting worse during the last two decades.

1. Do you think regional economic inequality in Guangdong has (1) widened, (2) narrowed, or (3) not changed much since the beginning of the 1980s?

Fig 9.8: Survey 1
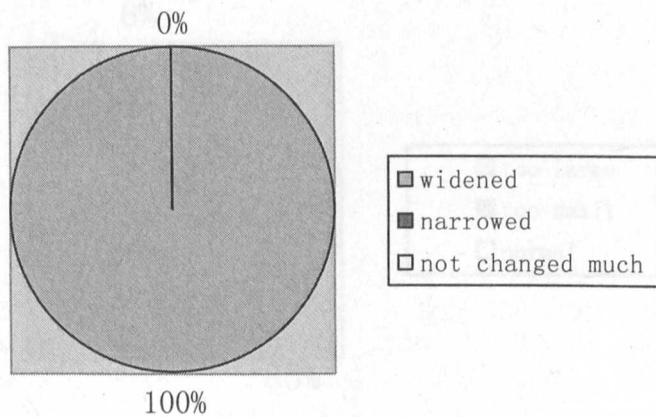
Fig 9.9: Survey 2
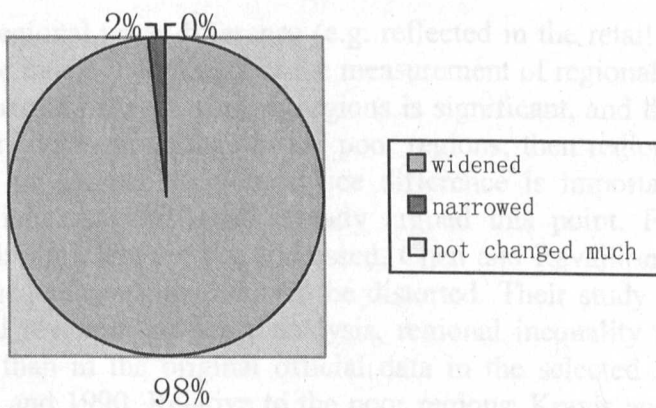
2. Do you agree that the regional gaps in terms of per capita income between the rich and poor regions of Guangdong are (1) too big, (2) too small, or (3) normal?

Fig 9.10: Survey 1

273

11%   0%

□ too large
■ too small
□ normal

89%

Fig 9.11: Survey 2

6%
9%

□ too large
■ too small
□ normal

85%
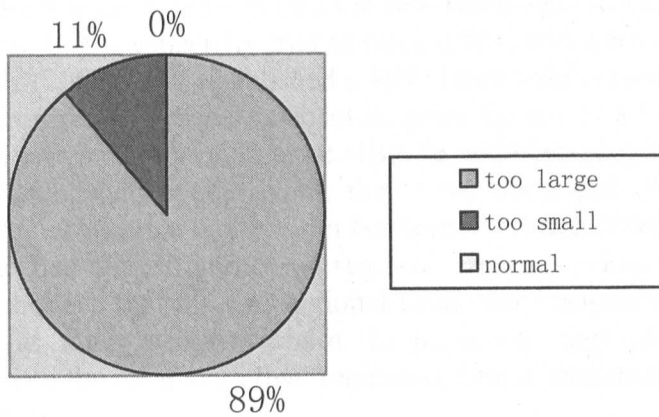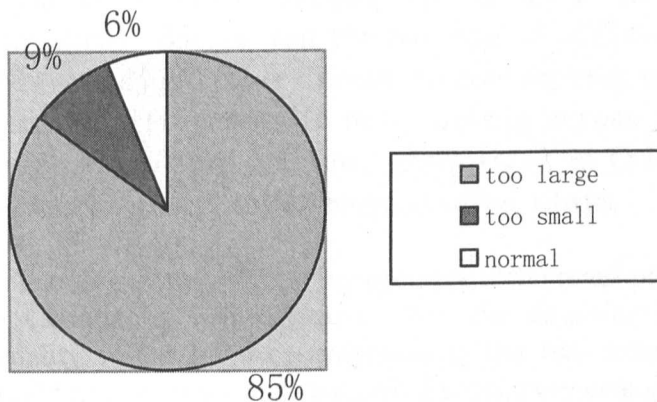
9.4 Regional Price Difference in Guangdong

The issue of regional price difference (e.g. reflected in the retail inflation index[57] or the consumer price index[58]) could affect the measurement of regional economic inequality. If the price difference between various regions is significant, and the general retail price is higher in the richer regions than in the poor regions; then regional economic inequality would be not so serious. Regional price difference is important to spatial inequality analysis. Williamson (1965) had already argued this point. Furthermore, if regional difference of living costs are not addressed, Chen and Ravallion (1996) suggest that the accuracy of inequality estimation will be distorted. Their study found that according to their empirical revision and price analysis, regional inequality in China had risen to a lesser degree than in the original official data in the selected four southern provinces between 1985 and 1990. Relative to the poor regions, Kravis and Lipsey (1988, cited in Brandt and Holz, 2006) argue that the price of non-tradable goods had been higher than tradable goods in the rich regions, according to their international empirical estimation.

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[57] According to the argument made by the GSB (2005, p. 229), "the change and adjustment in retail prices directly affects the living expenditure of urban and rural residents, the governmental revenue, the purchasing power of residents and the equilibrium of market supply and demand, and the ratio of consumption to accumulation. Therefore, the calculation of retail price index is useful to analyze the changes of the above economic activities."

[58] Mankiw (2006) highlights that the consumer price index is the most popular indicator to measure price change.

Brandt and Holz's study (2006) is one the few researches to carefully analyze regional price differences; this is especially true of price differences between the Chinese regions. Brandt and Holz (2006) have established a 1990 household expenditure basket through an absolute price comparison based on absolute price figures of a few selected products for each individual province reported by the NBS. In addition, adopting the annual consumer price indicator published by the NBS, they have developed absolute price levels for cross-period provincial price comparison between 1984 and 2004. Brandt and Holz seem to firmly argue that the difference of regional absolute prices is enormous in China; therefore, they believe that the real regional economic inequality within China might be not as severe as many scholars claim. In particular, they claim the absolute price difference between the rural and urban regions in China. Brandt and Holz (2006, p. 44-45) further stress that,

A large body of literature attempts to measure inequality in China. These inequality studies measure inequality using a variety of income or consumption measures. But, given the absence of official price level data, they are unable to adjust their income or consumption measures to take into account systematic differences in price levels across localities. If these differences were taken into account, inequality in China may well turn out to be significantly lower than these studies claim.

As far as this research is concerned, in my opinion, if the retail price gap between various regions within Guangdong is remarkable, then the empirical evaluation of regional economic inequality might be over-exaggerated; the real extent of unequal regional development might not be so serious, and will dramatically change the overall conclusion with regard to the worsening spatial inequality within Guangdong during the reform period. Moreover, the issue of regional price difference would affect the reliability and credibility of spatial inequality analysis within Guangdong. Therefore, this issue must be addressed in order to objectively measure the real degree of regional income disparities.

However, previous literature review (except for a few detailed studies like Brandt and Holz) has hardly provided in-depth discussion of the issue of regional price difference, and the NBS and other government departments in China have only offered official price indicators for the change comparison of the time-series consumer prices in the different provinces in China so far, such as the Consumer Price Index (CPI). The NBS has not published any detailed statistical data or specific regional price indicator which can be used for the measurement and comparison analysis of the absolute price difference between various regions at a fixed time. Brandt and Holz (2006, p. 43-44) argue that,

These price indices allow a comparison of the changes in the level of consumer prices over time across different localities but do not permit a comparison of absolute price levels between different localities at a given point in time. Like the Bureau of Labor Statistics, the NBS does not publish data on the individual prices and quantities underlying the provincial price indices it constructs.

Therefore, in order to ensure the reliability of spatial inequality analysis within Guangdong, during field research, I collected raw retail price data for a large number of

daily consumer products, which I call the 'basket of consumer products', and compared the difference of the absolute retail price in the six selected counties covering the western, central and eastern regions at a fixed time, as demonstrated in the 2006 Commercial Retail Price Survey of Guangdong (see Appendix 1). The counties, districts and products were selected as representative regions and retail commodities. The products were chosen according to probability sampling methods. The retail prices included all of the important daily consumption-based goods, education fees, medical goods and care fees, and a few representative industrial goods. Regional price surveys were conducted to collect the data on a market prices basis. Therefore, the retail price survey of the selected commodities in the targeted regions can effectively measure the real extent of the price differences in various regions within Guangdong. Based on the 2005 average per capita GDP and the principle of regional representativeness, six survey regions were selected; District of Guangzhou, Meixian, Wuhua, Districts of Shenzhen, Chaozhou and Zhaoqing six regions. On the one hand, these areas can represent the developed, middle and underdeveloped regions in Guangdong. On the other hand, they can stand for the western, central and northern regions. As a result, the quality and representativeness of the commercial retail price survey can be largely guaranteed.

The results of the commercial retail price survey suggest that the price differences between various regions exist in Guangdong; there have some absolute price differences for many daily consumed commodities. In general, this study found that the overall absolute price difference between the rich and poor regions within Guangdong was about 8-10 percent. The figures presented in Appendix 1 suggested that there were some relatively small absolute price differences in the selected commodities across various regions. As far as meat and vegetables are concerned, relative to other goods, the price gaps were almost the highest. For example, the retail prices of meat and vegetables in Shenzhen and Guangzhou were about 10 and 6 percent higher than the equivalent provincial average price, while the prices of meat and vegetables in Meizhou and Wuhua were 10 and 9 percent or so lower than the average price of Guangdong. Relative to the average provincial price of fruit, the absolute retail prices in Shenzhen, Guangzhou and Wuhua were around 10, 4.5 and 5.5 percent higher respectively; while the prices in Meixian was 3 percent lower than the average provincial price. Moreover, the retail prices of drinks in Shenzhen, Meixian and Wuhua were 2, 2 and 6 percent higher than the equivalent average provincial price, while the drinks price in Guangzhou was 2 percent lower than the average price of Guangdong.

In terms of education fees, regional price difference was quite significant. Shenzhen and Guangzhou were about 13 and 6 percent higher than the average price of Guangdong; but the equivalent education prices in Meixian and Wuhua were about 7 percent lower than the average provincial education fees. As far as medical care and medical goods are concerned, the rich region was around 10 percent higher than other regions in Guangdong; the poor region was barely 3.5 percent or so lower than the equivalent prices in the other regions. With regard to the industrial goods, significantly, the absolute retail prices in Shenzhen and Guangzhou were around 3.5 and 6 percent lower than the average provincial price respectively; however, the equivalent prices in Meixian and Wuhua were 2 percent higher than the retail prices in the other regions, with only selected commodities in Meixian and Wuhua recording higher average prices than the other regions.

However, more significantly, the findings of the retail price survey also clearly demonstrate that the issue of regional price difference was not large enough to seriously

challenge the general upward trend of widening regional disparities within Guangdong as this study claims. The figures from the field price survey have illustrated that the real degree of unbalanced regional development was severe in Guangdong during the reform period. I argue that the general gap of absolute retail price difference between the various regions within Guangdong was not enormous. The general retail price in Shenzhen was only 8 or so higher than the average general price of Guangdong; while the general retail price in the poor regions like Meixian and Wuhua was just about 5 percent lower than the other regions in Guangdong. The absolute retail price of Shenzhen probably ranked the highest among regions within Guangdong; under the circumstances of high average wages, geographical proximity to Hong Kong, and status of special economic zone, the average high price of the retail commodities in Shenzhen was not a surprise.

The results generated from the field price survey do not support either Chen and Ravallion's study (1996) or Brandt and Holz's (2006) empirical estimation; this study disagrees with their arguments that the regional price difference in China is enormous, and the issue of regional price difference will have seriously affected the general conclusion of widening regional inequality in the inter-regional and intra-regional inequalities comparison within China. Chen and Ravallion's sample size for empirical revision is apparently too small; the price analysis of four southern provinces was not sufficient to effectively represent price reality in the other Chinese provinces, and it cannot reveal the general regional price difference in the time-series inequality comparison in China. In addition, their regional price study during the mid-1990s is obviously too old and might not reflect reality, almost twenty years later; the heavy dependence on planning prices for past official statistics figures, claimed by Chen and Ravallion, which could understate the prices of home-produced agricultural products, is certainly not the case in the current statistical practice of the NBS. The NBS removed Soviet-oriented planning prices from statistics collection and reporting some years ago; instead, the NBS and other lower statistics departments have adopted statistics collection and analysis based on the market prices system.

Neither is Brandt and Holz's study above criticism; in fact, their research has certain problems, and their conclusion is not very convincing. First, their research findings were based on official consumer price indicators and many subjective assumptions in judgment of price specification of the selected commodities and population weights; Brandt and Holz have conducted virtually no retail price survey, and have not discussed the issue of personal price perception. Perhaps, their study was entirely based on pure mathematical calculation and subjective evaluation. Secondly, the household expenditure basket developed by Brandt and Holz is problematic; as they have not addressed the pattern change of national household living expenditure in order to re-price this household basket and make other updates. Thirdly, their empirical estimation of regional price differences has suffered from data omission and other calculation constrictions, which makes their conclusions too simplistic. They need far more hard evidence to support their argument. In fact, Brandt and Holz (2006) recognize the serious limitation existing in their study; as they admit,

Our calculations have involved a range of assumptions from the choice of the price specification for particular products to the choice of population weights, implicit versus composite pricing methods, and the handling of missing data. (2006, p. 83)

However, it is important to note the following point. The main difference between Brandt and Holz's study and mine is the regional setting. Brandt and Holz's empirical research mainly discusses the regional price differences at inter-provincial level. My study is based on the analysis of regional price differences on an intra-provincial level. Owing to transportation costs, it is reasonable to claim that high costs of inter-provincial transportation might contribute to relatively large regional price differences in terms of China as a whole, as suggested by Brandt and Holz. By contrast, in general, low cost of intra-provincial transportation due to developed transportation facilities might account for small regional price variation as I claim. It is possible that both our studies could be correct. Moreover, to be fair, the field retail price survey of this study also has certain limitations. First, due to limitations of time and resources, I was unable to do a more comprehensive regional price survey covering all counties within Guangdong. Secondly, it would be much more desirable to involve the absolute price comparison of more of the important retail and industrial commodities, for instance, commercial housing prices, which might have a large influence on the general regional price difference and total production output of a region. However, precise regional price of commercial housing is simply not available in official statistical data and very difficult to collect in field research surveys.

9.5 The Issue of Temporary Migration

Owing to the unaddressed issue of temporary migration of population, our measurement of regional income inequality within Guangdong might have suffered from some potential bias and limitations. Mainly due to fast economic growth and great working opportunities in Guangdong, many migrant workers, who come from the other interior regions in China, have moved to this southern prosperous province; and this is a fast increasing trend. This is particularly true of the economically rich regions located in the PRDA, such as Shenzhen, Dongguan and Shunde. However, our calculation of regional inequality in Guangdong shown in GDP per head was based on permanent registration of population, and migrant population has not been included. Therefore, the total population in each region within Guangdong might have been undervalued by this study; and the real extent of regional income disparities could be lower than shown by my measurements. Similarly, Wang and Hu (1999, p. 225-26) have also pointed out that,

Because most of these migrants are unregistered in their new residences, the population of the coastal regions may be underestimated, and the population of interior regions overestimated. Thus, we have to remember that regional differences in per capita GDP are probably in fact smaller than what our data seem to suggest.

However, the main reasons why migrant population have been excluded from my time-series measurement of spatial income inequality are these. On the one hand, it is because of data availability. As far as Guangdong is concerned, detailed annual figures of migrant population in every county region during the reform period have not been published so far. On the other hand, more significantly, population data are extremely problematic. To use low-quality data in our income inequality measurement would lead to unreliable and seriously distorted results. Take the registered population in 2000 for example, as shown in Table 9.11 below: in some regions, substantial data variation between the central and provincial statistics departments has been found by this study.

For example, in wealthy Doumen and Huiyang, according to the data given by the 2000 national population census, the total registration population was 365,600 and 620,600 respectively. Meanwhile, the equivalent figures published by the GBS were 303,000 and 558,000 in these two regions. The change percentages were up to 14 and 10.1. Moreover, this is not exceptional in the underdeveloped regions of Guangdong. For example, the total registered population in Heyuan District, published in the 2000 national population census was 256,100; however, the figure published by the 2001 Guangdong Yearbook was 293,000. The data change percentage reached 14.4. The biggest difference in registered population was perhaps shown in Shenzhen District. In 2000, the change percentage of population data was a striking 214. Given these mismatches between central and local government data, it is logical to believe that migrant population data, which are quite complex, would be very unreliable and problematic. Under these circumstances, regional economic inequality of Guangdong which included unreliable migrant population data, would not be meaningful.

Table 9.11: Population Data Variation between Central and Provincial Statistical Departments in Selected Counties within Guangdong (unit: 10,000)

Region	Registered Population (2000 Population Census)	Registered Population (2001 Guangdong Yearbook)	Data change	Change Percentage[1] (%)
District of Shenzhen	96	301.22	205.22	214
Doumen	36.56	30.3	6.26	17.1
District of Shanwei	40.22	46	5.78	14.4
District of Heyuan	25.61	29.3	3.69	14.4
District of Zhuhai	38.26	43.6	5.34	14
Huiyang	62.06	55.8	6.26	10.1
Yingde	103.1	94.73	8.37	8.1
District of Chaozhou	31.92	34.17	2.25	7
District of Yunfu	26.36	27.95	1.59	6
Zijin	78.67	74.99	3.68	4.7
Dianbai	162.56	155.34	7.22	4.4
Enping	48.6	46.63	1.97	4.1
Kaiping	70.74	67.92	2.82	4
Lianping	35.25	36.56	1.31	3.7
Haifeng	71.68	74	2.32	3.2
Lianshan	11.03	11.34	0.31	2.8
Qinxin	68.47	66.9	1.57	2.3
Boluo	75.72	77.25	1.53	2
Heping	46.85	47.81	0.96	2
Nanhai	107.54	109.5	1.96	1.8
Liannan	14.95	15.2	0.25	1.7
Lianjiang	150.53	148.18	2.35	1.6
Zengcheng	82.28	81.07	1.21	1.5
District of Meizhou	30.96	30.56	0.4	1.3
Dongguan	154.44	152.61	1.83	1.2
Nanao	7.19	7.28	0.09	1.2
Guangning	53.1	53.62	0.52	1

Note: [1] Change Percentage calculation is this: data change divided by the registration population in 2000 Population Census
Source:
1. Population Census Office of Guangdong Province (2002, pp. 42-48)

Last but not least, it is important to remember that migrants are a floating population. For various reasons, a large portion of these migrant workers in the developed regions have been returning to their interior hometowns during recent years. Murphy's study (2002) has provided a detailed discussion with regard to this issue. Therefore, the actual number of migrant workers in Guangdong should not be overestimated.

Nevertheless, I have attempted to evaluate the effect of migrant population on regional inequality, using floating population figures from 1990 and 2000, published in Tabulation of the 1990 and 2000 Population Census of Guangdong Province. I have re-calculated the per capita GDP Gini Coefficient and CV for all county-level regions for those years; addressing the migrant population issue. The figures of Gini Coefficient were about 0.363 and 0.417 in 1990 and 2000; the figures of CV were 0.75 and 0.86 in 1990 and 2000. the small differences in the data suggest that migrant populations have not significantly affected regional inequality in Guangdong during the reform period.

9.6 Regional Inequality Comparison between Guangdong and China

9.6.1 General Summary of Intraregional Inequality in the Provinces within China

In order to better understand the regional economic inequality within Guangdong during the reform period, a measurement standard is necessary, which can be used to show whether the regional disparity record in Guangdong is good or bad. Therefore, it is essential to compare the intra-regional economic disparities in other provinces of China with Guangdong. This chapter concentrates on measuring and comparing the inter-provincial level of development inequalities; it is not appropriate here to address the urban-rural levels of spatial economic inequalities within China in detail. The real issue which this section emphasizes is the level of spatial economic disparities within the Chinese provinces. Have the other Chinese provinces been facing similar problems of regional development during the reform period to Guangdong? Have the intra-provincial regional inequalities been intensified in the Chinese provinces? In contrast to the other provinces, how serious are the intra-regional economic disparities within Guangdong?

As discussed in the previous chapter, numerous scholars have done important research regarding the issue of intra-regional economic inequality within provinces, and the inequality between the eastern and western regions in China. Many studies suggest that the spatial development inequalities within China have been getting worse at both inter-regional and intra-provincial levels during the reform period (e.g. Yang, 1997; Tian, 1999; Wei, 2000; Démurger, 2001; Wang, et al, 2004; Natrajan, 2006). In general, in terms of China, except for a few studies, many scholars agree that spatial economic disparities have been narrowed or only slightly widened during the early reform period from 1978 until the mid-1980s, at both intra-provincial and inter-provincial levels. However, this is not the case for Guangdong. Both the CV and Gini coefficient empirical analysis of this study have demonstrated upward trends of inter-regional and inter-county economic inequality during the 1980s. Moreover, relative to many other provinces, Guangdong has been facing more serious intense regional inequality during the reform period. It can be demonstrated from the comparison of income inequality indicators (Gini coefficient and CV) between Guangdong and other provinces during the same time. For example, the CV for per capita output distribution in Fujian was 0.714 in 1995 (Lyons,

2000); however, the equivalent CV figure in Guangdong was 0.827. I have done more specific and up-to-date inequality comparison between Guangdong and three representative provinces in China in the following section.

There have been numerous studies on the issue of regional inequality within China during the reform period; these have provided an overall estimation regarding the real extent of spatial inequality within China, focusing on inter-regional, intra-provincial and inter-provincial levels of inequality, and have enlarged our knowledge on uneven regional social and economic development in China since 1978. However, it is important to note that there are certain limitations and problems in the previous research. First, many scholars have researched macro coastal-interior inequalities between the eastern, central and western regions; but far less research has addressed intra-regional economic disparities within Chinese provinces. As Wei (2000, p. 141) highlights, "while some progress has been made in the understanding of regional development across China's macroregions and provinces, much less attention has been paid to regional development and inequality at the sub-provincial level." Only a few studies have offered specific analysis of intra-regional economic inequality in a limited number of Chinese provinces, such as Jiangsu, Zhejiang, and Fujian. The real extent of regional development and spatial inequality in many other provinces has remained largely unknown; this is especially true of the provinces located in the western and interior regions like Guizhou, Qinghai, and Xizang.

Secondly, previous studies of Guangdong's spatial inequality are also limited; especially in the area of updating the development tendency of intra-county and intra-regional economic disparities after 2000, by adopting empirical time-series inequality analysis. In addition, the main cause of the widening spatial disparities has been rarely discussed. Thirdly, the knowledge and information demonstrated in many previous regional studies are obviously out of date; it might not be the case for the current situation. We have faced a shortage of research providing updated knowledge of regional economic inequality within China at both inter-provincial and intra-provincial levels since 2000.

Therefore, it is difficult to systematically analyze and compare the regional economic inequality between Guangdong and other Chinese provinces during the period between 1980 and 2005. It is also impossible to discuss the severe degree of intra-regional inequality within Guangdong in the absence of information in the other regions within China. Much more work needs to be done in order to bridge the research gap, and carefully compare the regional inequality within Chinese provinces. Due to limited time and resources, it is impossible to measure intra-regional inequality in all Chinese provinces during the reform period. However, by collecting the official data of per capita GDP in the provinces of Shandong, Henan and Guizhou, I have compared the regional inequality between Guangdong and these three Chinese provinces during the "reform and open-door" period using Gini coefficient and CV analysis.

9.6.2 Regional Inequality Measurement in Selected Chinese Provinces

To compare the intra-provincial level of regional inequality between Guangdong and the other Chinese provinces during the reform period, this chapter analyzes the regional economic development in the three selected Chinese provinces of Shandong, Henan, and Guizhou, in four chosen years across the reform period (1988, 1992, 1999 and 2004). Selected of provinces and years was based on three considerations: regional

representativeness (the eastern, central and western regions); relative land size and total population compared to Guangdong, and availability of reliable data. Owing to data limitations, I was only able to use the 1988 per capita NI in the various provinces as the start date for regional inequality analysis. Shandong is one of the eastern provinces which have achieved rapid economic growth during the reform period (in terms of total GDP and per capita GDP). Shandong's fast economic development can properly reflect many other coastal provinces (e.g. Meng and Wu, 1998, Wei, 2000). Henan and Guizhou's economic development are also quite typical among the central and western regions during the reform period. For example, Henan's economic growth has been quite moderate among the Chinese provinces with a general middle or lower-middle level of per capita income. By contrast, Guizhou, located in the interior western region, is one of the poorest and least developed provinces in China. Therefore, these three provinces can represent economic development level in the eastern, central and western regions. Furthermore, these three provinces have generally similar land area to Guangdong. Finally, the Provincial Statistics Bureaus in Shandong, Henan and Guizhou have published relatively reliable and consistent county-level statistical data, which can be used to systematically analyze the inter-county disparities within these three provinces. More significantly, study of these three provinces has been extremely limited. Empirical measurement of spatial inequality in Shandong, Henan and Guizhou can enlarge our knowledge of their regional social and economic development during the reform period.

I calculated the per capita income Gini coefficient and CV in Shandong, Henan, Guizhou and Guangdong in 1988, 1992, 1999 and 2004 (see Fig 9.12 below). The inequality indicator analysis shows that all these three provinces (Shandong, Henan and Guizhou) had experienced fluctuating upward trend of inter-county level economic inequality during the period between 1980 and 2004. The Gini coefficient increased steadily from 1988 to 1992 in Guizhou, from around 0.27 to 0.292 respectively; showing two percent annual growth rate. However, spatial inequality had been rapidly increasing from 1992; it dramatically reached around 0.381 in 1999, and further jumped to 0.472 in 2004. In terms of Henan, per capita GDP Gini coefficient was up to 0.35 in 2004 from 0.3 in 1988. There was only a slight increase between 1988 and 1992; the Gini coefficient was 0.33 in 1992. By contrast, the regional inequality in Henan decreased to 0.27 in 1999 from 0.33 in 1992. As far as Shandong is concerned, the Gini coefficient reached 0.409 in 2004, up by 20 percent from 0.34 in 1988; the growth rate was more prominent during the early 1990s: at 0.392 in 1992. Moreover, between 1992 and 1999, the spatial income inequality in Shandong had shown a decreasing trend; the Gini coefficient was down to 0.35 in 1999.

In comparison, in Guangdong, per capita income Gini coefficients were almost always higher than in the other three provinces in 1988, 1992, 1999 and 2004. The equivalent figures in Guangdong were 0.361, 0.396, 0.418 and 0.452 respectively. In addition, relative to Henan, Shandong and Guizhou, Gini coefficients were also notably high. Henan's Gini coefficient was relatively quite low among Chinese provinces; probably because local economic growth in many counties within Henan is equally slow, and regional income distribution has been more equal. The findings suggest that the real extent of economic development inequalities in Chinese provinces is different. In general, the inter-county level of spatial economic inequality among provinces within China had been getting larger by 2004. It seems the case that uneven regional development tends to be more severe in both the developed and under-developed provinces than in the middle-level provinces.

Fig 9.12: Comparison of the Gini Coefficient for Per Capita Income for Counties in Guangdong, Shandong, Henan and Guizhou in 1988, 1992, 1999 and 2004
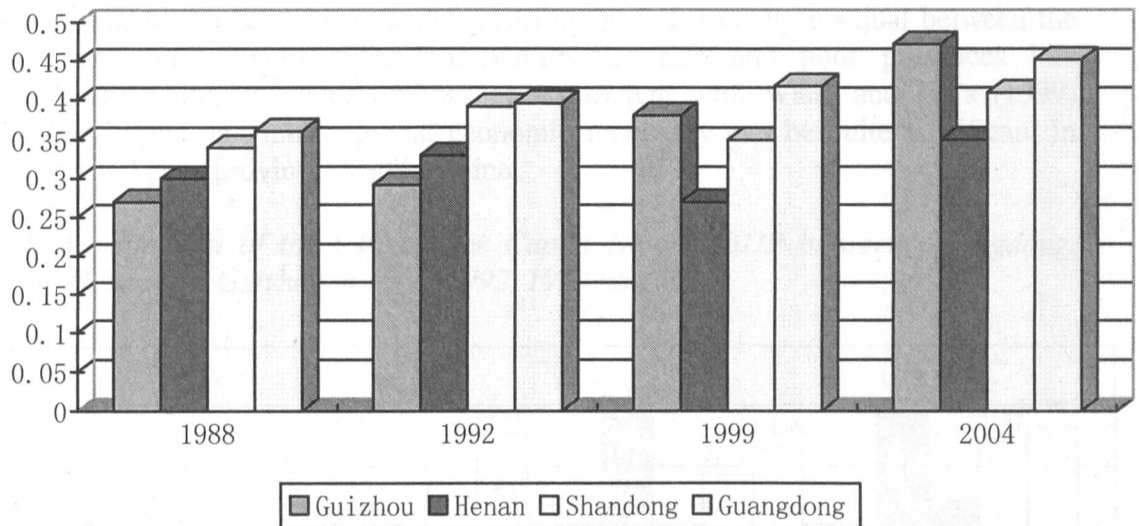
Note:
1. In 1988, Shenzhen was excluded from the calculation of Gini coefficient for per capita NI in Guangdong;
2. Based on the per capita NI and GDP in counties within Guizhou, Henan, Shandong and Guangdong, this study calculated the per capita income's Gini coefficient for the above four provinces in 1988, 1992, 1999 and 2004.
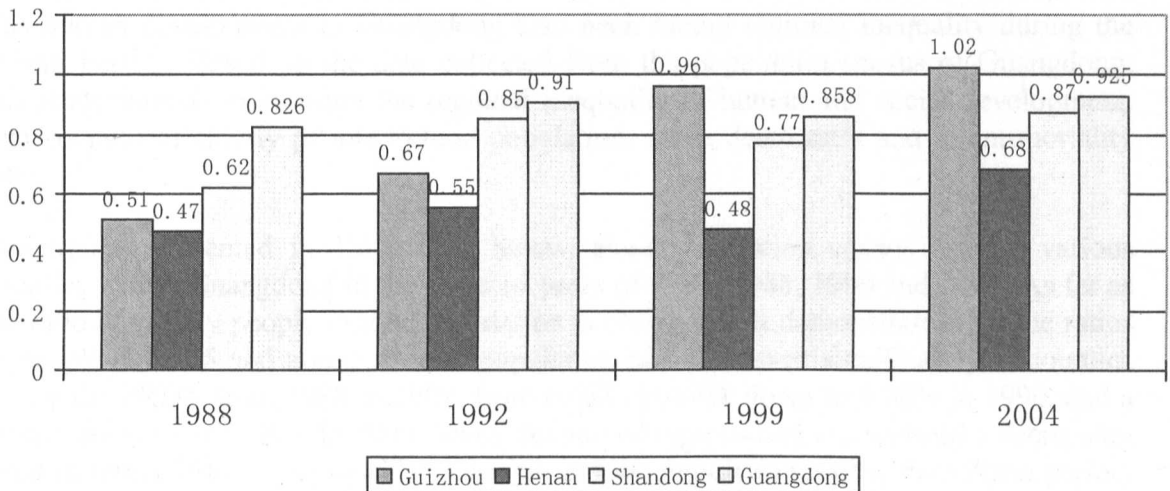
Source:
1. Guizhou Statistical Bureau (1989; 1993; 2000; 2005, various pages)
2. Henan Sheng Difangzhi Bianzhuan Weiyuanhui (1989, various pages)
3. Henan Statistical Bureau (1993; 2000; 2005, various pages)
4. Shandong Sheng Difangzhi Bianzhuan Weiyuanhui (1989, various pages)
5. Shandong Statistical Bureau (1993; 2000; 2005, various pages)
6. GSB (1991, various pages)
7. GSB (1993; 2000; 2005, various pages)

As far as the CV is concerned, the empirical finding demonstrate that all of these four provinces had also experienced similar upward CV trends of regional income inequality, as the Gini coefficient presented. The CV increased dramatically from 1988 to 2004 in Guizhou, with around 7 percent annual growth rate between 1988 and 2004; it arrived at 1.02 in 2004, doubling from 0.51 in 1988. As far as Henan is concerned, per capita income CV was up to 0.68 in 2004 from only 0.47 in 1988; it rose steadily between 1988 and 1992 (four percent growth rate per year), the CV figure was about 0.55 in 1992. In Shandong, the CV had increased to 0. 85 in 1992 from 0.62 in 1988; however, it shows a decreasing trend from 1992 to 1999; at about 0.77 in 1999. From 1999, regional inequality started to rise again until 2004, when it was about 0.87. The growth rate was more remarkable between 1988 and 1992 (about nine percent per year) (see Fig 9.13 below). It suggests that inequality in Shandong had experienced considerable fluctuations between 1992 and 2004.

By contrast, in Guangdong, the CV for per capita GDP was significantly higher than the equivalent figures in Shandong and Henan; this increasing inequality has also been demonstrated in the Gini coefficient analysis. The figures in Guangdong were 0.826, 0.91, 0.858 and 0.925 respectively. Shandong and Guizhou's CV were also notably high. Henan's CV was significantly lower than in the other Chinese provinces. The analysis of

CV clearly shows that regional development disparities tend to be more prominent in both the richest and poorest provinces than in the middle-level provinces. In fact, this study found that both the poor and rich provinces seem to face the worst intra-regional economic inequality, and regional wealth distribution is extremely unequal between the developed and underdeveloped regions within the rich and poor provinces like Guangdong and Guizhou[59]. Our findings are consistent with Wang and Hu's (1999) analysis; they argue that intra-regional economic inequality can be quite significant in both the rich and poor provinces within China.

Fig 9.13: Comparison of the CV for Per Capita NI and GDP between Guangdong, Shandong, Henan and Guizhou in 1988, 1992, 1999 and 2004

Note:
1. Shenzhen was excluded from the calculation of CV for per capita NI in Guangdong in 1988.
Source:
1. The per capita NI and GDP of counties in Guizhou, Henan, Shandong, and Guangdong were collected from the same source as Fig 9.12.
2. Based on the per capita NI and GDP in counties within Guizhou, Henan, Shandong and Guangdong in the various years, this study calculated the per capita income's CV for these four provinces in 1988, 1992, 1999 and 2004.

The findings suggest that almost all of the Chinese provinces have faced the challenge of unequal regional economic development and intensifying intra-regional disparities during the reform period. Moreover, the comparison of the inter-provincial economic inequality by this study has demonstrated that intra-regional disparity within Guangdong is remarkable, as shown in both Gini coefficient and CV for per capita income. Guangdong is one of the provinces in China with the highest intra-regional economic inequality. However, in terms of widening intra-regional economic inequalities within the Chinese

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[59] It is probably because there are only a few regions in Guizhou which are extremely wealthy and have achieved the fast economic growth of some districts surrounding Guiyang and Zunyi municipalities; meanwhile, the majority of counties and districts are very backward and underdeveloped; this is especially true of the counties in the north-west and south-west automatic regions (*shaoshu minzu zizhi zhou*). One of the important causes of fast economic growth in Guiyang is probably its location. Although Guiyang is not located close to the sea, it is the capital city of Guizhou in which the key provincial administrative organizations are located. In terms of China, it is always the case that the capital cities are generally more developed than other places; this is especially true of the underdeveloped provinces, for example, Chengdu in Sichuan, Kunming in Yunnan, and Lanzhou in Gansu.

provinces, Guangdong probably is not the most extreme case. As we can see, regional disparity in the least developed provinces can be more severe; Guizhou is a good example. At least the provincial government of Guangdong has been dealing with its core-periphery pattern of economic inequality by taking actions like preferential developmental policies and inter-regional transportation improvement. Although more work needs to be done, the argument that the government is doing nothing is not appropriate. Moreover, Guangdong's relatively strong financial position might have played an important role in helping its local governments to fight spatial inequalities.

9.7 Measurement of Human Development Inequality within Guangdong

This section attempts to investigate regional inequality in terms of human development. Has human development in Guangdong also been facing regional inequality during the reform period? Based on the data collected from the population census of Guangdong, this study intends to measure the regional inequality of human and social development, such as ratio of elderly people to total population, crude death rates and infant mortality rates.

The figures presented in Table 9.12 below, show population census data in various counties within Guangdong in the selected years of 1981, 1988, 1990 and 2000. As far as the ratio of elderly people to total population is concerned, it demonstrates that the ratios of people aged 65 and above to total population had decreased significantly in counties within the PRDA from 1988 to 2000, from 6.08% in 1988 down to 6.06% in 1990, and a further decrease to 5.56% in 2000. Many developed regions had experienced a decreasing trend in terms of the share of elderly people in total population during the reform period, for example, District of Guangzhou and District of Shenzhen. By contrast, the equivalent figures in the counties within the peripheral region had increased dramatically during the same period; up to 5.79% in 1990 from 5.25% in 1988, and the figure further reached 7.52% in 2000; up by 43 percent from 1988. Both Meixian and Wuhua had presented a steadily upward trend during the same period. In terms of Meixian, the figure had increased to 10.83% in 2000 from just 6.1% in 1988; the ratio of people aged 65 and above to total population in Wuhua was up to 7.72% in 2000 from 5.2% in 1988. An increasingly large number of young permanent migrants have been moving into the PRDA might be an important reason for the declining ratio of older people to total population in the rich and developed regions. Young migrants from various regions in China who are attracted by greater working opportunities, high wages and living standard, have been increasingly migrating into the PRDA over the past two decades; in particular, to the large municipalities within the PRDA (e.g. Guangzhou, Shenzhen, and Dongguan). As far as Guangdong is concerned, although the absolute figures were relatively small, the CV value of the ratio of people aged 65 and above to total population had risen during the period between 1988 and 2000; the figure arrived at 0.263 in 2000 from 0.135 in 1988. The real degree of regional inequality is not so serious in terms of the ratio of elderly people to total population; nevertheless, this data suggests that the gap in the ratio of people aged 65 and above to total population between counties within the PRDA and the periphery has been widening; which might contribute to the upward trend of coefficient of variation.

Moreover, as far as the crude death rate is concerned, in general, the regional performance in the PRDA had not been much better than in the periphery within Guangdong during the period between 1981 and 2000. In fact, since 1990, the crude death

rate in the counties within the PRDA was slightly higher than the equivalent figure in the peripheral region. Nevertheless, both the PRDA and peripheral region had experienced a decreasing trend between 1981 and 2000. The crude death rate in counties within the PRDA rose from 5.45‰ in 1981 to 5.68‰ in 1990; meanwhile, this rate decreased to 5.48‰ in 2000. Similarly, the equivalent figures in the periphery had decreased to 5.18‰ in 2000 from 5.81‰ in 1981, which was a decrease of about 11 percent in 20 years. The crude death rate in the peripheral region was about five percent lower than in the PRDA in 2000. The issue of migration might be an important factor contributing to the high crude death rate in the PRDA. In general, relative to regional economic inequality, the spatial disparity of human development between the regions within Guangdong was notably small. Nevertheless, the CV value for the crude death rate had increased substantially from just 0.137 in 1981 to 0.172 in 2000; up by 25 percent. The regional variance in terms of local health and medical care system, migration, and the fiscal investment spending on public health by the local government, probably had all contributed to the upward trend of CV between 1981 and 2000.

By contrast, more significantly, the infant death rate in the counties within both the PRDA and the periphery had decreased between 1981 and 2000. But the infant mortality rates in the periphery were still significantly higher than the equivalent figures in the PRDA at 19.9‰ in 2000. The infant mortality rate in the PRDA was 8.2‰ in 2000, which was only about 41 percent of the equivalent figure in the periphery. In general, it is important to note that the infant mortality rate had illustrated a downward trend between 1981 and 2000. Nevertheless, the CV value for the infant mortality rate in Guangdong had dramatically increased between 1981 and 2000: from 0.496 in 1981 to 0.69 in 2000; the upward trend of CV suggests there was quite large difference between various regions within Guangdong in terms of infant mortality.

With regard to the regional data of infant mortality rates within Guangdong, there are some issues which should be addressed here. First, the equivalent figures of infant mortality rate in some of the most economically impoverished counties, such as Yangshan and Liannan, were extremely high between 1981 and 2000. The relatively slow economic growth and backward conditions of public health are probably crucial factors explaining the high figures of infant mortality in these counties. Secondly, some densely populated counties had notably high infant mortality rates, for example, Haifeng and Xingning. As far as these regions are concerned, in order to avoid punishment, the strict 'one child per family' policy has caused many pregnant women to give birth in small private hospitals, which have a relatively poor environment and backward medical equipment. Pregnant women have much higher risk of suffering from infections and other diseases in these poor hospitals than in state-run facilities. This reason might help to explain the high infant mortality rate in these populous counties. Thirdly, as discussed earlier, the quality of Chinese population data is suspect. The figures for infant mortality rate in some counties within Guangdong simply cannot be trusted, for example, in Huadu and Dianbai. How can regions with fast economic growth show significant increases in infant mortality rate during the period between 1981 and 2000? It can hardly be true. This research suggests that there must be some reservations concerning interpretation of population census data and analysis of human development in Guangdong.

In general, some important conclusions can be summarized from the empirical analysis of human development indictors. On the one hand, inter-county human inequality has been much lower than the spatial economic disparities within Guangdong during the reform

period. The decreasing trends of crude death and infant mortality rates in both the PRDA and periphery have demonstrated this point. On the other hand, the findings of human inequality analysis suggest that the PRDA has done better than the peripheral region in terms of human development; this is especially true of infant mortality rate. Nevertheless, the human development performance in the PRDA is not so desirable. The crude death rate and the ratio of elderly people in total population in the PRDA were worse than the equivalent figures in the periphery. More significantly, the findings of this study indicate that there is increasing inequality of human development in the various regions within Guangdong during the reform period, as shown in the upward trends of CV value for all human development indicators. For example, according to the educational figures given by the Population Census Office of Guangdong Province (1992; 2002), in terms of the ratio of illiterate population to total population aged 15 and over, spatial inequality has also existed in the various regions within Guangdong. The economically poor and underdeveloped regions tend to have higher ratios of illiterate population than the developed regions.

Table 9.12: Human Development Indicators in Guangdong's Counties 1981-2000

Region	People aged 65 and above in total population% (1988)	People aged 65 and above in total population% (1990)	People aged 65 and above in total population% (2000)	1981 Crude Death rate‰	1990 Crude Death rate‰	2000 Crude Death rate‰	1981 Infant Mortality rate‰	2000 Infant Mortality rate‰
The PRDA								
District of Guangzhou	6	6.5	6.1	5.4	5.71	5.39	11	10.4
Huadu	5.5	5.9	6.08	5.8	5.3	6.05	15	18.5
Conghua	5.3	5.8	6.85	5.4	5.32	5.52	19	8.1
Zengcheng	4.9	5.6	6.05	5	5	5.01	10	8.2
Panyu	5.4	6	4.29	5.8	5.66	5.6	13	4.6
District of Shenzhen	4.8	1.6	1.23	4	6.24	3.02	8	6
Baoan	7.1	2.8	0.97	5.4	10.3	9.2	13	3.2
District of Zhuhai	5.5	3.5	4.03	5.2	4.48	3.98	17	7.6
District of Huizhou	5.8	4.6	6.23	4.6	6.8	5.61	10	8
Huiyang	6.4	6.6	5.54	5.6	6.35	5.24	12	9
Boluo	5.1	5.8	7.17	5.1	5.37	5.16	15	11
Dongguan	5.6	4.9	10.27	4.9	4.92	1.61	8	6.9
Huidong	6.1	6.1	6.91	5.8	5.84	5.18	15	9
District of Foshan	7.2	6.1	4.45	5.6	5.37	5.24	8	7.3
District of Jiangmen	6.5	6.4	6.55	5.6	4.86	4.84	11	8.4
Sanshui	7.2	7.6	5.67	6.2	5.5	5.95	21	8.4
Nanhai	7.3	6.8	3.59	6.1	5.69	6.04	11	6.5
Shunde	6.5	6.5	4.52	6.2	6	6.44	12	6.7
Zhongshan	5.7	6.2	5.16	5.7	5.35	6.8	8	6.3
Doumen	5.2	5.8	5.9	4.8	4.6	5.03	14	9.7

Xinhui	6.5	7.7	6.84	5.6	5.35	6.06	11	5.9
Taishan	7.1	8.5	7.17	5.7	6.18	6.73	10	9.8
Enping	5.9	6.7	5.53	5.7	5.21	6.18	9	10.8
Kaiping	7	8.5	7.18	5.7	5.63	5.86	8	9
Heshan	7.3	8.5	5.1	6.2	5.96	5.92	13	1.8
Gaoming	6.3	7.1	5.11	5.7	5.21	6.34	9	8.5
District of Zhaoqing	5.1	5.7	5.81	4.4	5.29	4	13	11.8
Average	6.08	6.06	5.56	5.45	5.68	5.48	12	8.2

The Periphery

Xinfeng	5.1	5.6	8.76	6.8	5.67	4.53	27	25.5
Longmen	5.7	5.7	8.51	5.7	5.83	4.92	19	15.8
District of Shaoguan	3.9	4	7.51	4.3	5.14	3.93	17	7.9
Qujiang	5.3	5.4	7.63	5.3	5.47	5.1	26	17.9
District of Shantou	5.8	6.2	6.61	4.9	5.47	4.4	7	6.9
District of Chaozhou	6.1	6.4	7.9	5.4	5.35	5.74	9	5.4
Chenghai	5.2	6.2	7.76	5.8	5.18	5.42	15	8.5
Raoping	4.6	5.5	7.67	5.5	5.68	5.09	12	9
Nanao	4.8	5.5	6.97	6.5	5.78	5.85	14	13.5
Chaoyang	4.7	5.4	5.98	5.3	5.09	5.05	12	3.1
District of Jieyang	4.9	6.1	6.5	5.7	5.51	4.63	7	9.6
Jiexi	5.5	6.9	8.43	5.5	5.6	4.59	7	4.3
Puning	4.5	5.4	5.56	5.1	5.3	4.74	9	8.1
Huilai	4.9	5.7	6.08	5.4	5.2	4.54	11	4.2
Lufeng	5.2	5.4	5.15	5.3	5.24	4.05	11	5.8
Haifeng	6.5	6.5	7.04	5	5.59	5	7	25.3

District of Meizhou	5.2	6.1	9.26	4.2	5.42	5.7	12	10.2
Meixian	6.1	7.2	10.83	5.4	5.93	5.78	18	10
Dapu	5.5	6.8	12.19	5.6	5.93	5.81	27	34
Fengshun	5	6	9.54	5.4	5.81	4.82	13	9
Wuhua	5.2	5.7	7.72	5.7	6.06	4.73	22	15.3
Xingning	5.5	6.5	8.93	5.9	5.91	5.32	19	32.1
Pingyuan	5.8	6.5	9.36	6	5.79	5.48	22	10.7
Jiaoling	5.9	6.7	9.7	5.6	5.93	6.35	20	12.7
Zijin	5.6	6.4	9.38	5.6	5.26	4.8	20	24.5
Heping	4.8	5.1	8.34	7.4	5.39	5.14	36	33.4
Lianping	5	5.3	8.04	6.9	5.35	5.34	30	31.2
District of Heyuan	5.3	6.1	8.86	6.6	5.78	4.84	33	19.8
Longchuan	5.3	6.1	9.22	6.3	5.6	4.88	29	21.1
Shixing	4.7	4.9	5.1	6.1	5.56	5.87	28	24.1
Nanxiong	4.9	5.2	8.69	7.2	6.73	6.13	42	33.6
Renhua	4.9	4.7	4.8	5.5	5.85	5.82	28	22.5
Lechang	4.6	4.7	6.08	5.9	5.47	4.75	36	33.4
Lianzhou	5.2	5.1	8.23	6.3	5.85	5.87	22	39.4
Yangshan	5.3	5.4	8.27	6.8	6.27	5.73	29	41.1
Yingde	5.1	5.5	8.45	6	5.75	4.98	30	26.1
District of Qingyuan	6.1	6.9	8.4	5.5	5.83	4.9	20	11.8
Fogang	6.1	6.5	8.77	6.1	6.09	5.49	20	20.6
Wengyuan	5	5.1	4.9	6.9	5.85	5.4	37	36
Lianshan	5.2	5.1	7.4	6.3	5.86	5.99	24	34.8
Liannan	4.1	4.4	6.89	6.7	5.9	6.31	47	57.3

Ruyuan	5.1	5.2	5.3	7.3	5.74	5.39	46	29.5
Gaoyao	6.1	6.9	6.66	6.1	5.74	5.75	14	6.3
Sihui	6.5	7.4	5.94	6.3	6.6	5.94	22	9.8
Guangning	5.8	6.7	6.8	6.6	6.85	6.08	22	21.2
Huaiji	4.8	5	5.1	7.1	6.68	5.42	22	22.3
Fengkai	5.6	5.9	6	6.7	6.56	5.95	25	16.9
Deqing	5.5	6	6.1	6.8	6.18	5.97	23	11.1
District of Yunfu	6.1	6.3	6.64	6.1	5.28	5.38	16	15
Xinxing	6.3	7.2	7.4	5.9	6.28	5.48	10	12.9
Yunan	5.7	6.2	6.4	7	5.87	5.88	24	21
Luoding	5.2	5.7	6.9	7	5.77	4.92	25	22.7
District of Zhanjiang	5	5.4	6.16	4.3	5.67	4.01	15	26.1
District of Maoming	4.4	4.9	6.87	5.1	4.28	3.29	13	6.4
District of Yangjiang	5.3	6.1	6.49	4.1	4.76	5.1	10	24.2
Yangchun	4.7	5.5	6.51	4.7	5.31	4.96	13	52.4
Xinyi	5	6	8.85	7	5.96	4.93	23	23.3
Gaozhou	4.8	5.8	8.9	5.5	5.82	4.84	20	21.9
Dianbai	4.8	5.3	7.12	4.8	4.17	5.05	15	25.3
Wuchuan	4.9	5.6	7.24	4.8	5.17	5.31	14	10.9
Huazhou	4.6	5.5	8.65	5.6	5.12	4.96	28	33
Lianjiang	5.4	6.1	8.85	4.8	5.27	4.61	15	19.8
Suixi	5.4	5.7	8.42	4.7	5.61	4.06	15	9.7
Xuwen	5.1	4.7	7.2	4.5	5.51	4.76	21	21.4
Average	5.25	5.79	7.52	5.81	5.66	5.18	20.7	19.9

Guangdong Province

291

	5.5	5.87	6.94	5.7	5.66	5.27	18.1	16.49
Mean								
Standard Deviation	0.743	1.058	1.831	0.781	0.705	0.907	8.984	11.32
Coefficient of Variation	0.135	0.178	0.263	0.137	0.124	0.172	0.496	0.69

Note:
1. The calculation equation for crude death rate is: crude death rate = total dead people in one specific year / total permanently registered population in that specific year
2. The calculation equation for infant mortality rate is: infant mortality rate = total of infants dying in one specific year aged less than one year / total of babies born in that specific year

Source:
1. NBS (1988, pp. 638-45)
2. NBS (1997, pp. 318-20)
3. Population Census Office of Guangdong Province (1992; 2002, various pages)

Regional human development in the other Chinese provinces needs to be discussed in order to objectively measure the real extent of regional human disparity in Guangdong. It is ideal to analyze the regional disparity of human development by measuring average life expectancy at birth in the different regions. Owing to lack of data availability, this study was not able to measure regional human disparity during the reform period in terms of life expectancy. Nevertheless, there is a very positive correlation between life expectancy and ratio of old people. It is not difficult to understand that when the ratio of older people to total population increases, the average life expectancy at birth also tends to rise. Therefore, by measuring the ratio of older people, life expectancy can generally be reflected. I decided to compare the regional human disparity within Guangdong with three chosen provinces – Shandong, Henan and Guizhou – during the 'reform and open-door' period in terms of the ratio of older people to total population, crude death rate and infant mortality rates. The figures presented in Fig 9.14 below illustrate that the ratio of people aged 65 and above to total population in all four provinces had increased significantly during the period from 1980 to 2000. In particular, Guangdong had a relatively high ratio compared to the other three provinces from 1980 to 2000. The equivalent ratios in Guangdong were 5.47%, 5.87% and 6.94% in 1980, 1990 and 2000 respectively; Henan ranked second the equivalent figures were 5.2%, 5.83% and 6.92% in 1980, 1990 and 2000 respectively. Moreover, the ratio of people aged 65 and above to total population in Shandong had just increased slightly during the same period; it was 5.41% in 1980 up to 5.65% in 2000, which was an increase of only four percent during the 20 year period. Relative to other provinces, Guizhou had almost the lowest ratio between 1980 and 2000: the figure was up to 5.96% in 2000 from 4.66% in 1980.

Fig 9.14: Ratio of People aged 65 and above to Total Population in Guangdong, Shandong, Henan and Guizhou 1980-2000, (unit: %)
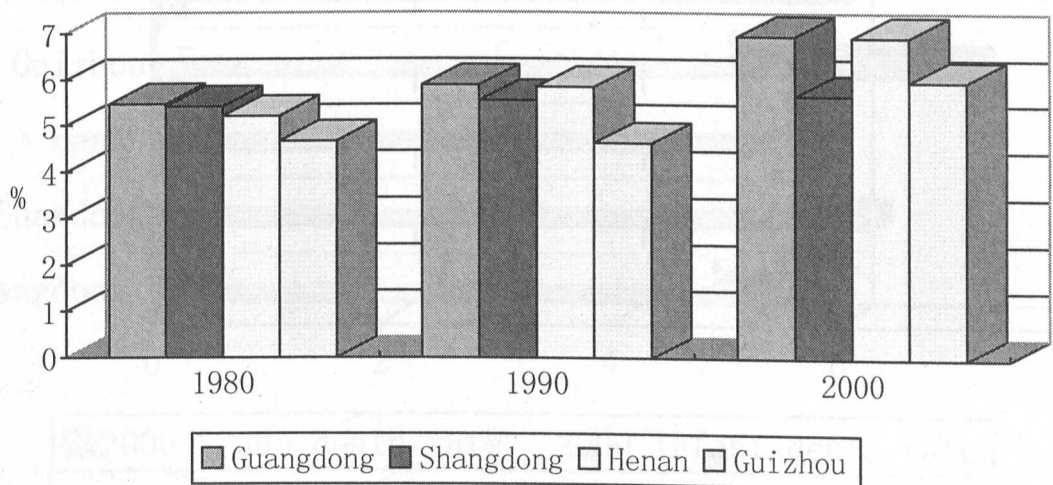
Source:
1. Population Census Office of Guangdong Province (2002, pp. 460-79; pp. 594-601; pp. 691-97)

2. Population Census Office of Henan Province (2002, pp. 5-8; pp. 473-77; pp. 631-32)
3. Population Census Office of Guizhou Province (2002, various pages)
4. Population Census Office of Shandong Province (2002, various pages)
5. NBS (2000; various pages)

In addition, according to the data shown in Fig 9.15 below, in 2000, Guangdong also had the lowest crude death rate of 5.27‰. In the same year, Guizhou had, at 7.1‰, the highest crude death rate, not only compared to the other three provinces but also to national average figures, in 2000. In addition, Guangdong had the lowest infant mortality rate: of 4.78‰ in 2000.

The analysis of population census data suggests that the regional inequality in Guizhou was very severe during the reform period; it is shown not only in the economic sector but also in the human development sector. This study found that Guizhou had the highest inequality figures in terms of per capita income, crude death rate and infant mortality rate in China. To be fair, relative to the other provinces, the findings of this section suggest that Guangdong, and the PRDA had actually not performed badly in human development. This is probably because the local government in Guangdong had the capability to spend more money on public medical care and health than the other three provinces. However, there are some significant variations found in the different counties within Guangdong, as the increasing CV figures for the regional inequality of human development demonstrated earlier.

Fig 9.15: Crude Death and Infant Mortality Rates in Counties within Guangdong, Shandong, Henan, Guizhou and Nationally, 2000 (unit: ‰)
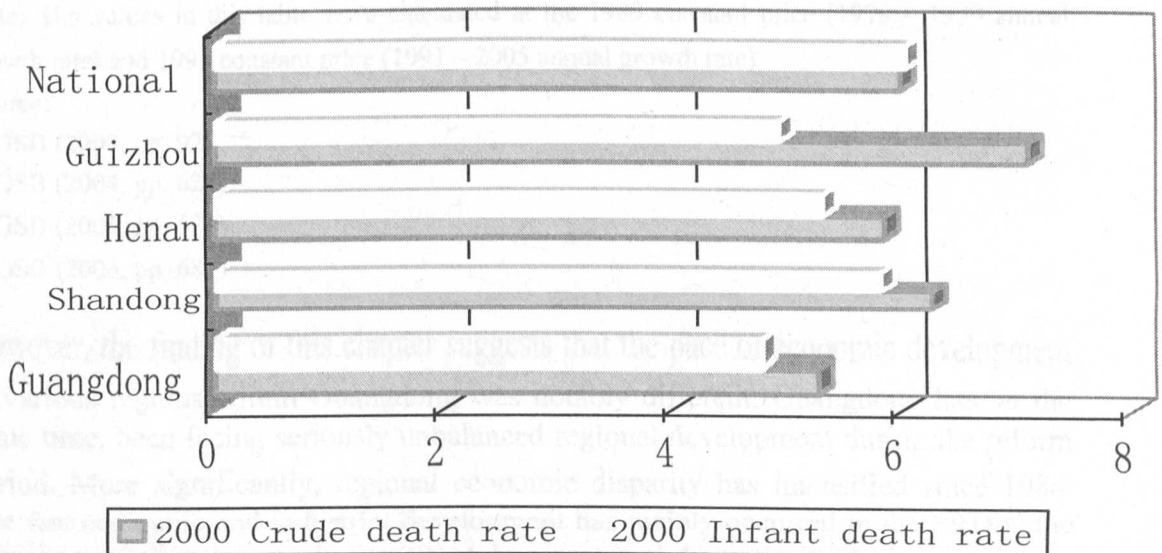
Source:

1. Population Census Office of Guangdong Province (2002, pp. 460-79; pp. 594-601; pp. 691-97)

2. Population Census Office of Henan Province (2002, pp. 5-8; pp. 473-77; pp. 631-32)

3. Population Census Office of Guizhou Province (2002, various pages)
4. Population Census Office of Shandong Province (2002, various pages)
5. NBS (2000; various pages)

9.8 Conclusion

Guangdong has made remarkable advancements in economic development since the late 1970s, and has been one of the fast growing provinces in China during this period. The figures presented in Fig 9.16 illustrate the annual growth rate of per capita income in Guangdong. Due to state-oriented development policies, geographical advantage and foreign trade, the economic growth in Guangdong since 1978 has been impressive. Guangdong has become one of the most prosperous and developed regions in China.

Fig 9.16: Annual Growth Rate of Per Capita GDP in Guangdong 1979-2005, (unit: yuan)
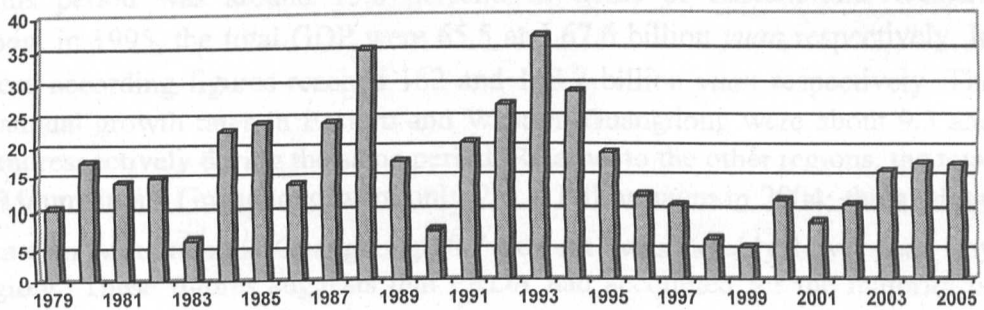
Note: The values in this table were calculated at the 1980 constant price (1979 – 1990 annual growth rate) and 1991 constant price (1991 – 2005 annual growth rate)
Source:
1. GSB (2000, pp. 92)
2. GSB (2004, pp. 629)
3. GSB (2005, pp. 629)
4. GSB (2006, pp. 687)

However, the finding of this chapter suggests that the pace of economic development in various regions within Guangdong was notably different. Guangdong has, at the same time, been facing seriously unbalanced regional development during the reform period. More significantly, regional economic disparity has intensified since 1980. The fast economic and industrial development has mainly occurred in the PRDA; the average per capita income in the PRDA has increased dramatically during the reform period. In contrast, the overall picture of economic development in the peripheral region is completely different. The general economic growth in the other regions has been much slower than in the PRDA, and per capita income in these regions has been substantially lower than the equivalent figure in the PRDA. In particular, the

295

underdevelopment and slow growth in the interior and hills regions within Guangdong is evident. The economic growth in the periphery has been far behind that of the PRDA since 1980. The peripheral region has not enjoyed economic benefits to the same extent as the PRDA over the past two decades. In addition, there is a growing inequality gap between the wealthy core region and the economically backward peripheral region.

Moreover, the case of regional inequality within Guangdong is different to other Chinese regions. It was found that the spatial economic inequality within Guangdong had not, on the whole, been reflected in the coast-inland region level; but more significantly, in the core-peripheral region level. The inequality gap between the core region (the PRDA) and the rest of Guangdong (the peripheral region) was vast. The land area of PRDA accounts for only 25 percent of total area in Guangdong. By contrast, the peripheral region occupies the majority of Guangdong's total area (around 75 percent). According to the data presented in Table 9.13, in terms of the PRDA, the total GDP was only 389.9 billion *yuan* in 1995; however, the equivalent figure was up by 3.5 times to 1339.4 billion *yuan* in 2004. The annual growth rate during this period was around 13.8 percent. In terms of Eastern and Western Guangdong, in 1995, the total GDP were 65.5 and 67.6 billion *yuan* respectively. In 2004, these according figures reached 162 and 163.2 billion *yuan* respectively. The average annual growth rates in Eastern and Western Guangdong were about 9.3 and 8.9 percent respectively during the same period. Relative to the other regions, the total GDP in Mountainous Guangdong were only 251.4 billion *yuan* in 2004; the average growth rate in Mountainous Guangdong (8.7 percent) was notably lower than any other regions. These figures suggests that PRDA had accounted for the majority of Guangdong's total GDP output by 2004; its share had been getting largger during 1995 and 2004 due to the relatively high annual growth rate. For example, in 1995, the PRDA, Eastern Guangdong, Western Guangdong and Mountainous Guangdong's GDP accounted for about 61, 10, 10.7 and 17 percent of total GDP in Guangdong respectively; in 1999, the equivalent figures arrived at 63, 11, 9.6 and 15 percent respectively. Moreover, in PRDA, the GDP output had accounted for nearly 70 percent of total GDP of Guangdong by 2004.

Table 9.13: Total GDP in Various Regions within Guangdong 1995-2004, (unit: billion yuan)

Region	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Annual growth rate %
PRDA	389.9	453.3	522.2	583.3	643.8	737.8	836.3	941.8	1134.1	1339.4	13.8
Eastern Guangdong	65.5	78.4	93.7	107.3	116.3	120.9	123.5	130.9	143.8	162.0	9.3
Western Guangdong	67.6	77.6	87.0	93.2	99	106.8	116	126.1	141	163.2	8.9

Mountainous Guangdong	107.2	125	136.6	150.9	162.2	172.1	185	199.6	219.3	251.4	8.7

Note:

1. The values in this table were calculated at the current prices;

2. From 1995, the Guangdong Statistical Bureau started to systematically publish the GDP data in various regions in Guangdong.

Source:

GSB (1996-2005, various pages)

In Guangdong, many social and economic achievements of the reform period deserve to be praised; nevertheless, rising regional inequality is surely not one of them. The development model of Guangdong has been shadowed by its rising regional disparity. The peripheral region should have developed more rapidly since 1978; the people living in the periphery deserve to have better living conditions. The purpose of the following chapter is to investigate the major causes of rising spatial inequality within Guangdong during the reform period. The crucial questions for this study, therefore, are to examine why the regional distribution of economic growth within Guangdong is so unequal during the reform period. As shown in Table 9.3, many regions in Guangdong had relatively similar per capita income in 1980. This suggests that regional economic growth was relatively balanced at the beginning of 1980s. The Gini coefficient was only 0.267 in 1980. From my point of view, regional economic development in Guangdong is not inherently unbalanced; every region should be able to share the economic benefits. This research project attempts to examine the main factors contributing to the rising spatial inequality within Guangdong since 1980, and to what extent, the worsening regional economic inequality can be explained by its geography.

With regard to regional price differences, the results released from the field price survey suggest that price differences among the regions in Guangdong do exist; the absolute price difference for selected representative commodities is about 8-10 percent. However, more significantly, the findings clearly illustrate that regional price difference has not been sufficient to seriously influence the general developing trend of regional disparities within Guangdong during the reform period. Moreover, as far as China is concerned, temporary migration makes a difference to regional economic inequality. Nevertheless, this study suggests that the role played by migration in development of spatial inequality is not as influential as some scholars claim. Migrant workers have not fundamentally affected regional economic disparities within Guangdong.

Chapter 10 Main Cause Analysis of Regional Inequality in Guangdong: Part I

10.1 Introduction

The previous chapter presented the developing trend of regional inequality in Guangdong during the reform period. Based on this analysis, this chapter is in the appropriate position to investigate the major factors causing regional economic growth and spatial inequality in the context of Guangdong Province. Before discussing geographical effects in the next chapter, this chapter attempts to analyze the significance of history, foreign direct investment and the state to regional economic development in Guangdong. On the one hand, I hope to offer proper estimation of the role played by history in influencing economic development during the reform period. On the other hand, I attempt to draw general conclusions with regard to foreign capital and the impact of the post-1978 state on the balance of regional economic development in Guangdong.

The three main sections in this chapter are organized as follows. Section Two examines the contribution of history to the widening spatial economic disparity in Guangdong. Sections Three and Four discuss the role played by foreign direct investment and the state in shaping regional economic growth and widening the unbalanced regional development. Finally, this chapter draws conclusions in Section Five.

10.2 The Historical Factor and Regional Economic Growth

The role played by history in affecting regional economic development in Guangdong since 1978 should be carefully discussed. The historical legacies to formation of the industrial and economic agglomeration in the PRDA should not be ignored. The emergence of economic concentration and industrial clustering, focused on Guangzhou, would not have occurred suddenly. Historical prosperity in commerce and trading activities helped to attract investors and led to the tendency of regional economic agglomeration. Detailed discussion of industrial cluster and economic agglomeration in the PRDA is presented in the next chapter. In fact, almost all of the 20 richest counties in the PRDA have inherited a long history of trade and commerce. For example, Guangzhou has a long and dynamic history of trade and civilized culture. Vogel (1989) points out that foreign trade out of Guangzhou started from the 8th century. Since then, Guangzhou had played a central role in foreign economic trade until 1949. Guangzhou was the only East Asian port trading worldwide during the period between 1760 and 1842. In addition, Sung, et al, (1995, p. 13) demonstrate that,

The Pearl River Delta has a long history of foreign trade. Guangdong has the longest coastline among China's provinces, and Guangzhou, the capital of Guangdong, was the trading centre of South China in the 16th century. Before the European expansion into East Asia, Guangdong merchants controlled Southeast Asian trade.

Moreover, the early studies conducted by HSBC (1985) and Vogel (1989) both described the long trading history of Guangzhou. Significantly, historical factors even influenced industrial and economic growth in the peripheral and mountainous regions. History matters for economic growth, and Shaoguan provides a classic illustration of this point.

10.2.1 The Historical Legacy and Economic Development in Shaoguan

The relatively rapid economic development in Shaoguan has demonstrated a challenging case in the study of the unbalanced regional growth in Guangdong during the reform period. Shaoguan District is located in a northern mountainous region and suffers from various kinds of geographical disadvantages; nevertheless, it ranked eighteenth in terms of 2005 GDP per capita among the county-level regions in Guangdong. Shaoguan District is one of the twenty most developed regions in Guangdong. If the theoretical arguments made by traditional economic geography make sense, rapid industrial growth and economic development should be difficult to achieve in a region like Shaoguan, which is geographically remote, a long distance from the coast and, unlike the PRDA, lacks proximity to large markets. According to *Shaoguan Shizhi* (2001), mountains account for more than 78 percent of total land area in Shaoguan (30,687 square kilometers); most of which are between 700 and 1,000 meters high. Shaoguan is the most mountainous region in Guangdong. In contrast to the other hill regions, why is Shaoguan so special? Why has this region performed so well in terms of economic development during the reform period? What is the driving force behind economic growth in Shaoguan District? In order to thoroughly investigate the regional economic disparity in Guangdong and its major causes, the case of Shaoguan cannot be ignored.

Table 10.1: Annual Growth Rate of GDP Per Capita in Shaoguan 1992-2005 (unit: %)
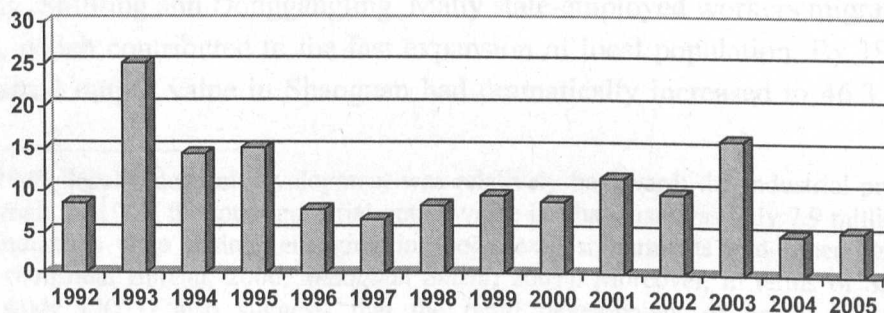
The economic development in Shaoguan during the reform period cannot be properly understood without addressing its historical legacy. According to *Shaoguan Shizhi* (2001), for more than one thousand years, Shaoguan was the key transportation centre for economic and goods communication between North and South China. This region was the political, economic and cultural centre of northern Guangdong. Moreover, the relatively rapid development in Shaoguan District during the reform period has significantly benefited from the dramatic expansion of heavy industry in this region before 1978. The high income per capita in this region is closely linked to its historical legacy of the development of defence and other heavy industries during the Maoist period. Shaoguan is perhaps the biggest winner in Guangdong during the 'Third Front Construction' period.

From a historical angle, the industrial development in Shaoguan can be dated from the Tang and Song Dynasties; the metallurgical and casting industry was relatively advanced at that time. During the Republic period, some mining and other heavy industries were established here. In the period between 1934 and 1935, a fighter plane manufacturing factory was set up in Shaoguan by the Republic's government. At least 40 air fighters had been manufactured in this factory (Planning and Economic Development Bureau of Shaoguan, 2000). However, the really dramatic growth of heavy industry in this region occurred after 1949 when the Chinese Communist Party came to power[60].

In general, the industrial development in Shaoguan during the pre-reform period can be separated into two sub-periods (1950-1966 and 1967-1977). In terms of the first sub-period, the construction of a heavy industry base was the major driving force behind industrial expansion in this region. Shaoguan is regarded as the strategic hinterland in northern Guangdong by both the provincial and central government of China. In 1958, due to its rich reserves of natural resources, Shaoguan was designated as the 'Heavy Industry Base of Southern China' by the central government. Since then, chemical, electrical machinery and some other heavy industries have been increasingly established in Shaoguan District and its surrounding satellite areas, such as Wuliting, Shiliting and Donggangling. Many state-employed workers migrated into Shaoguan, which contributed to the fast expansion of local population. By 1962, the total industrial output value in Shaoguan had dramatically increased to 46.3 million

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[60] Before 1949, local industrial development was relatively backward; the industrial production scale was small. In 1949, the total industrial output value in Shaoguan was only 7.9 million *yuan*, the local industries were mainly engaging in food, textiles, garments and other handicrafts (Shaoguan Statistical Bureau, 2006; *Shaoguan Shizhi*, 2001). Moreover, in terms of Shaoguan, Bramall's study (2007) also suggests that the rapid development of heavy industry and industrialization in Shaoguan should be traced to the 1950s.

yuan, which was more than 16 times higher than the equivalent figure in 1949. Until 1966, the share of heavy industry in total industrial value of Shaoguan was up to 80 percent (*Shaoguan Shizhi*, 2001, p. 174). Wu Yuwen (1985) argues that Shaoguan has been transformed into an important industrial region in Guangdong since the early 1950s; particularly, industrial expansion concentrated on iron and steel, non-ferrous metal, machinery manufacturing, electrical power generation and coal mining industries during the second five-year period.

Table 10.2: State-oriented Capital Investment in Large and Medium Development Projects within Guangdong, 1957-1964

1957	143.3 million *yuan*	1961	270.4 million *yuan*
1958	302.97 million *yuan*	1962	613.15 million *yuan*
1959	432.15 million *yuan*	1963	94.14 million *yuan*
1960	91.12 million *yuan*	1964	50.87 million *yuan*

(Source: *Guangdong sheng guomin jingji he shehui fazhan tongji ziliao*, p.198)

Reproduced from Bachman (2001, pp. 294)

After 1966, Shaoguan was designated as one of the key construction centre of the 'Little Third Front of Guangdong' by the central government[61]. In order to develop heavy industries and make necessary improvements to local infrastructure, a huge amount of external capital has been invested in Shaoguan by both the provincial and central government. As a result, many heavy industrial factories (regarded as the 'Little Third Front Enterprises') were set up in Shaoguan District; some of these firms were established in remote counties within Shaoguan. For example, machinery, semi-radio, electrical and pharmaceutical factories were located in Lian County, Lianshan, Liannan and Renhua. During this period, many key heavy industrial enterprises had been established in Shaoguan, which were fully funded by either the provincial or central government, including the Metallurgical Metal Factory of Shaoguan (*Shaoguan Yelian Chang*), the lead and zinc mining of Fankou (*Fankou Qianxin Kuang*), Shaoguan Iron & Steel Firm (*Shaoguan Gangtie Chang*), and Dabaoshan Mining Factory. Moreover, some industrial enterprises originally located in the coastal regions within Guangdong (e.g. Guangzhou and Shantou), moved to Shaoguan during the "Third Front" period, including turbine, diesel engine, oil pumping and textile firms (*Shaoguan Shizhi*, 2001, p. 748). Bramall's research (2007) has also suggested an industrial boom in construction of Third Front enterprises in

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[61] Yang Dali has done a detailed study of Chinese economic development during the 'Third Front Construction' period. In order to protect its defence and other heavy industries from the potential foreign threat (Soviet Union and America) during the 1960s, Mao designated that more defence industries should be established in the interior regions within China; the so-called 'Third Front Area'. Guangdong Province, even though located in the coastal region, has areas of small-scale third front construction, such as Shaoguan municipality, which are mainly in the northern region. Bachman (2001, p. 294) argues that "In short, Guangdong had become a big Third Front province, perhaps by contributing to a redefinition of what the Third Front was."

Shaoguan during the Maoist era. He argues that many industries had been relocated to the mountainous regions from the coastal regions in Guangdong.

During the whole pre-reform period between 1949 and 1978, compared to its average growth rate of first and tertiary industries (3.4 and 7.3 percent respectively), the average industrial growth in Shaoguan was up to 16.8 percent (Planning and Economic Development Bureau of Shaoguan, 2000). According to the estimation made by Bachman (2001), about 5.04 billion *yuan* was invested in the heavy industry of Guangdong during the period from 1964 to 1978. Shaoguan is one of the few major heavily industrialized areas in Guangdong, and under the circumstances, it is reasonable to believe that Shaoguan had received a large portion of this investment. Bramall (2007, p. 302) stresses that,

Any notion, then, that Guangdong was essentially unaffected by Maoist industrialization is flatly contradicted by the Shaoguan evidence.

Bachman's article '*Defence Industrialization in Guangdong*' (2001) is an important study investigating the historical contribution of the 'Heavy Industry Base' and 'Little Third Front' to industrial and economic development in Shaoguan during the pre-reform period; more significantly, the potential spillover effects generated from this historical legacy of industrial development in the reform decades. Shaoguan District was one the main beneficiaries in Guangdong during the 'Third Front Construction' period of Mao's development policy in terms of industrial enterprises and state-funded capital investment. This is especially true of the fast expansion of the defence and other heavy industries like coal mining and steel. Bachman (2001) has offered more detailed analysis regarding this issue.

The external capital invested in the heavy industries of Guangdong by the state dramatically increased after 1958. A significant portion of the state-funded fixed capital investment had been offered to defence and other heavy industries in Guangdong during the Maoist period. According to Wu's estimation (1985), the average ratio of heavy industry investment in total industry investment of Guangdong was up to 83.9 percent during the second five-year planning period. During the third and fourth five-year planning periods, the development of heavy industry in this region had been continually emphasized. In contrast to the average growth rates of 8.5 and 6.9 percent for light industry during the same period, the average output growth rates of heavy industry were up to 14.8 and 13.7 percent during the third and fourth five-year planning periods respectively. According to the data shown in Table 10.3, the ratio of heavy industry investment in the total industry investment of Guangdong had experienced dramatic increase after the first five-year planning period. The ratio of heavy industry in total industry investment of Guangdong jumped to 83.9 percent in the second five-year planning period from only 49.2 percent in the first five-year period, a rise of 70 percent. The dominant position of heavy industry in total industry investment of Guangdong had been maintained during the pre-reform period. During the Maoist era, the emphasis on heavy industry development in Guangdong by the

state was evident: with the defence sector being the biggest gainer. As far as Shaoguan is concerned, Bachman (2001) claims that ten key places in Guangdong established defence industries during the pre-reform period, and Shaoguan municipality alone accounted for up to six of them.

Table 10.3: Average Percentage of Heavy and Light Industries in Total Investment of Guangdong's Industries during the Period 1950-1983

Period	Light industry	Heavy industry
Recovery period (1950-1952)	62.3	37.7
First five-year plan period	50.8	49.2
Second five-year plan period	16.1	83.9
Readjustment period (1963-1965)	20.5	79.5
Third five-year plan period	11.0	89.0
Fourth five-year plan period	9.9	90.1
Fifth five-year plan period	11.8	88.2
1979-1983	26.81	73.19

Source: Guangdong Statistics Yearbook 1984

Reproduced from Wu (1985, pp. 226)

Moreover, a local research report conducted by the Economic Institute of the Special Economic Zones, Hong Kong and Macao, Jinan University (2006)[62], offers some detailed analysis regarding the history of industrial development in Shaoguan. The report argues that the historical development of heavy industry during the pre-reform period from 1950 to early 1970s has provided the fundamental basis for further industrial growth in Shaoguan since 1978. The industrial legacy has enabled this region to transform itself into a modern industrial city and important heavy industrial base in Guangdong during the reform period. Since 1978, Shaoguan has been preminent in economic growth among the four mountainous municipalities of North Guangdong. Significantly, in terms of the northern region, this report highlights that the outstanding economic performance in Shaoguan is mainly contributed by its historical industrial advantage. Many of these heavy industrial enterprises established during the pre-reform period have become the economic backbone and mainstay of Shaoguan since 1978, and have contributed a significant portion of local tax revenue and GDP[63]. As *Shaoguan Shizhi* (2001, p. 178) states,

The backbone enterprises located in this district (e. g. the casting, turbine and oil-pumping firms) have held the sufficient production equipments and advanced technology; and they have played an important role

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[62] This research was originally referenced from the Chinese book named 'Scientific Development and Building Harmonious Shaoguan', published by the Municipality Government of Shaoguan in 2006. For simplicity of referencing, it is cited as Jinan University (2006) in this research.

[63] "Shaoguan Iron & Steel Firm (*Shaogang*), Shaoguan Metallurgical Firm (*Shaoye*), Shaoguan Energy Firm (*Shaoneng*) and Shaoguan Casting Firm (*Shaozhu*) are the key enterprises for Shaoguan. They are the driving force stimulating the growth of local economy and tax revenue in Shaoguan." (Jinan University, 2006, p. 607)

My view is this: rapid expansion of heavy industry and dramatic industrial growth during the pre-reform period provided the basis for economic development in Shaoguan District after 1978. The inheritance of powerful industrial capacity has contributed to stimulate further economic and industrial growth in this region during the reform period. In that sense, historical legacy is the key to understanding the fast growth in such a remote and northern mountainous region. The maintenance of economic prosperity in Shaoguan is mainly due to its historical legacy. In their research of the regional economic development in Guangdong, Gu, et al, (2001) stress the importance of external capital and historical factors in stimulating the economic growth in the less developed regions.

To a large extent, historical industrial legacy compensates for unfavourable geography (remote and mountainous) interrupting economic development in Shaoguan. Industrial inheritance is the greatest treasure of this region. Yang (1990) expresses an inappropriate view in suggesting that the established 'Third Front' industrial enterprises have completely under-performed and demonstrated poor profit records owing to absence of economic consideration by these firms and infrastructure shortages in the third front areas. Similarly, Bramall (2007) seems to underestimate the spillover effects generated from the industrial legacy in boosting the development in Shaoguan during the reform period. It is reasonable to argue that a region would lose its self-development capability and innovation skills by over-relying on its historical legacy. However, the historical legacy of industrial development is still powerful enough to support current economic growth in Shaoguan District. In that sense, Shaoguan is dependent on its historical legacy.

As far as I understand, in precise terms, this historical industrial legacy of Shaoguan can be generally demonstrated from its large amount of heavy industrial investment, large industrial size and strong heavy industrial base: including coal mining and steel sectors. It is the case that many heavy industries located in Shaoguan are engaged in the production of munitions, and have not been so useful for economic growth in Shaoguan during the reform period. Nevertheless, on two counts, it is not appropriate to completely ignore their contribution to local economic prosperity. First, without question, owing to their relatively advanced technology, these defence industries have contributed to general industrial development in Shaoguan during the post-1978 period. Secondly, the steady transformation of certain military industries into civil industries has also directly stimulated economic growth in Shaoguan. Although the details of this military-civil industrial transformation are not known, we certainly should not ignore it. For example, Bachman (2001) claims that the defence-oriented electronic enterprises established in Shanguan during the pre-reform period have been successfully converted into civil electronic factories.

The relatively fast economic development in Shaoguan District since 1978 has been mainly credited to its historical legacy of industrial development during the Maoist

period. The important contribution made by Mao's industrial development policy and huge state-funded capital investment during the pre-reform period should not be ignored in the analysis of the present economic development of Shaoguan. This is an important conclusion drawn from this study. Any sensational claim arguing the complete failure of Mao's development policy in stimulating regional economic development in China would be contradicted by the evidence of Shaoguan and Maoming. As Bramall (2007) rightly claims, too much research has emphasized the relationship between economic development in the western region and third front construction, but, too little effort has been put into the study of the effects of third front construction on regional development in Guangdong and other coastal regions in China, particularly in the interior parts within the coastal regions.

Similar argument can be applied to Maoming District, a coastal peripheral region in Guangdong. It is of course the case that Maoming has a favourable coastal location. Its superior natural harbour and long coastline contribute to the relatively low transportation costs between Maoming and the outside world[64]. However, more significantly, without addressing its rich oil reserve and historical development of the petroleum industry, it is not possible to understand the rapid development in this place. The dramatic growth of the petroleum and oil-related industries during the pre-reform period has played an important role in the relatively impressive development in Maoming during the reform period. During the pre-reform period between 1963 and 1978, the industrial output and profit value of the petroleum industry in Maoming increased to 987.2 and 405.4 million *yuan* in 1978; more than 99 and 75 times higher than the equivalent figures in 1963. Since 1978, the petroleum industry has experienced further rapid development. For example, by 1988, the industrial output and profit value of this industry reached 1648.3 and 690.1 million *yuan* respectively, both of which were up by 70 percent compared to the figures in 1978 (*Maoming Shizhi*, 1997, p. 487-88). In his discussion of rural industrialization in Guangdong, Bramall (2007) has pointed out the importance of the oil-refining industry in the industrial and economic development of Maoming. As he states,

A mere county in the early 1950s, Maoming was transformed by the decision to develop it as the center of oil refining in southern China. The engine of growth was thus the Maoming shiyou gongye gongsi ⋯ (2007, p. 296)

The development of Maoming's petroleum industry started in 1958, since then, large amounts of state capital have been invested in the petroleum and oil-related industries by the provincial and central government; the capital investment was about 100 million *yuan* between 1958 and 1988. During the early reform period, the petroleum industry had already played a crucial role in developing the industries of Maoming. According to the data released in *Maoming Shizhi* (1997, p. 5), for example, in 1988,

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[64] *Maoming Shizhi* (1997) has pointed out the superior geography of Maoming and its good port facilities; especially its long coast and good natural harbours. Moreover, Bohe Harbour of Maoming is one of the four largest fishing harbours in Guangdong.

the industrial output value of the petroleum industry accounted for 76 percent of the total industrial output in Maoming (2.15 billion *yuan*). The total reserve of known oil shale in Maoming is up to 7.4 billion tons, which accounts for one-sixth of total oil reserves in China; and it can be easily exploited.

Both the cases of Shaoguan and Maoming suggest the important contribution of historical industrial legacies to local economic growth. Historical factors help to explain economic growth. However, one key question I am interested in is how much can the historical legacy of Shaoguan and Maoming districts be attributed to their geography? In other words, had the geographical factor accounted for the historical industrial development in these two regions? My personal judgment is that this is possible. Shaoguan has been taken as an example for a detailed analysis. The role of geography in the historical development of Shaoguan should not be overlooked. There are two issues which need to be addressed. First, why did the Chinese government choose Shaoguan for the construction of 'Heavy Industrial Base' and 'Little Third Front Area'? Its remote and mountainous topographical features are probably the key factors influencing the location decisions made by the central and provincial government. Although the interior characteristics of Shaoguan cannot be compared to other more landlocked and mountainous regions in China, such as Sichuan; as far as Guangdong is concerned, Shaoguan is surely one of the most isolated places. During the Maoist period it was believed that setting up defence and other heavy industries in Shaoguan could effectively protect these strategic industries from potential air strikes by the former Soviet Union and United States. Interestingly, unfavourable geographical location has thus been transformed into the competitive geographical advantage in Shaoguan.

Secondly, in terms of natural resource reserves, Shaoguan is a top ten source in China of at least 12 natural resources. In particular, lead and silver reserves rank second in China; zinc holds the third position. Shaoguan accounts for a significant portion of many other natural resources in both Guangdong and China as a whole, such as non-ferrous metal and limestone. Shaoguan is called the "home of nonferrous metal" (Wu, 1985; *Shaoguan Shizhi, 2001*, p. 283). Apparently, Shaoguan has rich reserves which can be utilized in the development of the heavy industrial sector. The rich resources of Shaoguan provided golden opportunities for developing heavy industries. In Shaoguan, according to economic principles, relative to other regions located within the PRDA, it is expensive to import large amounts of raw material for developing the heavy industries, due to the distances involved. Construction of the 'Heavy Industry Base of the Southern China' only becomes possible by relying on the exploitation of its own natural resources. In that sense, the role of geographical factors in heavy industrial development in Shaoguan should not be underestimated; geography is of paramount importance to the historical legacy of Shaoguan.

Moreover, history alone cannot explain the fast economic growth in Shaoguan during the reform decades. Why have some other regions within Guangdong, which, historically have experienced fast industrial growth, failed to maintain such rapid

economic development during the reform period? Zhanjiang and Meixian are two good examples of this. For example, in his research, Bramall (2007) points out the industrial development in Zhanjiang and Meixian during the Maoist era.

Regional distribution of the heavy industrial enterprises and defence industries in Shaoguan was not concentrated on Shaoguan District alone during the Maoist period. In fact, many heavy industrial factories (electrical machinery, nuclear, mining industries) were located in other remote and mountainous regions within Shaoguan, including Wengyuan, Rehua and Lian County (Bachman, 2001; *Shaoguan Shizhi*, 2001). However, why have these regions failed to maintain economic prosperity and further development? It is because these regions have faced a bottleneck problem of poor transportation and other infrastructure facilities. Even with a rich industrial inheritance, expensive transportation costs, remoteness and landlocked geography have largely restricted their capabilities to realize fast economic and industrial growth during the reform period. From my point of view, relatively good local infrastructure facilities and the status of regional transportation and communication centres have also been the two crucial factors stimulating the economic development in Shaoguan District. *Shaoguan Shizhi* (2001) suggests that good and convenient transportation facilities are the important factor contributing to the economic growth in Shaoguan. Moreover, in his study, Wu (1985, p. 380-81) states that,

Shaoguan becomes the transportation node of Guangdong, Hunan and Jiangxi, and the essential passing region for the North - South transportation of China.

After 1949, efforts were put into improving transportation and other infrastructure construction in Shaoguan by both the local, provincial and central governments in China. For example, during the pre-reform period, four key external roads were expanded or newly built, including the Shaoguan-Guangzhou (Guangdong), Shaoguan-Ganzhou (Jiangxi), Shaoguan-He County (Guangxi) and Shaoguan-Yizhang (Hunan) Roads (*Shaoguan Shizhi*, 2001). The construction of these roads had given the opportunity for Shaoguan to enhance its communication of goods and people with the outside world; it further strengthened the regional transportation centre of Shaoguan in the northern region of Guangdong. The relatively high transportation costs between Shaoguan and the outside world, mainly caused by distance and remote mountainous topography, have been reduced; this is especially true of links between Shaoguan and the PRDA. Under these circumstances, the inherited economic disadvantage of Shaoguan's remote geography, has to a large extent been overcome.

As far as Shaoguan District is concerned, the advantages of geographical location and good transportation facilities are notable. Shaoguan District is surrounded by two navigable rivers; the important Guangzhou-Beijing railroad (*Jingguang line*) crosses this district, and good road facilities have connected Shaoguan District to the other regions with the greater efficiency (*Shaoguan Shizhi*, 2001, p. 177). Since 1978,

transportation infrastructure has been further improved. For example, the newly built Guangzhou-Shaoguan expressway has reduced the travel time between Shaoguan and Guanghou to only two hours (Jinan University, 2006, p. 601). According to the data published by Shaoguan municipal government, Shaoguan has experienced fast development of road transportation during both the pre-reform and reform periods (see Table 10.4). Total amount of road increased to 4871 kilometers in 1978 from 807 kilometers in 1949, the equivalent figure further reached 13,050 kilometers in 2006. The total road length of Shaoguan has increased more than 16 times between the period from 1949 to 2006. In addition, the road density increased to 70.9 per 100 square km in 2006 from only 4.4 per 100 square km in 1949, which was up by 16 times.

Table 10.4: Road Transportation Development in Shaoguan 1949-2006

Year	Total Road Length (km)	Road Density (per 100 square km)
1949	807	4.4
1952	807	4.4
1957	1180	6.4
1962	2067	11.2
1965	2556	13.9
1970	3521	19.2
1975	4315	23.5
1978	4871	26.5
1980	5013	27.3
1985	5211	28.3
1990	5442	29.6
1995	8390	45.6
1998	8896	48.4
2005	9407	51
2006	13050	70.9

Source:
1. Municipal Government of Shaoguan (2006)
2. Shaoguan Statistical Bureau (2006);
3. Planning and Economic Development Bureau of Shaoguan (2000)

During the reform period, although economic development in Shaoguan has benefited substantially from the historical legacy of heavy industrial development, the long-term development in this region simply cannot depend too much on its inherited industrial legacy. Unless Shaoguan can successfully transform its traditional state-owned industrial sector and develop its own innovation capability, personally, I am pessimistic about the future economic development in this region. In contrast to the dramatic growth in the PRDA, the economic power of Shaoguan has continuously declined during the 'reform and open-door' period. The industrial inheritance seems not to be able to stimulate economic and industrial development in Shaoguan in the long term. In 1980, the industrial development of Shaoguan ranked third in

Guangdong (Gu, et al, 2001). However, the data presented in Fig 10.1 below, demonstrates that industrial growth in Shaoguan has recorded a steadily downward trend since 1982. This relatively slow industrial growth was particularly prominent after 1993. Regional industrial development can also be demonstrated from the ratio of secondary industry in total GDP. In contrast to the equivalent ratio in Shaoguan, the ratio of secondary industry in total GDP of the PRDA and Guangdong were significantly higher (see Table 10.5). In addition, relative to the eastern region of Guangdong, the superior industrial advantage of Shaoguan is no longer the case. It is not logical to expect that the industrial legacies of the Maoist period would last for ever; especially through the reform period. Industrial development in the eastern municipalities such as Shantou and Chaozhou has been impressive in recent years. In these two regions, the ratio of secondary industry in total GDP were both more than 50 percent in 2005. Moreover, the report conducted by Jinan University (2006) points out that the industrial advantage of Shaoguan lies in its rich industrial inheritance. However, the superior industrial position of Shaoguan in the northern region of Guangdong has been shaken due to the fast development of the foreign and private-oriented industries in Qingyuan, Meizhou and Heyuan.

Fig 10.1: Annual Industrial Growth in Shaoguan, 1982-2005 (%)
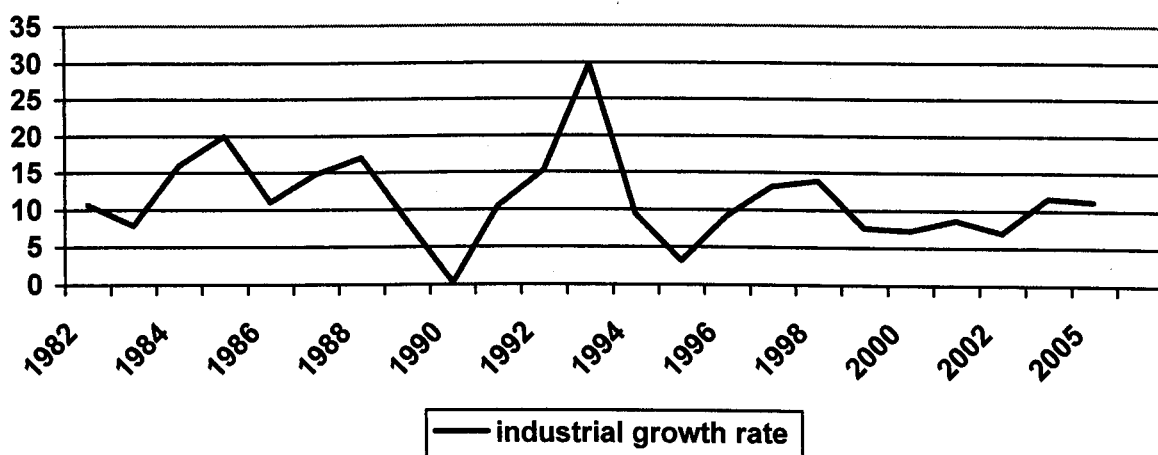
Source:
1. GSB (1991, pp. 94)
2. GSB (1992-2006, various pages)

Table 10.5: Comparison of the Industrial Structure between Shaoguan and Guangdong 2005 (billion yuan)

Region	GDP	Primary industry	Secondary industry	Tertiary industry	The ratio of secondary industry in GDP (%)
Shaoguan	33.9	6	14.4	13.6	44
Guangzhou	515.4	13	204.5	297.9	39.7
Shenzhen	495.1	1	263.3	230.8	53.2

Zhuhai	63.5	1.9	33.9	27.6	53..4
Shantou	65.1	4.5	33.2	27.5	51
Foshan	238.3	7.6	143.9	86.8	60.4
Heyuan	20.5	4.2	8.1	8.2	39.5
Meizhou	31.5	7.3	13.1	11.1	41.6
Huizhou	80.3	7.5	45.9	27	57.2
Shanwei	21.1	5.1	8.4	7.7	39.8
Dongguan	218.2	2	123.6	92.6	56.6
Zhongshan	88	3.1	53.9	31	61.3
Jiangmen	80.5	7.3	42.5	30.8	52.8
Yangjiang	29.5	8	11	10.5	37.3
Zhanjiang	65.8	14.5	29.7	21.6	45.1
Maoming	80.8	19.7	30.7	30.5	38
Zhaoqing	45.1	14.2	11.3	19.5	25.1
Qingyuan	32.3	7.2	12.7	12.5	39.3
Chaozhou	28.8	3.3	15.2	10.3	52.8
Jieyang	42.1	7.1	20.4	14.6	48.5
Yunfu	21.4	7.6	7.4	6.4	34.6
PRDA	1805.9	49.9	919.6	836.5	50.9
Mountainous Guangdong	245.7	65.7	95.6	84.4	38.9
Eastern Guangdong	157	19.9	77.2	60	49.2
Western Guangdong	176.2	42.2	71.3	62.6	40.5
Guangdong	2236.7	139.5	1134	963.1	50.7

GSB (2006, various pages)

Lack of foreign investment or prosperous private industry are two crucial factors hindering the long-term economic development in Shaoguan. As the report conducted by Jinan University (2006, p. 607) stresses,

The big state-owned enterprises, such as Shaoguan Iron & Steel Firm, Shaoguan Cigarette Factory and Shaoguan Electricity Firm, are the mainstays for the local economic development and tax revenue of Shaoguan, but they are not able to support the future economic development in Shaoguan. The underdevelopment of private economy and foreign trade still are the weakest points for the economy in this region.

On the one hand, the local government in Shaoguan attempts to transform the traditional heavy industries into modern market and technology-oriented enterprises via various measures, including brand-building and industrial cluster development strategies. By doing so, the Shaoguan authority hopes to strengthen its market competition capabilities and increase the profit of traditional key industries (*The Eleventh Five-year Plan for National Economic and Social Development of Shaoguan*, 2006). On the other hand, Shaoguan hopes to take advantage of the golden

opportunity provided by industrial transformation of the PRDA. By attracting relatively backward industrial enterprises and labour-oriented industrial sectors, originally located in the PRDA, due to relatively cheap land and labour cost, Shaoguan is seeking more foreign and private investment (Jinan University, 2006). However, how effective are these government measures in stimulating industrial growth? The jury is still out. Numerous scholars have pointed out the failures and limitations of the role played by the state in reforming the Chinese state-owned enterprises. For example, although many reforms have been implemented to improve the financial and working performance of the state-owned enterprises, Qian (2003) suggests that the inherited problems of these firms have been largely unsolved. Similarly, Bachman's research (2001) suggests the general conversion difficulty and poor economic performance of the defence-oriented and other heavy industries located in Shaoguan during the reform period.

In general, this section suggests that history is vital to an understanding of regional industrial development and economic growth within Guangdong during the post-1978 period. The inherited legacies of industrial development contribute to economic development. The historical factors help to explain widening spatial inequality within Guangdong.

10.3 Foreign Direct Investment and Regional Economic Disparity

During the reform period, Guangdong has been one of the key Chinese centres attracting foreign direct investment. In terms of total foreign capital inflow to Chinese provinces, the dominant position of Guangdong is clear. Numerous scholars have studied the important contribution made by foreign investment to the economic take-off in Guangdong since 1978. Chen, Chang and Zhang (1995) argue that FDI has been concentrated in two coastal provinces: Guangdong and Fujian, during the 1980s; this is especially true of Guangdong. According to their estimation, in contrast to 11.3 percent for all of the interior provinces in China, 51.8 percent of total foreign capital in China was offered to Guangdong alone between 1979 and 1987. Broadman and Sun's study (1997) suggests that the gap of the FDI inflow between Guangdong and the other Chinese regions is continually increasing. Relative to other regions in China and indeed, throughout the world, Yuen (1998) stresses that the contribution made by foreign investment to the local economy and export trade of Guangdong is very significant. OECD's study (2000, cited in Taube and Ögütçü, 2002) demonstrates that the majority of FDI has been concentrated in the prosperous eastern region of China; and more significantly, Guangdong has been the key beneficiary of foreign capital since 1978. Based on their systematic model test and empirical analysis, Berthélemy and Démurger (2000) point out that the effects of foreign investment in stimulating the economic development in the Chinese provinces are crucial.

It is justified to argue that the dramatic economic development in Guangdong has benefited from huge amounts of foreign capital inflow. According to the data

published by GSB (2006) (see Fig 10.2 below), the actually utilized foreign capital in Guangdong only was 0.09 US$ billion in 1979; the equivalent figure was increased to 2.02 US$ billion in 1990, which was up by 22 times compared to 1979. In 2005, the total amount FDI jumped to 15.2 US$ billion, which was up by 168 times in contrast to the equivalent figure in 1979. Without question, Guangdong has been experiencing rocketing increases in terms of FDI inflow during the reform period.

Fig 10.2: Total Amount of Utilized Foreign Direct Investment in Guangdong, 1979-2005 (US$ billion)

— Amount of foreign capital actually used — Expon. (Amount of foreign capital actually used)
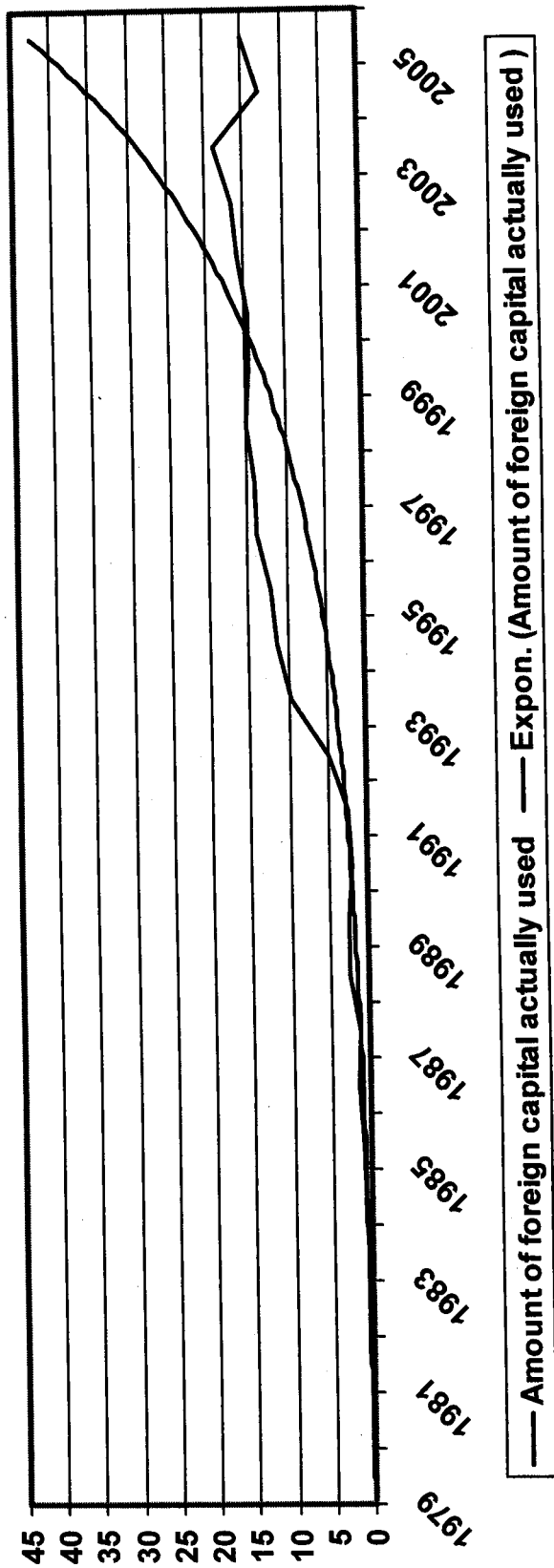
Note: according to the definition given by the GSB (2006),

a) "Since 2002, the foreign direct investment has been adjusted, of which the overseas borrowings in total investment of enterprises only include the loans by the foreign shareholders.

b) The foreign direct investment actually used in 2004 was adjusted, which was not comparable with that of 2003 and prior to it.

c) The number of signed projects, amount of foreign capital and foreign capital actually used excluded the foreign borrowings in 2004."

Source: GSB (2006) electronic version

313

It is certainly the case that there was a large amount of inflow FDI to Guangdong during the reform period. However, an interesting question is related to its regional distribution. As far as the individual regions are concerned, the contribution made by foreign capital to local economic development is considerably different, as the regional distribution of foreign capital is unequal. The PRDA has accounted for the majority of foreign investment inflow to Guangdong. By contrast, the peripheral region was only able to receive very limited amounts of foreign capital during the reform period. In 2005, the peripheral and mountainous regions together accounted for just 18.2 percent of the accumulated foreign investment in Guangdong; while the PRDA accounted for 81.8 percent. (Federation of Hong Kong Industries, 2007)

Table 10.6: Value Added to Guangdong's Industry, Foreign Direct Investment and Exports 2005

Region	Value added of Industry in 2005 (billion yuan)	As % of total value added of industry in 21 Guangdong's cities	Accumulated Foreign Investment from 1989-2005 (billion US$)	As % of Accumulated Foreign Investment in 21 Guangdong's cities	Total exports in 2005 (billion US$)	As % share of total exports in Guangdong
Eastern PRDA	408.8	39.2	71.1	37.2	153.1	64.3
Central PRDA	184.4	17.7	36.2	18.9	26.7	11.2
Western PRDA	269.6	25.9	48.9	25.6	47.5	20.0
Other Cities	179.0	17.2	34.8	18.2	10.9	4.6

Note:
1. East PRDA includes Shenzhen, Dongguan and Huizhou;
2. Central PRDA includes only Guangzhou;
3. West PRDA includes Zhuhai, Zhongshan, Jiangmen, Foshan and Zhaoqing.
Source: Guangdong Statistical Yearbook, various years
Reproduced from Federation of Hong Kong Industries (2007, pp. 33)

In addition, the PRDA has played a dominant role in the total exports of Guangdong. The majority of the exports in Guangdong were mainly concentrated in the PRDA by 2004. According to the data presented in Table 10.7 below, the ratio of exports of the PRDA in Guangdong had increased dramatically between 1980 and 2004. The share in 1978 was only 28 percent; in 1995, this share jumped to 81. Moreover, the ratio of PRDA's exports in the total amount of exports of Guangdong accounted for 95 percent in 2004.

Table 10.7: PRDA's Share of Guangdong's Exports, 1980-2004 (US$ billion)

Year	PRDA	Guangdong	PRDA's exports as ratio of Guangdong's (%)
1978	0.4	1.4	28
1980	0.6	2.2	27
1985	0.6	2.9	21
1990	3.5	10.5	33
1994	35.7	46.9	76
1995	46.1	56.6	81
2000	84.7	91.9	92
2003	145.1	152.8	94
2004	181.8	191.6	95

Source:
GSB (1985; 1987; 1991; 1996; 2005, various pages)

Shen et al, (2000, p. 312) claim that, "Within Guangdong a big proportion of foreign investment is and has been in the Pearl River Delta." They point out that foreign direct investment was a crucial factor in the regional economic transformation of the PRDA. Sit and Yang's study (1997) suggests that the rapid urbanization, industrialization and dramatic economic growth in many small towns and cities within the PRDA since 1978 have been mainly due to foreign investment, especially from Hong Kong and Macao. In their research, Sun and Chai (1998) summarize the important contribution of the FDI to the economic success of the Special Economic Zones and PRDA, including the industrial and export development, and the growth of fixed capital investment. Moreover, Tuan and Ng (2004) state that foreign investment has maintained the fast growth rate of the local economy in the PRDA since 1978.

As far as the huge amount of FDI in Guangdong is concerned, Hong Kong has taken a leading position. Hong Kong companies have poured vast amounts of capital investment into this neighbouring southern province. Guangdong has become the first destination for Hong Kong's capital investment in China during the 'reform and open-door' period[65]. As Shen (2002, p. 92) states,

[The PRDA] The region has been at the forefront of China's reforms and open door policy. Hong Kong with an advanced economy has enormous investment and impact on the region. (Bold content added)

With the close economic interaction between Hong Kong and the PRDA, demonstrated in foreign capital from Hong Kong, increasing bilateral trade and intensive industrial and economic cooperation, Yang stresses that the PRDA and Hong Kong have steadily become "a highly integrated economic region" (2006, p. 75). In fact, it is not possible to understand the dramatic industrial growth and economic development process in the Pearl River Delta without addressing the important contribution made by Hong Kong's capital investment. Between 1979 and 2005, the accumulated foreign capital inflow to Guangdong, invested by Hong Kong firms, was up to 105.4 US$ billion. The foreign investment made by the Hong Kong companies accounted for a striking 64.7 percent of total accumulated capital in Guangdong (Federation of Hong Kong Industries, 2007). According to the survey data conducted by Federation of Hong Kong Industries (2007) (see Table 10.8 below), there are about 45,200 Hong Kong factories located in the PRDA; mainly in Dongguan and Shenzhen municipalities. The estimated number of such

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[65] Some scholars have questioned the real amount of foreign capital investment which was funded by the Hong Kong's companies. They argue that the actual amount of Hong Kong-oriented capital investment might be much less than many people claim. This is because a certain amount of Hong Kong-oriented capital investment is originally from some other regions in China and other parts of the world (e.g. the capital investment funded by the Hong Kong branch of state-owned enterprises located in mainland China). Based on his own estimation, Kleinberg (1990) suggests that about 20 percent of foreign direct investment from Hong Kong to China was contributed by mainland state-owned companies. Similarly, Lu and Tang (1997) also maintain this view. However, significantly, no matter what kinds of statistical measurements are taken, without question, Hong Kong-oriented capital has accounted for the majority of total FDI inflow to China during the reform period. Foreign capital from the other regions in the world is important for Guangdong, but its contribution is much smaller than Hong Kong's. As Shen (2002, p. 98) argues, "It is noted that some capital from Hong Kong may be in turn from other areas as many transnational co-operations may use Hong Kong as a base for their investment in mainland China. Other sources are important but much less significant compared to Hong Kong."

factories located in the PRDA, accounted for 76.5 of total Hong Kong factories in China by 2003. In terms of the total number of Chinese workers employed by Hong Kong companies, the PRDA alone accounted for more than 80 percent. On the one hand, the figures shows the dominant position of Guangdong (especially the PRDA) in attracting FDI to this region; on the other hand, it suggests the important contribution to industrial transformation and economic development in Guangdong made by 'Hong Kong factor' during the reform period.

Table 10.8: Total Numbers of Factories in Guangdong and their Mainland Employees, Established by Hong Kong Firms, 2003

Region	Estimated Number of Factories	Estimated Number of Mainland Workers (1,000 persons)
Dongguan	18,100	4,025
Shenzhen	15,700	2,576
Huizhou	3,500	867
Guangzhou	4,900	920
Zhongshan	3,000	608
Other Cities in Guangdong	8,100	1,338
Other Provinces in China	5,800	885
Total	59,100	11,219
Ratio of PRDA	76.5%	80.2%

Reproduced from Federation of Hong Kong Industries (2007, pp. 35)

In fact, foreign capital has generated positive effects on the overall regional economic development in Guangdong. Significantly, the huge amount of foreign direct investment inflow has played an important role in updating the traditional industries, and developing export and foreign trade in the PRDA. Therefore, the FDI has contributed to the economic development in this region since 1978. By contrast, the mountainous and peripheral regions, facing the shortage of foreign capital and underdevelopment of the export-oriented industries, have suffered from slow economic growth and lagged behind the PRDA in terms of economic development. The role of foreign investment in stimulating the fast development in PRDA should not be underestimated. The FDI factor should be considered in the cause analysis of enlarging regional development disparity between the PRDA and peripheral region in Guangdong.

Nevertheless, a key question is whether or not foreign direct investment is an independent causal factor in regional inequality in Guangdong during the reform period. In other words, is the FDI just a dependent factor caused by other more fundamental factors? As the statistical data demonstrated earlier, the FDI has been concentrated in the regions within the PRDA. Why is that? What is the fundamental factor causing unequal distribution of FDI between the PRDA and peripheral region? My view is this: the FDI has not been an independent factor causing regional development disparity during the reform period. The unequal regional distribution of the foreign investment in Guangdong is mainly caused by geography. In precise terms, the inherited coastal location, the geographical proximity to Hong Kong and low transportation costs contributed by the development of transportation and other infrastructure facilities have all played crucial roles in attracting the FDI to the PRDA. Gu, et al, (2001, p. 116) point out that,

This contrasts with the accepted wisdom that FDI was the most important factor (development from outside) in the development of Guangdong. ····. In other words, FDI does not work independently to establish a new spatial configuration of

the economy.

The 1993 industrial survey conducted by Federation of Hong Kong Industries suggests that 96.7 percent of the participating investors (494 from total 511 sample interviewees) thought the geographical location (the proximity to Hong Kong) was the key in choosing the Pearl River Delta (Shen et al, 2000). In the 2007 report, in terms of the PRDA, the Federation of Hong Kong Industries (2007) stresses that the short distance to Hong Kong and good transportation infrastructure are the key to attracting Hong Kong-oriented capital to this region. This view is widely supported by researchers such as Yang, 1990; Sun, 2001; Gu, et al, 2001; Shen, 2002; Tuan and Ng, 2004. The negative correlation between amount of FDI inflow and road distance to Hong Kong has been found in Shen's study (2002). Moreover, in their research, both Sun (2001) and Bao, et al, (2002) have emphasized the important role played by geography in shaping the distribution of FDI in Guangdong.

I think that the studies conducted by Sun, Chai and Fan regarding the importance of foreign capital in boosting regional development in this southern province have certain limitations. Sun and Chai's argument (1998) is not perfect without criticism. They allege that the FDI and exports are the key factors in the rapid economic development in Guangdong. Similarly, Cindy Fan's argument with regard to the role of foreign capital in stimulating economic development in Guangdong is not correct. She seems to inappropriately suggest that the FDI is the determining and independent factor causing the regional economic growth in Guangdong during the reform period. As she claims,

In sum, foreign investment is perhaps the single most important determinant of uneven spatial development within Guangdong. (1995, p. 441)

Owing to the higher expected investment returns in the PRDA contributed by its favoured geography, foreign capital naturally will concentrate on this region. The majority of Hong Kong-funded enterprises engage in export and labour-oriented manufacturing industries, the low costs of transportation and other production activities are the key to their business success. Consequently, the PRDA is ideally placed: close to Hong Kong and other large international markets, and has attracted the majority of FDI.

In the context of Guangdong, the majority of export manufacturing industries are engaged in labour- and intermediate input-oriented goods, and foreign-oriented enterprises have accounted for a large proportion of the output value of these industries. The figures presented in Fig 10.3 below, demonstrate that by 2005, the foreign-owned enterprises (FOEs) located in Guangdong had mainly concentrated on processing and assembling trades using imported and customers' materials, all of which accounted for 73.5 percent of total exports and imports by the FOEs located in Guangdong. In fact, Guangdong is a main manufacturing base for China and the world. The study conducted by Sung, et al, (1995) highlights that the light and manufacturing industries have occupied a high share of the total industrial output in Guangdong. Many of these FOEs need to import a substantial amount of raw materials and intermediate inputs. The Hong Kong-oriented enterprises are not exceptional. Shen, et al, (2000) point out that low transportation costs are the main concern for them. Moreover, Sun (2001, p. 325) maintains that,

... foreign investments, especially those from Hong Kong and Taiwan (that

accounted for around 70 percent of FDI in China), are primarily oriented to exports using China's coastal region as the manufacturing base for exports by taking advantage of abundant and cheap labor resources and seaport facilities.

Fig 10.3: Main Trade Forms of Imports and Exports by the FOEs located in Guangdong 2005, (unit: percentage)

General trade

Processing and assembling with customers' materials

Processing and assembling with imported materials

Processing equipment

Foreign funded equipment

Bonded warehouse

Others
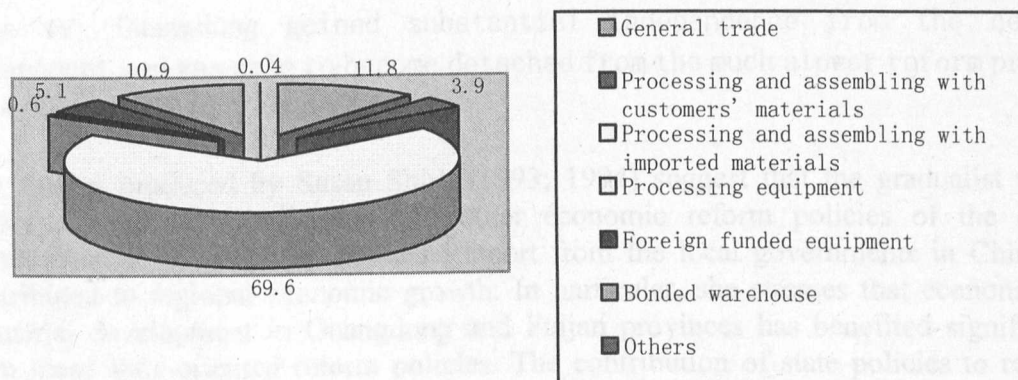
GSB (2006, various pages)

In conclusion, without any doubt, the total amount of FDI inflow to Guangdong is vast. The key question is how significant is foreign capital to local economic growth in Guangdong? In my view, without foreign direct investment, it is difficult to image how the PRDA could have made such impressive economic achievements since 1978. A lack of foreign capital should be taken into account for the slow economic growth and industrial underdevelopment in the peripheral and mountainous regions.

However, in terms of correlation between the foreign capital and economic growth, the issue of reverse causation needs to be considered. In other words, during the reform period, has FDI growth been leading to a change in economic development or has the fast economic growth caused an increase in foreign investment? It is possible that high investment return caused by dramatic economic development in the PRDA has attracted more foreign capital. Due to high risk, low investment returns and economic scale, the foreign investors would hesitate to invest in the under-developed regions in Guangdong. In that sense, economic growth is not mainly contributed by the FDI, but is due to other factors. In the correlation analysis of foreign direct investment and economic development, the causation question should be addressed. Moreover, as discussed earlier, geography has been influential in shaping the investment direction of foreign capital.

10.4 The Role of the Post-1978 State and Regional Economic Growth

As far as China is concerned, Guangdong Province has been acting as a development pioneer implementing the 'reform and open-door' policies since 1978. Guangdong has been a shop window for development of a modern market economy in China over the last two decades. The development experience of this southern province has been widely followed by other regions in China. In particular, the active role played by the post-1978 state [66] is remarkable. During the reform period, various kinds of government

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[66] This study of the role of the post-1978 state in shaping regional economic development in

development policies have been favourable to Guangdong, including foreign trade, export, and industrial development and tax reduction policies. Moreover, in the early reform period, three of the four Special Economic Zones (SEZs) designated by the Chinese government were located in Guangdong, and the Pearl River Delta was designated as Coastal Open Region in 1985 (Ng and Tuan, 2001). Therefore, the possible role of such policies in widening regional development disparity in Guangdong should be properly analyzed. Taube and Ögütçü (2002, p. 13) state that,

That way Guangdong gained substantial independence from the central government and was able to become detached from the much slower reform process in other parts of the country.

The studies produced by Susan Shirk (1993; 1994) suggest that the gradualist reform strategy, fiscal decentralization and other economic reform policies of the central government of China have obtained support from the local governments in China and contributed to regional economic growth. In particular, she stresses that economic and industrial development in Guangdong and Fuijan provinces has benefited significantly from these state-oriented reform policies. The contribution of state policies to regional economic development in Guangdong have been widely discussed (e.g Fan, 1995; Sun and Chai, 1998; Shen, 2002; Taube and Ögütçü, 2002; Fan and Scott, 2003). Fan's study (1995) suggests that the rapid economic growth in Guangdong has benefited from state-oriented financial and foreign trade policies. Chao (1994, cited in Tian, 1996) highlights that the SEZs and Guangdong have been given many unique special development policies by the central government of China during the reform decades, many of which have not been offered to other regions in China, such as tax reduction incentives, infrastructure construction capital, and autonomy in foreign trade. Shen (2002) has stressed that Guangdong was the earliest region in China to introduce preferential economic policies to attract foreign capital into the local economy; this is especially true of the Pearl River Delta. Fan and Scott (2003) argue that the role of institutional factors in shaping the regional economic development in China cannot be ignored, due to its socialist legacies and mixed economic system of central planning and free market. Particularly, they emphasize that the formation of regional industrial clusters and economic agglomeration in the PRDA has significantly benefited from the role of the state.

Besides foreign trade development and establishment of special economic zones, another important aspect of state-oriented preferential policies is the attraction of foreign capital (Kleinberg, 1990). As far as Guangdong is concerned, since the late 1970s, foreign direct investment to this province has benefited from the preferential FDI policies designated and implemented by the institutional force. Ng and Tuan's study (2001) has provided a detailed analysis on the unequal regional distribution of these government policies. They argue the important contribution made by the governmental policies to stimulation of foreign capital inflow to Guangdong; this is especially true of the Pearl River Delta. As Ng and Tuan (2001, p. 1054) state,

Guangdong, has emphasized state-oriented preferential polices. The active role played by the institutions can be generally demonstrated from the orientation and regional distribution of preferential development policies. Lu and Tang (1997, p. 10) point out that, "Preferential policies are the vehicle of government intervention. An economic policy is preferential to a business subject or economic agent if it grants the subject or agent favourable terms in receiving pubic services and official assistance or in fulfilling public liabilities."

Other than the economic and physical factors relating to investment environment, policy governance for FDI promotion is also believed to be a major striving force contributing to the success of the FDI promotion especially in Guangdong.

According to the data given by Ng and Tuan (2001, p. 1059), Guangdong has accounted for up to 21.2 percent of all types of Economic Opening Areas in China designated by the central government; the PRDA alone has accounted for 11.8 percent of the opening economic regions. In terms of the total five SEZs in China, the PRDA accounts for 40 percent of them (Shenzhen and Zhuhai). Moreover, the PRDA has accounted for more than 10 percent of the Open Coastal Economic Zones in China. The figures clearly suggest that the 'playing field' of foreign capital attraction has been favourable to the PRDA during the 'reform and open-door' period.

Shenzhen is perhaps the best example of the crucial role of the state policies in boosting local economic development[67]. Before 1978, Shenzhen was merely a village: mainly relying on agriculture and fishing. Kleinberg (1990) maintains that Shenzhen was an economically underdeveloped rural commune during the pre-reform period. Fan (1995) argues that Shenzhen was just a less-developed rural region of Baoan County before 1979. Its economic contribution to Guangdong can be almost ignored due to its small share of gross domestic product in Guangdong (less than 1 percent). Moreover, transportation and other infrastructure facilities in Shenzhen were extremely backward at that time. (Ge, 1999)

However, Shenzhen, achieved remarkable economic development after it was designated as an SEZ by the central government in 1979. Its economic transformation from a poor fishing village to a prosperous large metropolitan city over the last two decades has been impressive and widely discussed. It is hard to understand this rapid economic development in Shenzhen without addressing the important role played by the government and state-oriented policies. Various preferential policies and special treatment have been offered to Shenzhen. Ge (1999) argues that a significant proportion of the fixed capital investment in Shenzhen was financed by the government during the early reform period (e.g. 48 percent in 1979). Kleinberg (1990) points out that favourable treatment has been given to foreign-oriented companies located in Shenzhen, such as tax redction, preferential land fees, and flexibility on wages and recruitment. He further stresses that,

Shenzhen after five years of rapid growth presented a picture of success under China's policies of opening up to the outside world. (1990, p. 71)

From Kleinberg's point of view, owing to the state-oriented opening-up policies of special economic zones, it is certainly justified to argue that Shenzhen is an economic success in terms of job creation, foreign capital and infrastructure construction. However, he claims that the establishment of Shenzhen Special Zone and its local economic success has contributed little to national development; this is especially true of advanced technology transfer, exports and foreign currency earnings. In fact, Kleinberg believes

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[67] In terms of East Asia, Fan and Scott (2003, p. 300) argue that, "… Shenzhen in China were among the first generation of government-sponsored industrial zones for fostering export-oriented industrialization."

that too many central subsidies have been given to Shenzhen at the cost of other Chinese regions.

From my point of view, the state-oriented preferential policies are a vital factor in the regional economic development of Pearl River Delta. To some extent, the state policies contribute to enlargement of regional economic disparity between the PRDA and periphery. In analyzing regional development, the institutional factor certainly cannot be overlooked. During the field research in Guangdong[68], whilst preferential policies issued by the local government are similar, the significant difference in state-oriented development policies between the regions within the PRDA and periphery has been acknowledged. On the one hand, as far as attracting the foreign-oriented productive enterprises are concerned, the state-oriented policies in Yuexiu District (Guangzhou) and Wuhua County (Meizhou) are generally similar. A substantial reduction of income tax dependent on their specific situation is offered to foreign enterprises located in both regions; this is especially true of productive enterprises, engaged in export-oriented and hi-tech industries. Intermediate materials and equipment imported by these enterprises, are all exempt from customs duty, import-linked value added tax and administrative licence fees by the local governments of Yuexiu and Wuhua. In terms of enterprise registration by foreign companies, the preferential treatment and bureaucratic efficiency in both regions are virtually the same.

However, on the other hand, Yuexiu has been particularly favourably treated. In contrast to Wuhua, up to 15 percent reduction of income tax has been offered to foreign-oriented enterprises engaging in transportation and infrastructure construction, by the local authority of Yuexiu. Enterprises located in Yuexiu, established by investors from Hong Kong (China) and Macau (China), have been granted income tax exemption on their profit remittances. In addition, in Yuexiu, construction enterprises with business terms of over 15 years, set up by Taiwanese investors (China) can enjoy the benefits of income tax reduction for up to ten years. Moreover, local income tax exemption has been granted to the export-oriented foreign enterprises located in Yuexiu. After expiry of the tax exemption period, these enterprises can still enjoy 50 percent reduction of the local income tax rate. Nevertheless, it is much more difficult for export-intensive foreign firms in Wuhua to enjoy tax benefits. The qualification of exported products accounting for 70 percent or above in the total industrial output value of these firms must be met before they can enjoy similar benefits of tax reduction and exemption.

Moreover, the Yuexiu authorities have favoured the processing and assembling manufacturing enterprises of Hong Kong (China) and Macau (China), with various kinds of benefits and preferential policies, ranging from locally registered permanent residence and personal visas and car licence plates for exit and entry into Hong Kong and Macao, to exemption from local administrative registration fees. In addition, hi-tech foreign enterprises with one million *yuan* tax payment or above, or with a ten million *yuan* direct

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[68] The data utilized in the regional comparison analysis of the state-directed preferential policies were collected and summarized from the following official channels: the Foreign Economic & Trade Commission of Guangzhou; the Foreign Economic & Trade Bureau of Meizhou and Foreign Economic & Trade Bureau of Wuhua. In addition, three important documents issued and published by the State Council of China have been referenced: 'Industrial Directory for Foreign Investment' (published in December 1997); 'Some Regulation on Encouragement Foreign Investment by State Council' and 'Encouragement to Develop Industrial, Product and Technology Directory by State' (published in October 1986).
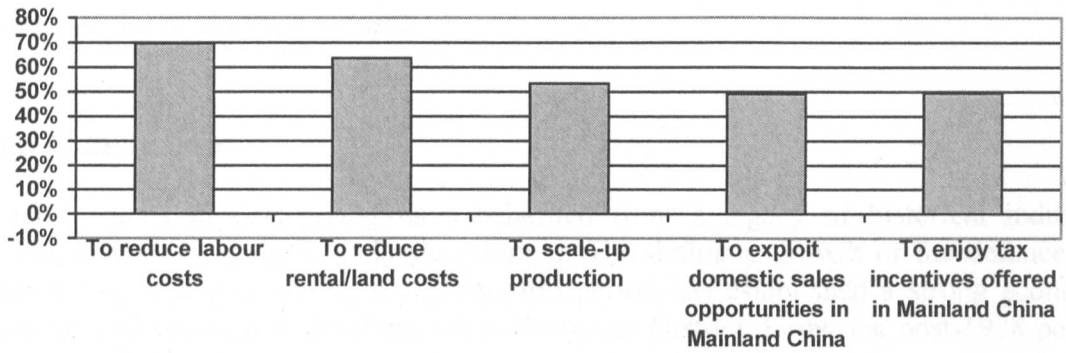
investment or above, would be offered further preferential treatments; for example, technical, professional and other skilled workers employed by these enterprises would be given priority when applying for permanent residence and offered up to 10,000 *yuan* setting-up allowance by the local government. Meanwhile, none of these preferential treatments have been offered to the high-technology foreign enterprises located in Wuhua.

The regional comparison analysis between Yuexiu and Wuhua suggests that the state-oriented preferential policies have been extended more to the Pearl River Delta than to the mountainous and peripheral regions. The role of the state in stimulating local regional industrial and economic development has differed widely in the various regions, and preferential government policies have made a difference to regional economic growth in this southern pioneer province.

However, more significantly, it is important to recognize that the role of the state and its preferential policies in shaping the regional inequality in Guangdong should not be overestimated. Firstly, it is completely unjustified to claim that the special development policies of central government have only favoured the PRDA during the reform period. In fact, many similar preferential policies have been steadily transforming other regions in Guangdong and China. For example, as the data in Appendix 5 shows, Shantou municipality became an SEZ in 1980. Moreover, in 1984, 14 coastal Chinese cities were given the privileged status of 'Coastal Ports and Industrial Cities' and granted similar special policies to the SEZs; Zhanjiang municipality is one of them. Many more Chinese regions became 'Coastal Open Cities' or 'Open Coastal Economic Zones' in 1985, with preferential treatment in tax and foreign trade granted by the central authority of China (Ng and Tuan, 2001). In that sense, it is reasonable to claim that all regions in China have steadily become generally equal in terms of preferential policies since 1990. Lu and Tang's study (1997) makes a similar claim that the significance of state development policies to regional economic growth in China has been reduced since 1994.

But why have many of these regions failed to achieve fast economic growth or attract as much FDI as Shenzhen? Why did the state fail to stimulate economic growth in these regions? It is clear that economic success and rapid industrial development in the PRDA cannot be explained by institutional factors or favourable state policies alone. Preferential policies are probably not the driving force behind regional economic development in Guangdong. As Zhang (2001, p. 133) points out, "Those counter-examples demonstrate that the central government's discriminatory regional policy may not be a fundamental reason for the unbalanced distribution of foreign trade and foreign investment, nor is it a fundamental cause of the unbalanced regional growth." According to the industrial survey conducted by Federation of Hong Kong Industries (2007), although preferential state policies ranked as one of the five most important reasons for Hong Kong-oriented companies setting up their factories in Guangdong (as demonstrated in 'to enjoy tax incentives offered in Mainland China'), they are much less significant than other factors: such as reduction of labour and land costs.

Fig 10.4: The Five Main Reasons given by Hong Kong Companies for opening Factories in Guangdong

80%					

(bar chart with categories)

To reduce labour costs | To reduce rental/land costs | To scale-up production | To exploit domestic sales opportunities in Mainland China | To enjoy tax incentives offered in Mainland China

Reproduced from Federation of Hong Kong Industries (2007, pp. 55)

Secondly, due to the underestimation or even complete ignorance of the role of geography in development of regional disparity in Guangdong, many previous researches have inappropriately alleged the key contribution made by state-oriented development policies to local economic growth. In my opinion, without favourable geography, preferential state policies could have generated little effect on local economic development in this southern province. In terms of Guangdong, the role played by geography in influencing regional economic growth is more significant than preferential policies. Zhang's research (2001, p. 133) suggests that,

The central government's policy of opening up has played a role in promoting foreign trade and foreign investment in the coastal area, but only in the sense that it has loosened repressive constraints, therefore allowing the inherent comparative advantages of the coastal area to be realized.

Bao, et al, (2002) stress the importance of geography to analysis of economic development. They argue that the major proportion of foreign capital, foreign trade activities and migrant workers have been concentrated in the coastal provinces of China due to their superior location and transportation facilities. My argument is this: during the pre-reform period, the Pearl River Delta's advantage of geographical location was politically restricted. This is possibly why many regions located in the PRDA were underdeveloped and economically poor at that time, such as Dongguan, Zhongshan, Shenzhen and Foshan. Development policies, designated and implemented by the central state after 1978, have given the PRDA and Guangdong a golden opportunity to realize their geographical advantages and to develop export-oriented manufacturing industries. In precise terms, the advantage of large market proximity (Guangzhou and Hong Kong) could be fully utilized by the PRDA in stimulating its industrial transformation and local economic growth. Tuan and Ng's study (1995) found that geographical proximity to Hong Kong was the main factor attracting foreign capital to Guangdong. In addition, Bramall (2007) states that reform and open door policies have enabled Guangdong to capitalize on the geographical advantage of Hong Kong's proximity. Furthermore, in their study, by citing the evidence of coastal provinces, Bao, et al, (2002) share the view expressed by Bramall. Démurger, et al, (2002, p. 460) further reinforce this point:

The growth decomposition yields two important observations for economic policy. First, the faster growth of the coastal provinces could not be largely attributed to the more preferential policies that they had received. The

coastal location was probably marginally more important than preferential policies in promoting growth.

10.5 Conclusion

A few regions in Guangdong have benefited from a legacy of historical industrial development; Shaoguan is a classic example. The dramatic growth of the defence and other heavy industries during the pre-reform period has established a strong economic basis for rapid economic development in Shaoguan District during the post-1978 period. This powerful industrial capacity has continued to boost industrial growth and local economic development. Therefore, history has been a key factor in the relatively fast growth of this mountainous region and this mainly relates to the heavy industrial expansion during the Maoist period. The important contribution made by Mao's industrial development policies and state-funded capital investment during the pre-reform period should not be ignored in any analysis of present economic development in Shaoguan. As far as this region is concerned, it is impossible to understand the present without addressing the past. However, significantly, the historical legacy of Shaoguan can be revealed through its geography. Its remote and mountainous terrain was crucial to the decision made by the central and provincial government in the location of 'Heavy Industrial Base and 'Little Third Front Area'. Moving strategic heavy industries to Shaoguan could protect these industries from foreign invasion. In that sense, landlocked and remote features became a regional competitive advantage for Shaoguan.

Foreign capital has been an important factor in the increase in regional development inequality in Guangdong since 1978. However, the influence of FDI on regional economic growth is much less significant than that of geography. In addition, foreign capital is not an independent factor in spatial disparity in Guangdong. Without geographical advantages and the role of the state, the huge foreign capital inflow to Guangdong (especially to the PRDA) would have been difficult to achieve.

Furthermore, the regional distribution of preferential state policies in Guangdong has been unequal. It indicates that the role of the post-1978 state in stimulating local economic and industrial development has been different in various regions. Preferential state policies are one of the factors boosting economic development in the PRDA. Nevertheless, the role played by the state should not be overvalued, as some regions, which have benefited from government aid, have still failed to achieve rapid economic growth or to attract significant amounts of FDI. The evidence of Shantou and Zhanjiang has supported this argument. The dramatic economic take-off and rapid industrial development in the PRDA was not entirely due to state intervention. As specifically discussed in the next chapter, in terms of Guangdong, the contribution of geography to local economic growth was far more significant than government policies. Both the geographic characteristics and regression analysis, which are presented in the next chapter, clearly support this argument.

Chapter 11 Main Cause Analysis of Regional Inequality in Guangdong: Part II

11.1 Introduction

This chapter further investigates the major factors causing regional economic growth and spatial inequality in the context of Guangdong Province. The main focus is on analysis of the effects of geography on regional economic development in Guangdong. On the one hand, I hope to offer proper estimation of the significance of geography to the economic development of Guangdong during the reform period. On the other hand, I attempt to draw general conclusions with regard to the main causes of unbalanced regional economic development in this southern province. The following questions are particularly addressed in this chapter: What is the role played by geography in establishing the core-periphery pattern of spatial disparity in Guangdong? To what extent has geography affected local economic growth since 1980?

Four main sections are included in this chapter. They are organized as follows. Section Two analyzes the effect of geographical location on regional economic growth. It examines whether or not the locational advantages of coast and large market proximity have significantly contributed to economic growth in the PRDA. It discusses how landlocked and remote features of topography explain economic underdevelopment in the peripheral and mountainous regions. Moreover, the limitations of using coastal location in analysis of regional economic development will be discussed.

Section Three presents discussion of industrial clusters and regional economic agglomeration in Guangdong. In this section, the spatial distribution of the industrial output value of the nine key industries in Guangdong will be demonstrated to measure the real scale of industrial clusters and the contribution made by economic agglomeration to economic growth. Section Four emphasizes the importance of transportation improvement to local industrial and economic growth. The correlation between transportation development and regional economic growth will be analyzed in this section.

The empirical model analysis of the major factors causing regional economic inequality will be presented in Section Five. The first part demonstrates geographical analysis of the 20 richest and 20 poorest county-level regions in Guangdong. Investigation of the regional economic disparity in Guangdong based on regression analysis will be presented in the second part. Finally, this chapter draws conclusions in Section Six.

11.2 Geographical Location and Regional Economic Development

11.2.1 Coastal Location and Regional Economic Growth

Guangdong is close to the South China Sea, and is a coastal southern province of China. A large proportion of the land and population in this region are located near to the coast or ocean-navigable rivers. Many economically developed regions of Guangdong inherit favourable topography of coastal location. The PRDA, which is the most prosperous place in Guangdong, is a coastal region. However, a substantial amount of the land in this province is landlocked; many regions are located in remote and mountainous areas with long distances to the sea. The majority of places in the under-developed peripheral region are situated in the hills area. Therefore, it is important to consider how coastal location has affected regional economic development in Guangdong. In particular, the contribution made by coastal location to local industrial and economic development through lowering of transportation costs should be carefully analyzed. Edmonds (1996) highlights the spatial economic disparity between the coastal region and interior region in Guangdong.

As far as the PRDA is concerned, its economic development has benefited from geographical proximity to the coast. The majority of places in the PRDA are coastal regions, and they have good access to both the sea and ocean-navigable rivers (within 100 kilometers). There is also high density of small inland rivers; almost all of the counties within the PRDA are crossed by at least one river. The importance of these inland rivers lies in their ocean navigability: the majority directly or indirectly connect with the Pacific Ocean (Zhao, 1994; Edmonds, 1996). However, relative to the PRDA, the peripheral and mountainous regions are distantly located from both the coast and navigable rivers. Interior location has probably hindered the economic growth of these regions. Vogel (1989) discusses the strong correlation between interior landscape and regional under-development of mountainous Guangdong. Unlike the PRDA with its flat plains, the peripheral region is extremely mountainous. Both Vogel (1989) and Harral et al, (1992) point out that dominance of mountainous topography in the peripheral region. For example, Vogel (1989, p. 252) states that,

Roughly 70 percent of Guangdong's land is mountainous or hilly ···. Except for flatlands along major rivers, mountains and hills are almost continuous in Guangdong's north, north-west, and north-east. Guangdong's southern and coastal areas are generally flat, with only occasional hills jutting out of the plains.

Mountains and landlocked areas have impacted negatively on economic and industrial growth in the non-coastal region within Guangdong. The landlocked topography has not only hindered communication and transportation of goods between the interior and other regions, but also it dramatically reduced the opportunities for these

non-coastal regions to take part in inter-regional and international economic cooperation. Evidence from the 20 poorest counties in Guangdong has demonstrated this point. For instance, Lianshan is situated in the most remote region of North Guangdong has inherited extreme geographic conditions: this region is extremely hilly (*Shaoguan Shizhi,* 2001). Wengyuan's landscape is also very mountainous: mountainous land accounts for 80 percent of total land in this region (*Wengyuan Xianzhi,* 1997). Liannan, another of the least developed counties in Guangdong, has also severely suffered from its remote and mountainous terrain. *Liannan Xianzhi* (The Records of Liannan County) (1996) has made a detailed analysis of the geographical disadvantages of Liannan.

Wuhua is a typical landlocked county. There is only one main road (*Zhugandao*) in Guangdong connected to Wuhua, and it is distant from both the coast and navigable rivers (more than 100 kilometers). Consequently, extremely high transportation costs mean that, trade and other economic activities are particularly difficult to develop in this region. In order to transport its finished goods to the nearest port for shipping, Wuhua's companies must cross two domestic territorial boundaries (Meizhou and Shanwei) by road first. As there is no railway, the road is the only means of transportation of goods and passengers. Therefore, it is not difficult to understand that concentration of all transportation of goods on one main road has inevitably led to traffic congestion in Wuhua: especially at peak times. Traffic congestion further increases transportation costs and travel time for the enterprises located in this region. Wu (1985) points out that the high cost of transportation has reduced the product' competitiveness of this region. The main transported-goods produced in Wuhua are coal, wood and some raw building materials: their average value per shipping unit is relatively low. Therefore, high transportation cost has substantially increased total production costs and reduced the attractiveness of goods produced in Wuhua in terms of regional competition in Guangdong. In that sense, as far as Wuhua is concerned, it is difficult to realize the economic potential of its rich supply of raw materials. In discussion of the challenge caused by shortage of transportation facilities in the peripheral and mountainous regions within Guangdong, Harral, et al, (1992) raise the issue of backward transportation facilities in the eastern peripheral regions. They state that,

The development of mineral based activities in resource-rich, densely populated, but otherwise impoverished eastern Guangdong has been blocked for lack of low cost access, denying both the growth centres access to potentially lower-cost resources and the eastern region participation in the economic miracle taking place elsewhere in the province. (1992, p. ix)

A short interview survey was conducted in Wuhua by the writer. The interview question, "do you agree with the remote and landlocked characteristics of geography[69]

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[69] As far as the interview question is concerned, the poor geography in Wuhua is specifically discussed as having remote and landlocked characteristics. In terms of its long distance to

playing a crucial role in explaining the slow economic growth in Wuhua? (1) Agree strongly, (2) Agree, (3) Disagree, or (4) Disagree firmly" was put to local interviewees during the interview sessions (see Fig 11.1 below). The result shows that 60 percent of respondents agree strongly that poor geographical location plays a key role in contributing to slow economic development: 30 percent of interviewees agreed. By contrast, only six percent of interviewees disagree; and about four percent of respondents disagree strongly that geographical disadvantage is an important factor in the underdevelopment of Wuhua. In total, the majority of interviewees (90 percent) argue that the landlocked feature of geography is an important factor explaining the slow economic growth in this place. They believe that the main root of economic underdevelopment in Wuhua lies in its landlocked location. If Wuhua had inherited the advantage of good location, local economic development would have been much greater.

Fig 11.1: Field Survey 3 (unit: percentage)
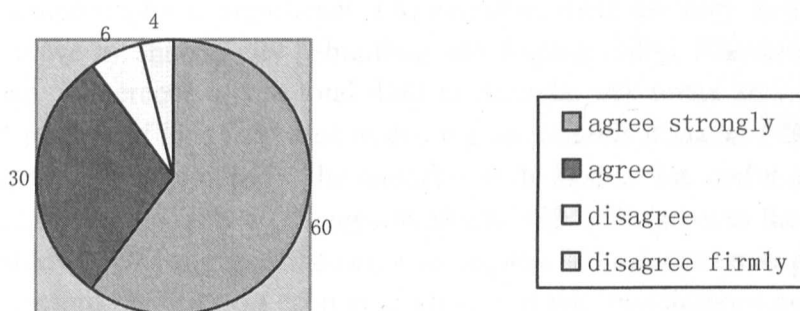
(Source: Field Survey 3[70], conducted in September 2006)

One local interviewee, who participated in the field survey, points out this to the writer,

Wuhua is a beautiful and resource-rich region in Guangdong. However unfortunately, this place is located in the remote northern region. The landlocked and mountainous topography has negatively influenced its potential to develop the resource-intensive industries. (Field Interview 11, conducted in October 2006)

Meixian, under the administrative jurisdiction of Meizhou, is another very hilly and remote county in Guangdong; the surrounding mountains in Meixian have become a large roadblock hindering its communication with the other regions. Its landlocked location has tended to cause relatively slow economic development. Vogel (1989)

Guangzhou, Wuhua is a remote region. Relative to the coastal places, Wuhua is a landlocked region.

[70] The interview survey was completed during the field research in September 2006. A total 15 local residents participated in the field survey. The interviewees were chosen according to snowball sampling methods from four townships located in Wuhua County, Guangdong.

highlights the mountainous topography of Meixian. Furthermore, Ku's study (2003) further claims that the inherited geographical characteristics have hindered communication between the people in Meixian and the other regions.

The arguments made by Vogel and Ku are correct. As far as Wuhua is concerned, inherited disadvantages of geographical location have significantly increased goods transportation costs, and severely affected its ability to participate in inter-regional economic interaction and development of trade and industry.

Wuhua is a remote and landlocked county; it is geographically distant from Guangzhou and other coastal regions in the PRDA like Shenzhen and Dongguan. Moreover, mountainous land makes up about half of Wuhua. Arable and flat land with high agricultural productivity is extremely rare. *Wuhua Xianzhi* (1991, p. 3) states that, "the whole of Wuhua is surrounded by high mountains. Wuhua has 31 hills of 1000 meters and above." In contrast to the flats of the PRDA, Wuhua's remote and mountainous topography is significant. For example, there are only two hills of 100 meters and above in Shunde city (Shunfeng and Jinping Hills). Flat terrain accounts for more than 58 percent of the total land in Shunde; the water area accounts for another 37.4 percent of total land area in this region (*Shunde Xianzhi*, 1996). As far as Dongguan is concerned, similarly, the majority of its land is flat, and it only contains 11 hills of 50 meters and above (*Dongguan Shizhi*, 1995). Relative to the PRDA, Sun and Chai's study (1998) suggests the negative impacts of backward transportation and other infrastructure facilities on economic growth in the mountainous and peripheral regions. They highlight that transportation disadvantages have accounted for underdevelopment in the peripheral region.

Detailed data of transport costs for both goods and people in the different regions within Guangdong has not been published in any local statistical yearbook or any other official documents. The lack of regional data has caused problems in precisely analyzing the correlation between location and transportation costs. However, during the field research, first-hand data of the transportation costs for some individual regions has been collected. Three transportation cost surveys[71] have been conducted in order to assess the real negative effect of location on local transportation costs. Significantly, the data demonstrated in the surveys of regional transportation costs suggests a positive correlation between the road distance, geographical location and high transportation costs. In addition to the long distance between the periphery and PRDA, the inherited mountainous geography has added further to the relatively high transportation costs in the peripheral region. For example, for Chaozhou, a peripheral northern region, for heavy vehicles weighing 10 tons carrying oranges, relative to the average per kilometer transportation cost between Chaozhou and Shenzhen (1.2 *yuan*), the equivalent cost figures are 1.3 and 1.4 *yuan* on the longer routes such as Chaozhou-Guangzhou and Chaozhou-Zhuhai respectively (see Table 11.1 below). As

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[71] In terms of the three regional surveys of the transportation costs conducted by this study, in order to fairly measure the regional variation of transportation cost, the specific transported product is the orange and transportation means is a heavy vehicle weighing 10 tons.

far as Xingning is concerned: a northern city located in mountainous Meizhou, the average transportation cost is higher due to its mountainous and rugged topography and perhaps also the quality of local roads. Compared to the average per kilometer transportation cost between Xingning and Dongguan (1.4 *yuan*), the equivalent figure is 1.6 *yuan* from Xingning to Guangzhou (see Table 11.2 below).

Table 11.1: Transportation Costs for Heavy Vehicles weighing 10 tons (yuan) (Chaozhou: a less mountainous peripheral region)

Route	Total two-way Road Distance (km)	Road and Bridge Checkpoint Charge	Petrol Cost	Vehicle Maintenance Cost	Total Transportation Cost	Average transportation cost/per kilometer
Chaozhou-Guangzhou	938	500	410	300	1210	1.3
Chaozhou-Shenzhen	816	440	300	220	960	1.2
Chaozhou-Zhuhai	1238	700	550	450	1700	1.4

(Field Survey, conducted in October 2006)

Table 11.2: Transportation Costs for Heavy Vehicles weighing 10 tons (yuan) (Xingning: a mountainous region)

Route	Total two-way Road Distance (km)	Road and Bridge Checkpoint Charge	Petrol Cost	Vehicle Maintenance Cost	Total Transportation Cost	Average transportation cost/per kilometer
Xingning-Guangzhou	800	500	600	200	1300	1.6
Xingning-Dongguan	700	350	500	120	970	1.4
Xingning-Shenzhen	660	300	450	110	860	1.3

(Field Survey, conducted in October 2006)

Table 11.3: Transportation Costs for Heavy Vehicles weighing 10 tons (yuan) (Dongguan: a region located within PRDA)

Transportation Route	Total two-way Road Distance (km)	Road and Bridge Checkpoint Charge	Petrol Cost	Vehicle Maintenance Cost	Total Transportation Cost	Average transportation cost/per kilometer
Dongguan-Guangzhou	122	50	45	25	120	1
Dongguan-Shenzhen	204	70	80	40	190	0.9
Dongguan-Zhuhai	416	150	200	90	440	1.1

(Field Survey, conducted in October 2006)

Compared to the average transportation costs for the same goods (oranges) in the interior periphery, the equivalent costs for the regions located in the Pearl River Delta are considerably lower. For example, the average per kilometer cost between Dongguan and Guangzhou (1 *yuan*) is between 30 and 60 percent lower than the equivalent figure on the transportation route Chaozhou-Guangzhou (1.3 *yuan*) and Xingning-Guangzhou (1.6 *yuan*). In terms of shipping goods to Shenzhen, the average per kilometer transportation cost for Dongguan (0.9 *yuan*) is about 33 percent lower than the equivalent transportation cost for Chaozhou (1.2 *yuan*). Moreover, in the comparison of transportation costs between the routes Chaozhou-Zhuhai and Dongguan-Zhuhai, the regional gap between the peripheral and PRDA regions is up to 27 percent (see Table 11.3 above).

The discussion of the effects of coastal location on economic development, illustrates that economic success in the PRDA during the reform period is largely due to its coastal location. The coastal factor should also be taken into account in analysis of widening the core – periphery pattern of spatial development disparity in Guangdong since 1978. In particular, the importance of coastal location in boosting economic and industrial development through low costs of transportation and other production processes should be carefully addressed.

11.2.2 Coastal Locational Factor: Limitations

In the context of Guangdong, traditional geographic theories have their limitations in studying economic growth and spatial inequality. Numerous geographical scholars argue that coastal or river location would inevitably boost economic growth in a region favoured in this way. However, this is not the case for some coastal regions in Guangdong. Among the twenty least developed counties, five have the advantage of coastal location (Suixi, Lianjiang, Wuchuan, Huilai and Lufeng). All of the land area in these five poorest counties is within 100 kilometers of the coast; all of the populations in these regions live close to the coast (within 100 kilometers). Road distance from Shaoguan district to Guangzhou is up to 309 kilometers; and Shaoguan is located in a mountainous region: but surprisingly, Shaoguan district has achieved faster economic development than some regions in the PRDA and other coastal peripheral regions. In 2005, it was one of the 20 richest and most developed counties in Guangdong.

The various regions close to the sea or navigable rivers do not demonstrate a uniform speed of economic growth. In reality, the opposite is true: economic development in the individual regions within Guangdong is very unequal. The regional evidence of Guangdong suggests that the possession of geographical advantages has not necessarily contributed to economic prosperity. This seems to indicate that coastal location alone is not sufficient to boost economic development in coastal regions. For example, Zhanjiang and Shantou, and many other coastal municipalities in Guangdong, have advantages such as coastal location or many small ocean-navigable

rivers, and natural good deepwater harbours. All of these factors provide the ideal location for developing international trade and export-oriented manufacturing industries.

Shantou, has a history of industrial development and commercial prosperity going back more than one hundred years. After the Opium War, new and modern industries were steadily developed in Shantou, such as ship building, sugar refining and oil tanker construction. During the early 20th century, Shantou became the economic centre of northern Guangdong after the completion of Shantou-Chaozhou railroad in 1906 (Wu, 1985). Shantou District had established about 43 kinds of modern industries by 1936. The manufacturing equipments and machinery utilized in these factories were actually quite advanced. There were more than 3,000 private shops in Shantou, and in terms of commercial prosperity it ranked seventh in China (*Shantou Shizhi*, 1999, p. 7). Moreover, Shantou became the regional centre for goods transportation and commerce in northern Guangdong, southern Jiangxi and western Fujian after it was designated as a Treaty Port (*Shantou Shizhi*, 1999, p. 240; 991). In the past, the strong industrial basis and influential regional power of Shantou were obvious. The rapid development of modern industries and commerce was mainly due to its advantageous coastal location[72] and Treaty Port Status[73]. Referring to the naturally good conditions of Shantou Port, *Shantou Shizhi* (1999, p. 6) states that,

The harbor in Shantou is wide and deep; and it's surrounding small islands and mountains defense the harbor against storm waves. The large ships can put into the port.

In fact, by 1933, the facilities and development of Shantou Port were already quite advanced. The total number of ships which entered and departed from Shantou was up to 4,478; and the total weights of shipping capacity was more than 6.32 million tons. At that time, the handling capacity of Shantou Port ranked third in China: behind only Shanghai and Guangzhou (*Shantou Shizhi*, 1999, p. 959). However, even though it inherited a legacy of fast industrial expansion and commercial prosperity, and more significantly, coastal location and good natural harbour, Shantou has failed to maintain its regional commercial prosperity or achieve rapid growth of the local economy during the reform period. Coastal advantage has not stimulated rapid economic growth in Shantou: unlike many regions located within the PRDA. Bramall's study (2007) suggests the economic slowdown and decline of Shantou during the reform period.

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[72] Silt sedimentation causes problems for Shantou port during certain periods of the year, making it impossible for some large ships to enter the port, and deep-water berth facilities are very difficult to construct (*Shantou Shizhi*, 1999). However, the general geographical advantage of Shantou is clear.

[73] In 1861, according to the Tianjin Treaty, Shantou was opened to foreign trade and offered the status of 'Treaty Port' by the Qing government (*Shantou Shizhi*, 1999).

In terms of North Guangdong, the case of Shantou indicates that coastal advantage has not contributed to its economic prosperity during the post-1978 period. What about West Guangdong? Zhanjiang has been specifically discussed in the following section.

11.2.2.1 The Case of Zhanjiang

Zhanjiang has a natural deep-water harbour on the South China Sea and is situated in the Leizhou Peninsula of Guangdong; Zhanjiang harbour can accommodate up to 50,000 tons of ships; and the large trading ships can put into port all year round (Vogel, 1989). According to the data published in Guangdong Yearbook 2005, Zhanjiang Port has 174 variously sized shipping berths. In fact, Zhanjiang Port is the biggest seaport in South Guangdong and the whole of North Bay (*Beibu Wan*); it also has the deepest sea-route in South China. Zhanjiang Port does not only serve Guangdong, but also it is used by the other south-western provinces in China like Guangxi and Guizhou[74]. Several previous studies have pointed out the natural geographical advantages in Zhanjiang (e.g. Sun, 1988; Vogel, 1989). For example, Sun (1988, p. 350) stress that,

··· Zhanjiang harbour is a modern coastal harbour, which is wide and deep, with excellent natural conditions. ··· it is the most convenient harbour for exports in south China, with 14 dock berths, 7 of which have an accommodation capacity of 10,000 tonnes.

Among the major ports in Guangdong, Edmonds's study (1996) suggests that Zhanjiang Port has inherited excellent advantages. He argues that the physical characteristics of its port have transformed Zhanjiang into 'another Hong Kong'. Due to its deep water, the berths development potential of Zhanjiang is much superior to the ports located in Guangzhou and Shenzhen. Edmonds (1996, p.100) further stresses that,

All Guangdong ports fall short of Zhanjiang in development potential.

The case of Zhanjiang demonstrates that the natural conditions of the ports in the peripheral region are no worse than in the PRDA. Meanwhile, in contrast to the regions in the PRDA, the local economic development in Zhanjiang has been very slow during the 'reform and open-door' period. Of course, Zhanjiang is an important navy base in southern China. Therefore, it is logical to predict significant Chinese military expenditure in Zhanjiang. Nevertheless, the total GDP generated in Zhanjiang does not include this military spending. In that sense, we might underestimate economic development in Zhanjiang and its real amount of GDP. Nevertheless, relative to many other regions in Guangdong, economic underdevelopment of

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[74] The railroad connects Zhanjiang with other south-western provinces, therefore, the goods produced in the south-western provinces can be easily transited to Zhanjiang Port by railway, and then these goods can be shipped to the world markets through Zhanjiang Port.

Zhanjiang is surely the case. This is especially true of the development of its port. Zhanjiang Port has handled less and less freight compared to other major ports in Guangdong: the contribution of Zhanjiang Port to the total freight handled in Guangdong has been increasingly weak since 1980. The figures demonstrated in Table 11.4 below, shows that the share of Zhanjiang in the total volume of freight handled in Guangdong has continually decreased since the 1990s. In 1980, Zhanjiang Port still accounted for 34 percent of total volume of freight handled in the major ports of Guangdong; while this equivalent figure decreased to about 14.5 percent in 1995. Moreover, in 2004, the ratio of Zhanjiang Port's volume of freight handled in Guangdong was down to only nine percent. The early study conducted by the HSBC (1985) suggests that Zhanjiang still played an important role in the freight traffic of Guangdong during the early reform period. The share of total amount of foreign trade freight in Guangdong by Zhanjiang was 21 percent in 1983.

Table 11.4: Volume of Freight Handled in Major Coastal Ports of Guangdong (unit: 10,000 tons)
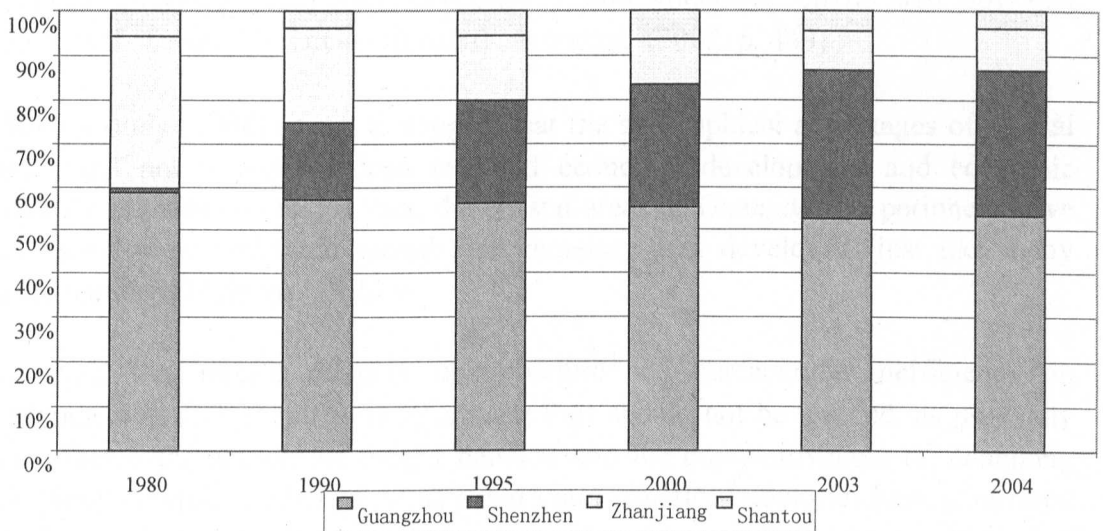
Source:

1. Guangzhou Statistical Bureau (2005, pp. 672)
2. Shenzhen Statistical Bureau (2005, pp. 574)

More significantly, three of the five poorest coastal counties are located in Zhanjiang municipality (Suixi, Lianjiang, and Wuchuan). Zhanjiang has not benefited from the geographical advantage of coastal proximity. From a comparable angle, the economic development in Zhanjiang remains relatively slow and is behind most regions in the PRDA. Other regions in Guangdong, without the advantage of coastal location, and despite higher transport costs, have achieved faster economic growth than Zhanjiang since 1980. Such regions have, indeed, recorded higher per capita GDP than the equivalent figures in Zhanjiang and many other coastal regions in Guangdong during the reform period. Why have geographically favoured regions such as Zhanjiang and Shantou failed to develop as quickly as the PRDA? In fact, economic performance in

some coastal regions like Zhanjiang and Shantou is even worse than in some landlocked and remote regions in Guangdong. For example, as previously discussed, remote Shaoguan district was, in 2005, one of the 20 richest counties in Guangdong. Relative to many coastal counties in Guangdong, it has shown much faster economic growth. Therefore, the coastal advantages are not as powerful in boosting regional economic growth as many people claim. I am not convinced by the analysis made by Démurger, et al, (2002) regarding the absolute positive correlation between coastal location, prosperous foreign trade and high income per capita. Zhanjiang and Shantou's evidence does not support their argument. If inherited good geography is the main driving force behind regional economic development: as claimed by Démurger and some other researchers, why has Zhanjiang failed to develop as quickly as the regions located in the PRDA since 1978? Démurger, et al, seem to overestimate the contribution made by coastal location to economic growth. As they inappropriately claim,

Hence, provinces with easy access to sea transportation received boosts to their incomes from international trade whenever China did not cut itself off from the international economy. (2002, p. 449)

Skinner's study (1994) seems to suggest that the geographical advantages of coastal regions did not necessarily lead to rapid economic development and economic prosperity in these regions; in fact, the coastal areas of Guangdong's periphery have been facing slow economic growth and remained less developed: just like many remote peripheral regions in China.

Of course, the impacts of poor infrastructure and bureaucratic inefficiency on development of freight traffic in Zhanjiang Port should not be ignored, as they may have affected the amount of freight handled and the competitiveness of Zhanjiang Port. Many previous studies of African and Latin American countries have confirmed that there are strong relationships between the volume of freight handled, port facilities and port efficiency (see Micco and Pérez, 2001). However, this chapter mainly investigates the role of geography in influencing regional economic growth; therefore, it is not my intention to further address the issue of port' management and bureaucracy in Guangdong.

11.2.3 Geographical Location and Large Market Proximity

Regional examples such as Zhanjiang and Shantou suggest that the inherited advantage of coastal location might not be sufficient to guarantee economic growth in Guangdong. Geographical proximity to large markets (Hong Kong and Guangzhou), industrial clustering and economic agglomeration might, indeed, be more significant than coastal location. The two geographical conditions of large market proximity and coastal location need to be presented in order to realize rapid economic development. Zhanjiang, Shantou and many other coastal areas have suffered from the same

disadvantages of long distance from Hong Kong and Guangzhou. The high costs of intra-regional road transportation in Zhanjiang and Shantou have deferred potential investors: particularly those from Hong Kong, from investing in these regions. Moreover, the spillover effects of industrial clustering and economic agglomeration, generated from Guangzhou and other large regions in the PRDA, towards the peripheral region, are very insignificant. Although Shantou is on the coast and a special economic zone, Bramall (2007) claims that this region has not achieved the fast economic growth of areas such as Foshan: mainly due to the disadvantage of long distance to Hong Kong and Guangzhou.

The road distance between Guangzhou and the majority of regions located in the PRDA is less than 100 kilometers (see Table 11.5 below). Accompanying the good transportation facilities and developed expressway network, almost all of the regions located in the PRDA can be easily accessed from Guangzhou within one and a half hours: thus placing it within 'the one and a half hour' economic circle'. The concept of 'one and a half hour' economic circle' means that any region within the PRDA can generally be accessed within one and a half hours by road from the centre of Guangzhou. The industrial and agricultural goods produced in the PRDA can be delivered to customers within one and a half hours of the PRDA' firm receiving the customer's order. For the enterprises engaging in processing and assembling manufactured products, transportation costs and travel time are key concerns. The 'one and a half hour' economic circle' has generated a great incentive for these companies and industries to locate in the PRDA.

Table 11.5: Road Distance between Different Regions in Guangdong (unit: kilometer)

City	Guangzhou	Shenzhen	Meizhou	Zhanjiang
Dongguan	61	102	399	553
Shenzhen	163	0	393	655
Zhongshan	94	152	527	462
Zhuhai	140	208	583	518
Foshan	28	89	461	464
Jiangmen	98	156	531	412
Taishan	150	211	583	378
Yangjiang	257	318	690	255
Zhanjiang	492	553	925	0
Xuwen	646	707	1079	156
Gaozhou	398	459	831	118
Luoding	256	317	689	298
Zhaoqing	73	171	543	399
Huaiji	201	262	634	509
Lianzhou	318	379	637	668
Shaoguan	309	330	464	798
Conghua	67	88	416	559
Lianping	237	237	260	729

Heyuan	205	171	228	697
Longchuan	312	278	121	804
Pingyuan	442	408	66	934
Meizhou	433	399	0	925
Dapu	534	500	101	1026
Jieyang	437	376	147	929
Chaozhou	469	408	178	961
Raoping	516	455	226	1008
Shantou	460	399	102	952
Puning	394	333	186	886
Huizhou	143	86	312	639
Guangzhou	0	61	428	492

Guangdong Map Press (2006, pp. 6-7)

Due to the PRDA's geographical proximity to the core markets of – Guangzhou and Hong Kong, – more and more foreign and domestic firms have been moving to this region since 1980. This is especially true of labour-intensive and intermediate-oriented goods production. Moreover, the Guangzhou-centralized transportation hub advantage in the PRDA has further contributed to low transportation costs and strengthened the investment motivation of the manufacturing industries located in the PRDA. It is important to note the following: the contribution made by overseas enterprises and export-intensive manufacturers is significant in the total output value of the nine major industries of Guangdong[75]. Detailed discussion regarding these nine major industries will be presented in the following section. It is clear that both the low cost of sea transportation and proximity to major markets are the key factors for these companies. As a consequence, the nine major industries have converged on the PRDA. Tuan and Ng (2004, p. 689) point out that,

Agglomeration economies from selected economic regions have played an important role in attracting FDI inflows. At the regional level, well-established cities or areas (in terms of physical infrastructure, market size, manufacturing base, income level, and developed production service industries) will continue to enjoy advantages in FDI promotion.

The regions within the PRDA have enjoyed the benefits of large market proximity. In their book 'Lun Jingji Zhongxin – Guangzhou' (Discussion of Economic Centre Guangzhou), Guan and Liu (1987) highlight that good transportation network and low

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[75] In Guangdong, the nine major industries can be generally separated into three industrial groups: first, the emerging industries include electrical machinery and special purpose equipment, electronic information and petroleum and chemical industries; secondly, textile and garments, building materials and food and beverages are regarded as three traditional key industries in Guangdong; thirdly, motor vehicle, logging and paper making and medicine are the three high-potential industries for Guangdong. (Federation of Hong Kong Industries, 2007)

transportation costs are the key factors stimulating economic development in Guangzhou, and have been important to maintaining Guangzhou's status as an economic centre for more than two thousand years.

Guangzhou is the key metropolitan city in both the PRDA and Guangdong: it is the trade, commercial, industrial economic and cultural centre of Guangdong and even South China. During the Tang and Song Dynasties, Guangzhou had become a relatively advanced city in terms of commerce and foreign trade (Wu, 1985; Guan and Liu, 1987). In 1949, the industrial enterprises located in Guangzhou accounted for 43 percent of total industrial enterprises in Guangdong; and the industrial output value of this region accounted for up to 32 percent of total industrial output in Guangdong (Wu, 1985). Human talents, capital and information are all concentrated in Guangzhou; in addition, it is the only central transportation hub in Guangdong. Government, education and research institutions also cluster in Guangzhou and its surrounding administrative districts. Scholars (Zhao, 1994; Chan, 1998; Weng, 1998) have provided detailed analysis of the important regional position of Guangzhou in history, in fields such as foreign trade.

During the past two decades, rapid economic growth has transformed the PRDA into one of the largest and most prosperous markets in China. This is especially true of Guangzhou, which has accounted for more than 30 percent of Guangdong's total GDP and industrial revenue. Although the role of Guangzhou in stimulating the economic development in the other regions within Guangdong has been reduced with the rise of Shenzhen and Dongguan during the reform period, the economic power and regional influence of Guangzhou within Guangdong are remarkable. It is reasonable to argue that the dominant economic influence of Guangzhou might be weakening, but it has not been fundamentally shaken. Its position as the key economic centre of Guangdong and even South China, is clear. It is still justified to claim that Guangzhou is the core region of Guangdong. Guangzhou is part of Lingnan region; and Skinner (1977) has pointed out that Guangzhou's monopoly in overseas trade has boosted economic development in Lingnan compared to other regions. More significantly, the economic importance and strong regional influence of Guangzhou in Lingnan region and even throughout China is evident. In macroregional language, the regional importance of Guangzhou is not only reflect within the traditional regional boundary (Guangdong province), but beyond to the macro region of China (Lingnan).

Due to their relatively long distance from core economic centres like Guangzhou and Hong Kong, one of the most prominent issues for the interior regions in Guangdong is the average high transportation costs. Of the 20 least developed counties, 18 face much longer road distance and travelling time to Guangzhou than the top 20 richest counties; the average distance is greatly in excess of 150 kilometers (or more than four hours driving distance). By contrast, the average distance and travel time between the most developed counties and Guangzhou are much shorter: the road distances between 15 of the top 20 richest counties and Guangzhou are less than 150 kilometers and within one and a half hours travelling time. Guangzhou, which had

accounted for about 30 percent of Guangdong's total GDP by 2005, is located in PRDA, and the other regions in the PRDA are generally much closer to Guangzhou than the regions situated in the periphery. In terms of their accessibility to Guangzhou, the peripheral regions have been facing much longer road distance and relatively higher transport costs. For example, the road distance between Dongguan and Guangzhou is 61 kilometers, while the road distance between Meizhou and Guangzhou is 428 kilometers: this makes Meizhou seven times farther away from Guangzhou than Dongguan. Even after the new expressway Meizhou-Heyuan was completed in 2005, the journey from Meizhou via Heyuan to Guangzhou was still 350 kilometers, and it is 330 kilometers to Shenzhen.

It is important that the boost to local economic development in Guangdong, due to geographical proximity to Hong Kong, should not be undervalued. If Guangzhou is the domestic core region and economic centre of Guangdong, then, it is justified to argue that Hong Kong is possibly the external core region and economic centre of this southern province. Due to the advantages of geographical location and good transportation accessibility in the PRDA, Hong Kong has established a close economic tie with this region in terms of trade, investment and economic cooperation. Numerous scholars argue that proximity to Hong Kong is another major advantage for the PRDA and Guangdong (e.g. Smith, 1991; Sung, et al, 1995; Aijmer and Ho, 2000). Smith argues the important contribution of geographic proximity to Hong Kong to industrial and economic development in Guangdong during the reform period. Smith (1991, p. 278) states that,

Perhaps the single greatest asset that Guangdong has had all through the reform era, however, has been the advantage of geography. Proximity to Hong Kong allowed the new entrepreneurs in Guangdong Province to seek out economic support and the transfer of technology from their highly successful cousins in the colony.

The early research conducted by the Hong Kong Trade Development Council (1990) suggests the potential reasons why Hong Kong companies prefer to invest in the PRDA. It argues that the physical proximity factor is particularly prominent. In addition, Sung, et al, (1995) point out the close trade and export cooperation between Hong Kong and Guangdong. Their research demonstrates that the majority of exported agricultural and manufactured industrial commodities in Guangdong were exported to Hong Kong, and accounted for more than 90 percent of Guangdong's total exports (many of these products were then re-exported to other countries like the United States via Hong Kong's port). Li and Yang's study (2003) further suggests the strong and inseparable relationship between Guangdong and Hong Kong.

In fact, the Hong Kong-oriented firms greatly prefer to invest in Guangdong, this is especially true of the PRDA where they can expect higher profits returns than in other places: mainly through reduction of transportation and other production costs. According to the data published by Guangdong Yearbook 2006 (2006, p. 702), Hong

Kong accounted for 47 percent of total utilized FDI in Guangdong in 2005, which was almost three times higher than the second-ranking region Virgin Islands. It suggests the leading position of Hong Kong in the share percentage of total foreign capital inflows to Guangdong. Hong Kong firms have been moving their manufacturing factories to the PRDA since the implementation of 'reform and open-door' policies in late 1978. Zhang's study (2003) further stresses the close economic correlation between Guangdong and Hong Kong. Zhang highlights that Hong Kong is the biggest foreign investor in Guangdong. The manufacturing factories established by Hong Kong companies have transferred advanced technology and management practices to Guangdong, and many job vacancies have also been offered by these factories.

11.2.4 Climate and Regional Economic Growth

The climate can significantly affect agriculture; however, it has very little influence on the development of industry and other economic activities. The correlation between climate and agricultural prosperity is close, but not the correlation between climate and industrial prosperity. The key question is this: whether or not agricultural prosperity is crucial for regional economic development in Guangdong? In order to investigate the relationships between climate and regional economic growth, specific meteorological data of Guangdong has been analyzed. The figures presented in Appendices 2, 3 and 4 demonstrate meteorological phenomena in Guangdong between 1980 and 2004. In terms of the average annual sunshine hours, according to the data shown in Appendix 2, the various regions in Guangdong had not demonstrated significant difference between 1980 and 2004. The eastern region had the highest average annual sunshine hours, at 2117.1 hours; while the equivalent figure in the central regions was 1593.5 hours. The figures illustrated in Appendix 3 suggest that the annual temperatures across all of the eastern, western, northern and central regions were quite similar. The gap in annual temperatures between the highest and lowest region is only 3°C. The western regions had the highest temperature (23.6°C), which is probably contributed by the tropical and subtropical climate. Guangdong's land area is traversed by the Tropic of Cancer; the majority of Guangdong is subtropical, and only a very small portion of Guangdong: mainly in the west and south-west, is tropical. The northern region had the lowest average temperature (20.6°C). As far as annual precipitation is concerned, Guangdong had sufficient rainfall; and regional disparity was also small. The data shown in Appendix 4 illustrates that the north-east had the lowest average annual precipitation among all the regions within Guangdong (1449.1 mm). In the western region, annual precipitation was 1791.2 mm: the highest figure in Guangdong. In general, the figures presented in Appendices 2, 3, and 4 indicate that the average annual sunshine, temperature, and precipitation have not shown much regional variation since 1980. Of all the Chinese provinces, Guangdong perhaps has the least climatic variation within its regions. Guangdong has generally favourable climatic conditions of warm temperature, ample rainfall and sunshine. The weather is quite conducive to

agriculture. Strahler and Strahler (1987) point out that the abundant rainfall and warm climate in South-east Asia are due to the monsoon effect.

Guangdong, the climate and monsoon effects are helpful to agricultural development and provide the ideal conditions for cultivation of grains and general agriculture. In fact, this southern province is one of the main paddy rice production bases in China; other local activities like fishing and sugar cane are also important to the Chinese economy. Edmonds (1996, p. 71) maintains that "Guangdong's geography possesses good possibilities for economic development. Its subtropical and tropical climate combined with high levels of precipitation and adequate soils have given the province a strong base for agriculture." Of all the regions in Guangdong, the PRDA tends to have the most favourable climatic conditions of sufficient annual rainfall and sunshine hours, and mild temperatures. Agriculture in the PRDA has a long history and is relatively advanced: with generally high productivity. Sivin, et al, (1988) and Aijmer and Ho (2000) both suggest that the PRDA has some of the most fertile land, and is one of the best areas for farming on the entire earth. Similarly, Zhao (1994) points out that agricultural productivity in Guangdong has benefited from the favourable climate. In an early study, Nolan (1983) also stresses that the good farming condition in the PRDA are due to the climate.

The output value of primary industry in Guangdong has shown a steadily increasing trend since 1978. According to the data presented in Table 11.6 below, the output value of primary industry was 5.5 billion *yuan* in 1978; the equivalent figure reached 86.9 billion *yuan* in 1995; with a further increase to 139.5 billion *yuan* in 2005. In conclusion, Guangdong and especially the PRDA have achieved remarkable agricultural development: and in so doing have benefited enormously from the good climate.

However, how important is the ratio of the output value of primary industry in total GDP of Guangdong? If the local economy is agriculturally oriented and primary industry accounts for a large portion of the total GDP in Guangdong, then, the climate can be reasonably argued to be an important factor in widening spatial inequality in Guangdong during the reform period. As far as Guangdong is concerned, it is important to note that local economic growth depends more on the secondary and tertiary industries rather than primary industry. According to data presented in Table 11.6, on the one hand, in 1978, the output value of the secondary and tertiary industries accounted for 70.3 percent of total GDP in Guangdong; the equivalent figure reached more than 80 percent in 1992. Moreover, the ratio of the secondary and tertiary industries in total GDP of Guangdong jumped to nearly 94 percent in 2005. On the other hand, the importance of primary industry has dramatically weakened during the reform period. Although the absolute output figure is increasing, the ratio of the primary industry in total GDP has been decreasing during the same period; down to only 6.2 percent in 2005 from nearly 30 percent in 1978. Moreover, the figures shown in Table 11.7 illustrate the share percentage of secondary industry output in total GDP in the different regions within Guangdong between 1992 and

2005. The two main points can be highlighted from this table. First, relative to the other regions, the PRDA had the highest share of secondary industry in total GDP between 1992 and 2005. The main driving force for economic growth in the PRDA is the industrial sector. Secondly, the importance of secondary industry output in total amount GDP had been continually increasing in all regions within Guangdong by 2005, including the underdeveloped peripheral and mountainous regions. In general, the data indicates that the output contribution made by primary industry to economic development in Guangdong has been increasingly marginalized. Agricultural prosperity has generated little influence on regional economic and industrial development. By contrast, the development of the secondary and tertiary industries has shaped regional economic growth and modernization in Guangdong since 1978. During the reform period, the main engines of the regional economic growth in Guangdong have been the fast growth of the secondary and tertiary industries. Due to lack of climatic variation between the individual regions in Guangdong and the effects of climate on agriculture, it can be concluded that climate has not been an important factor in regional economic development or in causing the widening spatial disparities within Guangdong since 1980.

Table 11.6: Structure of GDP in Guangdong, 1978-2005

Year	Amount (unit: billion *yuan*)				Percentage (unit: %)		
	Gross Domestic Product	Primary Industry	Secondary Industry	Tertiary Industry	Primary Industry	Secondary Industry	Tertiary Industry
1978	18.6	5.5	8.7	4.4	29.7	46.6	23.7
1979	20.9	6.7	9.2	5.1	31.8	43.8	24.4
1980	25	8.3	10.3	6.4	33.2	41	25.8
1981	29	9.4	12	7.6	32.4	41.4	26.2
1982	34	11.8	13.5	8.6	34.8	39.8	25.4
1983	36.9	12.1	15.2	9.5	32.9	41.3	25.8
1984	45.9	14.5	18.8	12.6	31.7	40.9	27.4
1985	57.7	17.2	23	17.6	29.8	39.8	30.4
1986	66.8	18.8	25.6	22.3	28.2	38.3	33.5
1987	84.7	23.2	33	28.4	27.4	39	33.6
1988	115.5	30.7	46	38.9	26.5	40	33.5
1989	138.1	35.2	55.4	47.6	25.5	40.1	34.4
1990	156	38.5	61.6	55.9	24.7	39.5	35.8
1991	189.3	41.6	78.3	69.5	22	41.3	36.7
1992	244.8	46.6	110	88.1	19	45	36
1993	343.2	56	170.1	117.1	16.3	49.6	34.1
1994	451.7	69.5	224.2	158	15.4	49.6	35
1995	573.4	86.9	287.8	198.8	15.1	50.2	34.7
1996	652	94.2	326.9	230.8	14.4	50.2	35.4
1997	731.6	98.7	364.8	268.1	13.5	49.9	36.6
1998	792	100.5	399.2	292.2	12.7	50.4	36.9
2000	966.2	100	486.9	379.3	10.4	50.4	39.2

2003	1362.6	730.7	109.4	522.5	8	53.6	38.4
2004	1604	889	124.5	590.4	7.8	55.4	36.8
2005	2236.7	1134	139.5	963.1	6.2	50.7	43.1

Source:

1. GSB (2005, pp. 661-62)
2. GSB (2006, pp. 682-84)
3. NBS (1999, pp. 592)

Table 11.7: Comparison of Share of Secondary Industry in Total GDP between Regions within Guangdong, 1992-2005 (unit: %)

Region	The PRDA	Eastern Guangdong	Western Guangdong	Mountainous Guangdong
1992	49.3	39.7	30.7	36.9
1993	50.4	44.3	34.6	42.2
1994	50.7	40.7	38	38.8
1995	50.1	43.5	36.9	35
1997	50.5	45.3	36.4	36.3
1998	50.3	46.3	37.2	38.2
1999	53.1	46.6	37.6	38.4
2000	49.5	46	37.1	36.7
2001	49.4	45.6	36.7	36.8
2002	49.7	46.1	36.9	37.1
2003	52.3	47.4	39.4	38.2
2004	53.8	48.7	39.2	39.7
2005	50.9	49.1	40.4	38.9

Source:

GSB (1993-2006, various pages)

11.3 Industrial Clusters and Economic Agglomeration

In order to analyze the effects of industrial clusters and economic agglomeration on regional economic development in Guangdong since 1978, regional industrial distribution should be carefully addressed. The significance of regional economic agglomeration can be properly demonstrated from the spatial distribution of industrial activities and industrial output value. Analyzing economic agglomeration in Guangdong without knowledge of its regional industrial distribution is inappropriate, as the economic take-off in this southern province during the reform period has been mainly driven by dramatic industrial development. How have regional industries developed in Guangdong since 1978? Is the tendency of industrial clusters and economic agglomeration notable in the PRDA? How significantly do industrial clusters affect regional economic development? These questions will be addressed in this section.

11.3.1 Measurement of Industrial Clustering

For this study, the regional distribution of industrial output value of the nine major industries in Guangdong (in the Chinese term, *jiuda zhizhu chanye*) has been measured in order to analyze the impact of industrial clustering on economic development. An important report, '*Made in PRD: the Challenges & Opportunities for HK Industry*' which was published by Federation of Hong Kong Industries in 2007, has provided comprehensive statistical information relating to regional industrial development in Guangdong during the reform period. Therefore, based on the data regarding the industrial output value of these nine major industries in the individual regions within Guangdong, this study is able to calculate the share of regional industrial output value of these industries by the top three leading regions, and then measure the tendency and real degree with regard to the industrial clusters in Guangdong during the 'reform and open-door' period. According to data given by Federation of Hong Kong Industries (2007), the industrial output value of these nine major industries had accounted for more than 70 percent of the production output of the industrial enterprises by 2005, which are "above the minimum designated threshold[76]" (2007, p. 36). Therefore, regional distribution measurement of the industrial output value of these nine industries can sufficiently reflect the condition of regional industrial development and industrial agglomeration in Guangdong; it can demonstrate the impact of industrial clusters on the unequal economic development among the different regions.

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[76] "The minimum designated threshold of an enterprise for inclusion in the census is defined in terms of annual sales revenue exceeding 5 million *yuan*." (Federation of Hong Kong Industries, 2007, p. 29)

Table 11.8: Value-added Industrial Output of Nine Key Industries in Guangdong,
2005 (billion yuan)

Industry Name	Value-added industrial output
Electronic Information	175.5
Electrical Machinery and Special Purpose Equipment	124.7
Petroleum and Chemical	106.2
Textile and Garments	53.2
Food and Beverages	51.1
Building Materials	35.4
Logging and Papermaking	18.3
Medicine	11.1
Motor Vehicle	34.9
Total Value-added Industrial Output of Nine Industries	610.8

GSB (2006, pp. 240)

As far as the three emerging industries are concerned, the unequal regional distribution of industrial output value is evident. For example, in the electronic information industry, with a 2005 value of 58 percent, more than half of the industrial output was produced in Shenzhen, Dongguan and Huizhou ranked in second and third positions: they accounted for 12 and 9 percent respectively of the output of the electronic information industry. According to the data published by *Shenzhen Yearbook 2006* (2006), one-sixth of the industrial output value of the electronic information industry in China was produced in Shenzhen by 2005. In terms of the electrical machinery and special purpose equipment industry, the industrial production and output of this industry have been dominated by Foshan, Shenzhen and Dongguan: three municipalities located in the PRDA. Their industrial output value has accounted for 26.6, 21.8 and 13.3 percent respectively of this industry in Guangdong. Overall, more than 60 percent of the total industrial output value of this industry was generated in these three regions. Lai, Chiu, and Leu (2005) point out the fast development of the information technology industry in Shenzhen. Moreover, Walcott's study (2002) suggests that many research and development (R&D) facilities related to the electronic information, telecommunication and pharmaceutical industries have been concentrated in Shenzhen, which maintains the close links with research institutions and universities in Mainland China and throughout the world.

In addition, the dominant position of Guangzhou in the development of petroleum and chemical industries within Guangdong is clear, as 31.9 percent of industrial output value of this industry was produced in Guangzhou. The output value share percentages of Shenzhen and Maoming in this industry were 16.1 and 15.9 percent respectively in 2005. Therefore, the concentration of this industry in Shenzhen and Maoming is also notable.

Fig 11.2: Share of the Industrial Output Value of Electronic Information Industry in Guangdong by the Top Three Regions, 2005

21%

9%

12%

58%

Shenzhen
Dongguan
Huizhou
Other Regions
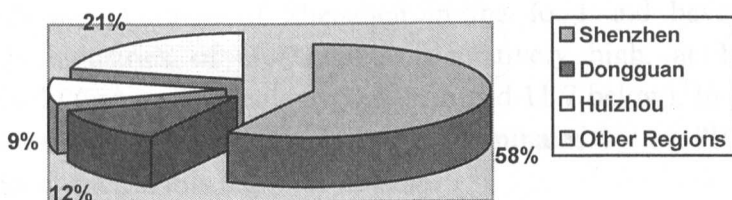
Federation of Hong Kong Industries (2007, pp. 30)

Fig 11.3: Share of the Industrial Output Value of Electronic Machinery and Special Purpose Equipment Industry in Guangdong by the Top Three Regions, 2005

26.6%

38.3%

13.3%

21.8%

Foshan
Shenzhen
Dongguan
Other Regions
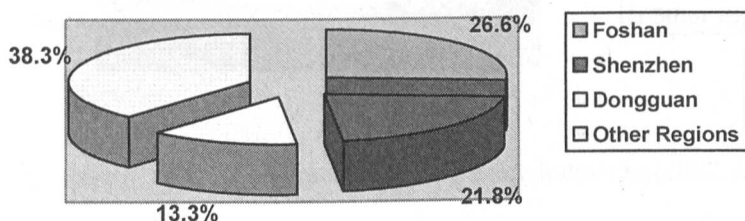
Federation of Hong Kong Industries (2007, pp. 30)

Fig 11.4: Share of Total Industrial Output Value of Petroleum and Chemical Industry in Guangdong by the Top Three Regions, 2005


31.9%

36.1%

15.9%

16.1%

Guangzhou
Shenzhen
Maoming
Other Regions
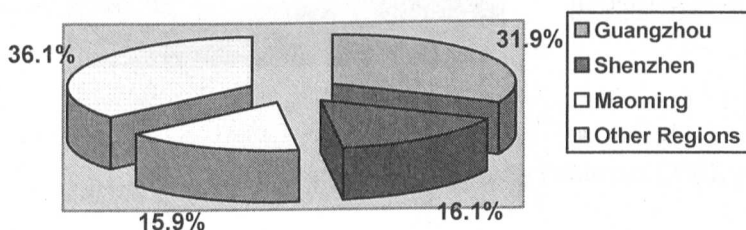
Federation of Hong Kong Industries (2007, pp. 30)

In terms of the three traditional industries, the unequal regional distribution of industrial output value is notable; the tendency of regional industrial agglomeration is also significant. Guangzhou, Foshan and Shenzhen municipalities have taken the leading positions in development of traditional industries in Guangdong. On the one hand, in terms of Guangzhou, its shares of industrial output value in the textile and

garments and food and beverages industries of Guangdong were top ranking at 15.4 and 26.5 percent respectively; which ranked the top position; on the other hand, Foshan accounted for more than 35 percent of industrial output value of the building materials industry in Guangdong, achieving top status. Moreover, the industrial output value of Shenzhen in the food and beverages and building materials industries of Guangdong is relatively high, at 12.8 and 9 percent respectively (see more details in Figs 11.6 and 11.7 below). In general, distribution of traditional industries in Guangdong is dominated by the PRDA. The traditional industrial cluster in this region is notable.

Fig 11.5: Share of Total Industrial Output Value of Textile and Garments Industry in Guangdong by the Top Three Regions, 2005
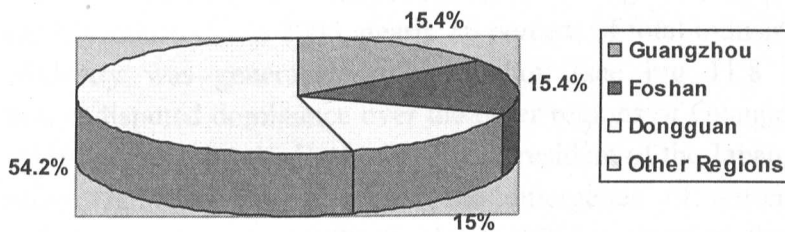
Federation of Hong Kong Industries (2007, pp. 31)

Fig 11.6: Share of Total Industrial Output Value of Food and Beverages Industry in Guangdong by the Top Three Regions, 2005
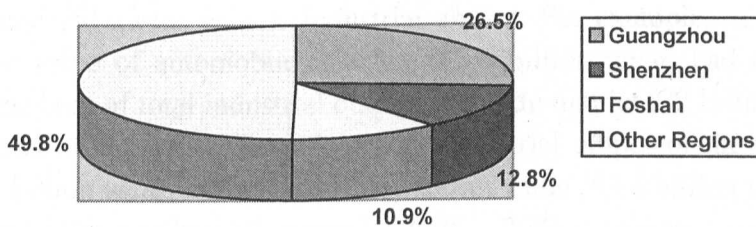
Federation of Hong Kong Industries (2007, pp. 31)

Fig 11.7: Share of Total Industrial Output Value of Building Materials Industry in Guangdong by the Top Three Regions, 2005

43.6% 35.7% 9.0% 11.7%

Legend: Foshan, Guangzhou, Shenzhen, Other Regions
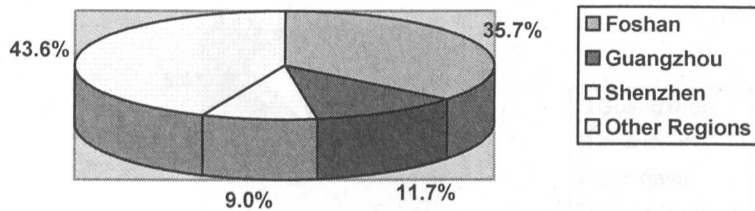
Federation of Hong Kong Industries (2007, pp. 31)

As far as the three high potential industries are concerned, the unbalanced regional distribution of their industrial output value is very evident; the agglomeration tendency of these industrial activities is strong. Referring to the transport equipment manufacturing industry[77], in 2005, nearly 80 percent of total industrial output value of this industry was generated in Guangzhou (see Fig 11.8 below): giving Guangzhou undisputed dominance over the other regions of Guangdong. In several studies, Akifumi Kuchiki, the Executive Vice President of the Japan External Trade Organization (JETRO), has discussed the emergence of automobile industry clustering in Guangzhou after 2000. Kuchiki (2006) emphasizes that Guangzhou is perhaps the only place in the world where the three major Japanese automobile producers (Nissan, Toyota and Honda) have all set up automobile manufacturing bases. The Japanese automobile manufacturing factories are situated in different districts within Guangzhou: Huadu is the home of Nissan's automobile factory, Toyota is located in Nansha, and Honda's automobile production base was established in Zengcheng (Kuchiki, 2007). The local economic growth in Guangzhou has benefited substantially from the rapid development of automobile industry and motor vehicle industrial cluster. For example, in 2005, the industrial output value of automobile industry (33.5 billion *yuan*) had accounted for about 46.5 percent of total industrial output of Huadu district (72 billion *yuan*). Moreover, in terms of Huangpu, the ratio of the industrial output of the automobile industry (46.4 billion *yuan*) in total industrial output value (93.4 billion *yuan*) was up to 49.7 percent (*Guangzhou Yearbook 2006*, 2006, various pages). Emphasizing Guangzhou's importance to the Chinese automobile industry, a report produced by Federation of Hong Kong Industries (2007, p. 41) suggests that,

Besides being the second largest output base of motorcycles after Chongqing, Guangdong became the second largest region for producing cars after Shanghai in 2005.

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[77] The regional distribution data of the industrial output value for motor vehicle industry is limited. The data of regional industrial output for the transport equipment manufacturing industry has been replaced to measure the regional industrial cluster of motor vehicle industry in Guangdong by the writer.
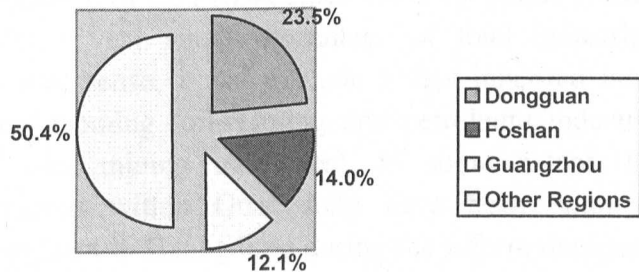
Fig 11.8: Share of Total Industrial Output Value of Transport Equipment Manufacturing Industry in Guangdong by the Top Three Regions, 2005
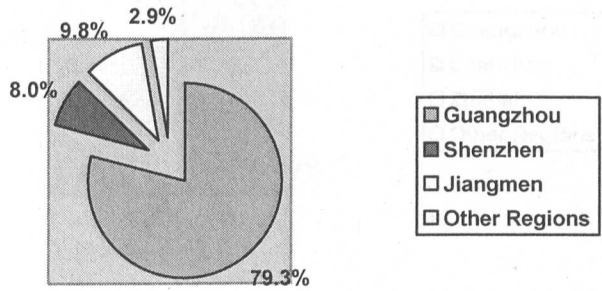
In terms of development of the logging and paper-making industries, Dongguan, Foshan and Guangzhou have played leading roles. In 2005, the industrial output value generated in Dongguan, Foshan and Guangzhou accounted for 23.5, 14, and 12.1 percent respectively of total output value of this industry. Moreover, the strong tendency of industrial cluster in the high potential pharmaceutical industry is remarkable. In 2005, a top ranking 28.6 percent industrial output value of this industry was produced in Guangzhou; the output value share percentages of Shenzhen (15.7 percent) and Zhuhai (12.9 percent) were also relatively high, and ranked second and third in total industrial output of this industry in Guangdong (see Figs 11.9 and 11.10 below).

Fig 11.9: Share of Total Industrial Output Value of Logging and Papermaking Industry in Guangdong by the Top Three Regions, 2005

Fig 11.10: Share of Total Industrial Output Value of Medicine Industry in Guangdong by the Top Three Regions, 2005

42.8%

28.6%

15.7%

12.9%

Legend:
- Guangzhou
- Shenzhen
- Zhuhai
- Other Regions
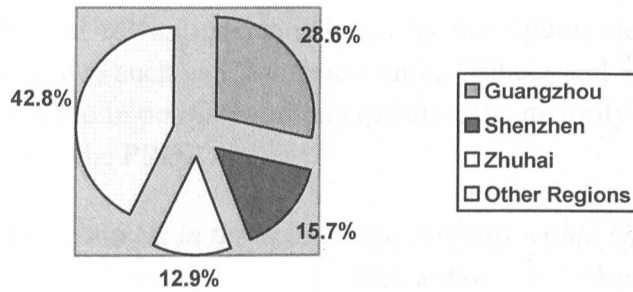
Federation of Hong Kong Industries (2007, pp. 32)

The regional distribution analysis of industrial output value for the nine key industries suggests that industrial development and industrial output distribution are extremely unbalanced between the PRDA and peripheral region. As far as Guangdong is concerned, the scale of regional industrial clusters ranges from the high-level transport equipment manufacturing industry to the relatively low-level textile and garments industry. The strong tendency of industrial clustering in the PRDA is evident, and this region has dominated the rapid industrial development in Guangdong during the reform period. The regions which occupied the top three positions in terms of industrial output value of these nine key industries are almost all located in the PRDA. Moreover, the distribution of the remaining industrial output of these nine industries has also been mainly dominated by regions within the PRDA. The dramatic industrial growth has enabled the PRDA to enhance industrial productivity and technological capability, and to transform the traditional agriculture-oriented economy (in the pre-reform period) to a modern industry-intensive economy. Industrial development has contributed significantly to local economic growth in the PRDA since 1978. By contrast, the peripheral regions only account for a very small percentage of total industrial output value in Guangdong. In that sense, if we exclude a few inherited heavily industrialized regions such as Maoming (oil-refining and petroleum industries) and Shaoguan (iron ore and coal mining industries), to some extent, the peripheral and mountainous regions within Guangdong have been untouched by the rapid industrial development in Guangdong during the reform decades. This is especially true of the high-tech, export-oriented manufacturing and modern light industries.

Moreover, as far as the counties are concerned, the development tendency of industrial cluster in the PRDA is also evident. During the reform period, many specialized industrial towns have flourished in this region. Numerous scholars have systematically analyzed the regional industrial agglomeration within the PRDA. Zhang, To and Cao's study (2004) suggests the regional agglomeration of textile industry in Dalang (Shunde), Humen (Dongguan), Shaxi (Zhongshan), and Xintang (Guangzhou) and so on. They stress that foreign direct investment mainly from Hong Kong (China) and Taiwan (China) has contributed to the emergence of textile industrial agglomeration in certain townships located in the PRDA. Bellandi and Di

Tommaso's empirical analysis (2005) demonstrates the rapid development of specialized industrial towns in Guangdong. As the figures demonstrate in Table 11.9, except for a few, such as Chaozhou (Anfu, Caitang and Fengxi) and Shantou (Chenghai), which are in peripheral municipalities, the majority of these specialized towns are located in the PRDA.

Table 11.9: Main Industries in the Specialized Regions within Guangdong

Specialized town	Industrial specialization	PRD and/or DST	Share of town industrial output (%)	No. of firms
Anfu	Food packaging	DST	91.9	1,080
Caitang	Metal products	DST	55.7	500
Changan	Electronics	PRD, DST	67.6	935
Chenghai	Toys	n.a.	72.0	2,000
Dachong	Furniture	PRD, DST	74.8	400
Dalang	Woollen products	PRD	38.77	2,000
Dali	Aluminium products	PRD, DST	65.1	120
Fengxi	Ceramics	DST	93.6	3,000
Guanyao	Toys	PRD, DST	65.8	100
Guzhen	Lamps	PRD, DST	72.7	1,500
Houjie	Furniture	PRD, DST	45.0	420
Huangpu	Food processing	DST	16.2	100
Humen	Clothing	PRD, DST	n.a.	1,000
Jianghai	Electronics products	PRD, DST	44.5	180
Jinsha	Metal products	PRD, DST	78.9	800
Ketang	Pearls, jewellery	DST	83.3	210
Lecong	Furniture	PRD, DST	n.a.	800
Lunjiao	Wood working	PRD, DST	9.27	78
Nanzhuang	Ceramics	PRD, DST	50.01	72
Pengjiang	Motorcycles	PRD, DST	44.0	28
Pingzhou	Footwear	PRD, DST	37.6	612
Qingxi	Electronics	PRD	60.0	100
Shaxi	Clothing	PRD, DST	56.8	580
Shijie	Electronics	PRD, DST	71.8	500
Shiling	Textiles	PRD	93.4	4,000
Shilong	Electronics	PRD, DST	72.2	2,800
Shiwan	Ceramics	PRD, DST	91.7	60
Shuikou	Plumbing, etc.	PRD, DST	89.3	410
Tangkong	Acoustic electronics	DST	49.3	135
Xiqiao	Textiles	PRD, DST	42.6	2,000
Yanbu	Underwear	PRD, DST	25.3	60
Yuncheng	Stone products	n.a.	41.1	4,000
Zhangcha	Knitting	PRD, DST	69.4	2,000

Note: (1) Main industry (>1 billion yuan of annual output); (2) specialized towns localized in

the Pearl River Delta (PRD) and/or included in the innovation services' programme of the Department of Science and Technology (DST); (3) number of firms and employees in the specialized industry.

Source: Di Tommaso and Rubini (2004)

11.3.2 The Case of Dongguan: IT Industrial Cluster

The Dongguan phenomenon attracted worldwide attention, and Dongguan-produced information and computer products have carved an important niche in the world market. (Jiang, 2003, p. 17)

Dongguan is a classic example to demonstrate the importance of industrial agglomeration to regional economic and industrial development. Dongguan is not only one of the largest manufacturing bases of information technology (IT) and other electronic products in China; but also it has become a key base for processing and assembling IT products for China and throughout the world. Dongguan had accounted for more than 10 percent of the world IT market by 2005 (e.g. Sun, et al, 2006; GSB, 2006). "IT and other electronic manufacturing industries had shared about 60 percent of Dongguan's gross industrial output value by 2003" (GSB, 2004, p. 516). Research conducted by three Taiwanese scholars Lai, Chiu, and Leu (2005) suggests that, overshadowing Taiwan, Dongguan has now emerged as major manufacturing base of computer and other associated products in the world, as they call it "computers and peripherals (C&P) products" (2005, p. 299). The computer products made in Dongguan now account for a significant portion of the world consumer market. They claim that 40 percent of hard disk heads, cases and semis, more than 30 percent of the disk drives and 25 percent of scanners and mini-motors in the world have been produced in this southern municipality. Zhou, Fan, and Kuang (2007) have also conducted a detailed study of the dramatic IT industry development and computer industry clustering in Dongguan. They argue that the rural industrialization and urbanization of Guangdong has contributed to the formation of the industrial cluster in Dongguan.

An IBM senior manager vividly claimed that a 15 minutes traffic jam on the Dongguan-Shenzhen expressway had already been able to affect the world's computer prices (Jiang, 2003). More and more IT and complementary industries have relocated to Dongguan: manufacturers can source all necessary supplies quickly and at cheap prices. Yeung's study (2001, p. 127-28) suggests that,

The proximity of complementary industries allows foreign-financed firms to source inputs locally and target the Chinese market. On the other hand, local sourcing reduces transport costs and the time-lag for the shipment of raw materials or semi-finished products from foreign-financed firms.

Industrial agglomeration has significantly stimulated local economic growth and strengthened the regional economic competitiveness of Dongguan. Yeung's study (2001) suggests the important contribution made by industrial clustering to industrial development in Dongguan. Industrial agglomeration has acted as a catalyst in boosting economic growth and strengthening the economic capability of Dongguan.

*Table 11.10: Annual Growth Rate of GDP Per Capita in Dongguan 1992-2005, (unit: %)*
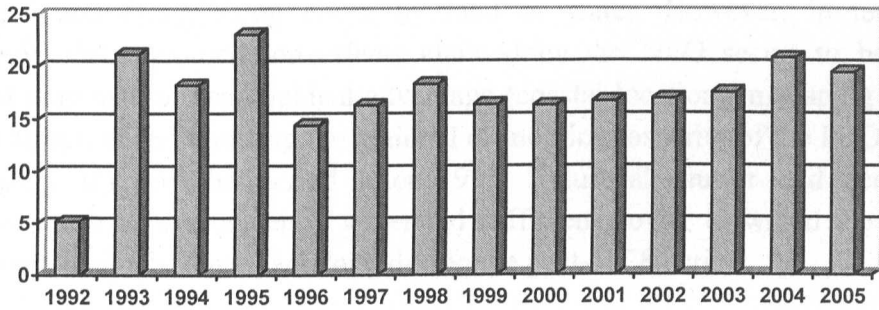
Note: calculations of GDP per capita are based on the 1991 constant price
Source:
GSB (1992-2006, various pages)

The emergence of the IT industrial cluster in Dongguan has benefited from the large amount of foreign direct investment. Thanks to low transportation costs and large market proximity (Guangzhou and Hong Kong), the world computer producers have invested hugely in this region. The growth of exports and foreign investment in Dongguan has been remarkable since the 1990s (see Table 11.11 below).

Table 11.11: Total Amount of Exports and FDI actually utilized in Dongguan 1991-2005, (unit: US$ billion)
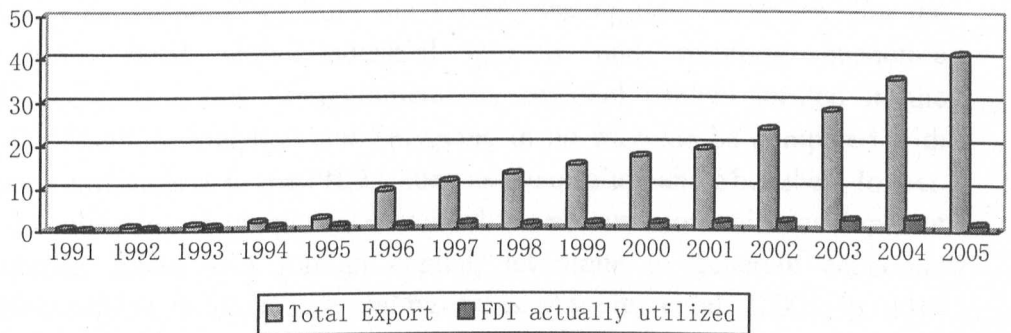
Note: the figures of total exports and FDI actually utilized are based on customs statistics
Source: GSB (1992-2006, various pages)

Low transportation cost and favourable geographical location are probably the two crucial factors shaping the economic and industrial agglomeration in Dongguan. This region is located in the central area between Guangzhou and Shenzhen (Yeung, 2001). The short road distance to both of the core regions – Guangzhou and Hong Kong – significantly reduces transportation costs for companies in Dongguan. Yeung (2001, p. 133) points out that,

In addition to Shenzhen, Dongguan is an ideal place for foreign investors because of its accessible and efficient transport networks …

In addition, Jiang (2003) points out that Dongguan can easily be accessed from Guangzhou and Hong Kong either by land or water. However, in terms of Guangdong, the agglomeration effects claimed by the NEG seems to be more important than natural geographical advantage (coastal location) in shaping freight traffic distribution and boosting the regional economic prosperity of the PRDA: this is especially true of the period after 1992. Industrial cluster and economic agglomeration have consequently generated sufficient power to widen the spatial development inequality in Guangdong during the post-1978 period.

In general, since 1978, rapid industrial growth has led to significant economic development in Guangdong. However, regional distribution of industrial activities and industrial output value in this southern province is very unbalanced. The strong tendency of regional industrial clustering and economic agglomeration in the PRDA is notable. With the incentive of increasing returns to economic scale, large consumer markets and the effect of industrial agglomeration, a huge range of industries has been attracted to the PRDA.

Thanks to the effects of industrial agglomeration in a few major regions, such as Guangzhou, Shenzhen and Dongguan, other small areas in the PRDA which surround these large regions, such as Panyu, Shunde and Gaoyao, have been able to enjoy the benefits of economic agglomeration and the strong spillover effects from the industrial cluster. However, due to a lack of regional centres of industrial agglomeration in the peripheral region and the generally weak spillover effects of the industrial cluster spreading from the PRDA, the regions located within the periphery have faced slow industrial growth and resulting economic underdevelopment. In terms of agglomeration, regional centres located in the periphery like Shantou, Meizhou and Zhanjiang in no way can be compared with powerful economic centres in the PRDA such as Guangzhou and Shenzhen. In fact, for regional centres in the periphery, it is hard to achieve economic development without external forces like foreign capital, let alone to generate economic agglomeration effects in their surrounding areas. As Gu, et al, (2001, p. 110) maintain,

Although Shaoguan, Shantou, Meizhou, Maoming, Chaozhou, and Zhanjiang were still the local central cities in the periphery, they appeared to

be less powerful in triggering the local economy in their hinterland.

In addition, during the reform period, both the domestic and foreign industrial enterprises have steadily moved to regions in the PRDA; industrial production and output value of Guangdong have been mainly generated from the PRDA. To understand the dramatic economic take-off in the PRDA and unequal regional economic development between this region and periphery, it is important to recognize the important role played by industrial cluster and economic agglomeration. Bellandi and Di Tommaso (2005) point out the strong spatial industry cluster formed in Guangdong: which is evident in both rural and urban areas.

In order to take advantage of increasing returns, the large markets of intermediate- and final goods and the spillover effect of industrial agglomeration, labour-oriented manufacturing enterprises tend to relocate to the PRDA. Moreover, many similar intermediate input goods are produced in the PRDA, so that companies can choose from different input products and purchase them relatively cheaply. Many foreign enterprises engaged in export-oriented manufacturing production have located in the PRDA since 1980. This economic concentration in the PRDA naturally leads to the agglomeration of industrial sectors and economic activities in this place. Owing to the effects of economic scale and the spillovers effects generated from industrial agglomeration, more industrial enterprises have been attracted to this region. The further development of this industrial cluster has been 'locked in'. Démurger, et al, (2002, p. 458) suggest that,

In turn, these rural enterprises generated agglomeration effects and backward economic linkages that induced new rural enterprises (not necessarily export oriented) to locate themselves in the same localities, thus making the coastal region a major growth area.

The regions located in the PRDA have benefited from economic agglomeration since 1978. The dramatic economic take-off in the PRDA has attracted many scholars' attention (e.g. Sung, et al, 1995). This research highlights the significant position of the PRDA in Guangdong in terms of economic growth, exports and foreign direct investment.

Agglomeration has played a crucial role in further strengthening the industrial and economic concentration in the PRDA. By contrast, the lack of local industrial clustering due to small market size and limited economic potential, and more significantly, to lack of spillover from the economic agglomeration generated by the PRDA, have to be taken into account to explain economic underdevelopment in the mountainous and peripheral regions. The lack of economic agglomeration and absence of industrial clusters perhaps explain why Lufeng, Huilai, Wuchuan and some other regions have failed to achieve fast economic growth and remain economically backward, despite their coastal location.

Economic agglomeration has tended to stimulate economic and industrial growth in the PRDA: strengthening its geographical competitive advantages and reinforcing its leading economic position. In terms of this region, as discussed earlier, the impact of the industrial and economic agglomeration can be illustrated through location of industrial clusters, such as Guzhen Township, Zhongshan, which specializes in lighting and associated products design and manufacture; Changan Township, Dongguan, which specializes in textile and clothes; Dongguan Municipality, famous for electronics and IT products'. My argument is this: the positive effects brought by industrial clustering and economic agglomeration have played an important role in influencing the fast regional economic and industrial growth in the PRDA. The contribution made by the self-reinforcing feature of industrial clusters has been particularly significant during the late reform period (starting from around 1995). Due to improvements in transportation between peripheral region and the PRDA, coastal location became less significant for the PRDA. Instead, the locked-in agglomeration effects become the main driving force behind the fast industrial and economic development in the PRDA. The role of the agglomeration factor in the core – periphery pattern of widening spatial disparity within Guangdong since 1980 cannot be underestimated.

The existing industrial clusters formed in the PRDA have been strengthened by a self-reinforcing process; this self-reinforcing feature of agglomeration further attract more industries and firms to converge in the PRDA: so the economic agglomeration tends to be reinforced. At the same time, the competitiveness and leading economic position of this region is strengthened. This is perhaps why, even if the advantages of costal location and low transportation costs have become less significant than in the past, the PRDA still maintains fast economic growth and achieves further development of regional industrial concentration. This also reveal why the core – periphery pattern of spatial development disparity in Guangdong is continually widening during the reform period.

Significantly, even if it is facing obstacles to economic agglomeration such as high labour costs and severe traffic congestion, the tendency for further economic agglomeration in the PRDA seems to be strong and difficult to shake: firms still prefer to invest in the PRDA rather than the periphery, mainly because of industrial cluster effects and external economic scale. It is clear that the economic benefits brought by these two factors are much higher than the costs contributed by traffic congestion and high wages. As far as 2005 average annual wages in the various regions within Guangdong are concerned, the average wage in the municipalities within the PRDA was significant higher than the equivalent figures in the mountainous and peripheral regions. For example, relative to the lowest average annual wage in Jieyang (9657 *yuan*), the equivalent wage figures in Guangzhou (33853 *yuan*) and Shenzhen (32396 *yuan*) were more than 3.5 and 3.4 times higher than Jieyang. In contrast to the average wage in the PRDA (23147 *yuan*), the equivalent figure in the peripheral region was up to 67 percent lower, at about 13860 *yuan*. (GSB, 2006, p. 714)

In conclusion, the self-reinforcing feature of economic agglomeration boosts the economic development in the PRDA; and reinforces its inherited locational advantages and leading economic position. Export industries have been increasingly attracted to the PRDA during the reform period. High labour costs and traffic congestion are unlikely to hinder the tendency of industrial agglomeration in the PRDA.

11.4 Transportation Improvement and Regional Economic Growth

The development of transportation and other infrastructure facilities is one of the key pre-conditions of rapid industrial growth and economic take-off. Without transportation improvement, the high transportation costs in the landlocked and remote regions cannot be substantially reduced: making economic growth difficult to achieve. The transportation development in the PRDA during the reform period is a good example. Relative to the reform period, the local transportation facilities in this region during the pre-reform period were extremely backward. The single-track Beijing-Kowloon and Beijing-Guangzhou railroads were the only two railway lines existing in the PRDA during the period between 1949 and 1980. No other railway was built in this period. Furthermore there were not motorways in the PRDA before the 1980s. The small rivers in this region had interrupted the road transportation of goods and people between the regions within the PRDA (Loo, 1999; Shen, 2002). The study by Harral, et al, (1992) highlights the backward transportation facilities in Guangzhou and PRDA in the 1980s and early 1990s. In his study, Shen (2002) claims that, before 1978, the time taken over transportation of goods between Guangzhou, Shenzhen and Zhuhai was far too long: vehicles driving in the PRDA had to cross the many small rivers and tributaries by ferry.

By contrast, since 1978, a huge amount of capital investment, generated from various channels (e.g. bank loan, foreign direct investment, state subsidies), has been spent on infrastructure development in the PRDA, this is especially true of the transportation network. In terms of the PRDA, the well-known infrastructure development strategy 'building the nest to attract the phoenix' (*zhucao yinfeng*)[78] has been widely implemented by the local government. This transportation improvement strategy is regarded as the main attractant of foreign direct investment to the local region (Lin, 1999). Except for Zhongshan municipality, Loo (1999) states that all of the other regions located in the PRDA have been connected to Guangzhou by railroad. Besides the railroad development, a well-connected network of the road transportation within the PRDA had been established by 1995.

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[78] In order to highlight the importance of transportation development, the strategy of *zhucao yinfeng* was specifically designated by the local government in Guangdong. This strategy vividly describes how transportation improvement and development (regarded as the nest building) are key to attracting foreign direct investment and foreign-oriented enterprises (treated as the phoenix) to the economically poor region. Without the nest, the phoenix cannot survive. According to Chinese history and legend, the phoenix is believed to be very special animal, and it is often used to describe something very valuable.

In addition, the rapid expression of deep-water berths in the PRDA has been impressive since 1978. In general, Loo stresses the striking infrastructure improvement in this region. Furthermore, Shen (2002, p. 111) highlights that,

Firstly, there is a close relationship between regional development and the infrastructure development. Provision of adequate infrastructure is a necessary pre-condition for regional economic activities. In the early 1980s in the delta region, economic activities were seriously constrained by inadequate transportation network and inadequate supply of electricity.

During the reform period, the PRDA has developed advanced transportation facilities. Local road improvement and high-speed motorway construction linking almost all of the regions in the PRDA have significantly changed the backward transportation condition of the past, and built a good foundation for rapid development of the manufacturing and service industries. Moreover, this region has held the highest density of high-speed motorway and railroad among the regions in Guangdong. In terms of railroad transportation, the two most important national railroad lines – Beijing-Kowloon (*Jingjiu line*) and Beijing-Guangzhou (*Jingguang line*) – all meet in the PRDA. The majority of important regional railways within Guangdong also meet in the PRDA (Li, 1998). Sung, et al, (1995) suggest the importance of transportation improvement for the economic and industrial development in the PRDA.

In addition, huge investment on motorway construction has made intra-regional transportation within the PRDA faster and more convenient. There are currently more than 20 motorways in the PRDA (122.8 kilometer' Guangzhou-Shenzhen expressway; 135 kilometer' Guangzhou-Zhuhai; 103 kilometer' Guangzhou-Foshan-Kaiping; 64 kilometer' Shenzhen-Huizhou; 22.6 kilometer' Guangzhou-Huadu expressway, etc), which connect the various places within a one and a half hours travelling time. Li (1998) describes the rapid development of high-speed motorway in the PRDA during the reform period.

The infrastructure facilities in Guangzhou, the economic and political capital of Guangdong, are well developed and advanced. Transportation network improvement has further reinforced the advantage of its good access to other regions in the PRDA. With the rapid economic growth, the government of Guangzhou has been able to continually strengthen its local tax capacity; therefore, the government can put more investment in public transportation and other infrastructure construction. Guangzhou is not only an important logistics and communication centre of South China; but also a sea, road and air transportation hub. Guangzhou has a high density railway network, with all of the major national and regional railroad lines passing through Guangdong. In terms of sea transportation, Guangzhou Port ranked among the top ten largest world ports in 2005: freight handling capacity had reached 3.2 million standard containers. The

newly-built Guangzhou International Airport is one of the three main international airports in China for passenger and freight traffic turnover (GSB, 2006; Guangzhou Yearbook 2006). In Guangzhou, the improvement of infrastructure, in particular the transport and communication facilities, has played a crucial role in stimulating economic growth since 1978.

In contrast to the rapid development of transportation facilities in the PRDA, both the local and intra-regional transportation facilities in the peripheral region are generally backward, and transportation development is very slow. The research document of the Hong Kong Trade Development Council (1990) suggests that shortage of transportation and other infrastructure has been the main cause of underdevelopment of the peripheral region. Furthermore, Sung, et al, (1995) argue that shortage of transportation facilities has impeded the spread of economic prosperity and industrial development to the periphery from the core region in Guangdong. Sung, et al, (1995, p. 107) state that,

However, Guangdong's transportation and power supply are highly inadequate .... As a result, processing operations cannot be developed in many places, especially in the peripheral areas. Adequate transportation will allow prosperity to diffuse from coastal areas to hinterland.

Underdeveloped transportation services are especially evident in remote and mountainous eastern municipalities, such as Heyuan and Meizhou, and this study can show a positive correlation between backward transport facilities and the remote and landlocked regions. The figures presented in Table 11.12 below, demonstrate the insufficiency of transportation facilities in the periphery. In particular, the disparity between the PRDA and peripheral region is vast. Average per square kilometer of road and highway in the municipalities within the PRDA are 77 and 4.3 kilometers respectively. Meanwhile, in municipalities located in the peripheral region, the equivalent figures are notably lower, at 63 and 1.4 kilometers respectively. It suggests that transportation development in the economically rich and developed regions is much ahead of the less developed regions in Guangdong. Significantly, it is important to note that population density can affect the development of transportation networks. In that sense, owing to their relatively low population density, it is logical to expect that transportation network density would be lower in the under-developed regions within Guangdong. Nevertheless, even ignoring the issue of population density, in the economically poor regions, transportation development is still slow, and density of facilities is notably lower than in the developed PRDA.

Table 11.12: Basic Transportation Conditions in the Municipalities within Guangdong by 2004 (unit: kilometer)

Municipality	Length of Roads	Per Square Kilometer Length of Road	Length of Highways[79]	Per Square Kilometer Length of Highway	Total Bridge (unit)	Meters of Bridge (m)	Volume of Freight Handled in Ports[80] (10000 tons)
The PRDA							
Guangzhou	5501	64	442	5.2	1332	69166	23887
Shenzhen	1583	74	247	11.7	491	17195	13537
Zhuhai	1085	78	11	0.8	251	26642	3203
Foshan	4037	105	108	2.8	1269	92599	3798
Huizhou	7491	78	231	2.4	1160	43609	1542
Dongguan	2724	110	155	6.4	599	51418	2600
Zhongshan	1346	80	89	5.5	542	29930	1960
Jiangmen	4457	48	342	3.7	1268	48396	2030
Zhaoqing	8290	55	60	0.4	1231	42078	428
Average	**4057**	**77**	**187**	**4.3**	**904**	**46781**	**5887**
The Peripheral Region							
Yangjiang	4176	53	89	1.1	680	26532	155

[79] "Length of highways refers to highways which are built in conformity with the grades specified by highway engineering standards formulated by the Ministry of Communications, and have been formally checked and accepted by the Departments of Highways and put into use. Highways includes suburb an highways in large and medium-sized cities, highways passing through small streets at small cities and towns, and also the length of bridges and ferries. It does not include streets in large and medium-sized cities and highways built for production purposes in factories, mines, forest areas and agricultural areas." (GSB, 2005, pp. 396)

[80] "Volume of freight handled refers to the volume of cargo passing in and out of the harbour area and having been loaded and unloaded. The volume of freight handled is calculated in the actual weight tonnage of the goods, based on the loading weight of goods. It is a major indicator to show the scale of the port production." (GSB, 2005, pp. 396)

Zhanjiang	7639	61	114	0.9	857	29124	5096
Maoming	8898	78	137	1.2	1885	58609	1409
Qingyuan	10859	56	119	0.6	1603	67272	N/A
Chaozhou	1939	63	37	1.2	454	14761	68
Jieyang	4337	83	154	2.9	1017	33046	245
Yunfu	4416	57	19	0.3	815	22241	543
Shantou	1825	67	68	2.5	412	12340	1576
Shaoguan	9408	89	164	1.5	1190	37915	140
Heyuan	9185	50	268	1.4	1450	42360	29
Meizhou	12333	58	168	0.8	1986	53593	360
Shanwei	3820	67	171	3	776	22745	108
Average	**6569**	**63**	**125**	**1.4**	**1093**	**35044**	**810**

Source: the transport data of municipalities were collected from both the Transportation Commission of Guangdong during the field research and GSB (2005, pp. 388). The author calculated the per square kilometer length of road and highway in the individual municipalities within Guangdong by 2004.

One of the important policy recommendations to the provincial government of Guangdong suggested by this study is that transportation improvement in the peripheral region is essential in order to weaken the negative effects on the regional development in this region caused by landlocked characteristics of topography and to reduce geographical isolation. Without transportation improvement, the slow economic growth or even stagnation in these landlocked regions will continue to exist. As Vogel (1989, p. 221) argues, "increased trade between the Delta and the rest of Guangdong would not have been possible, however, without the improvement of roads and the greater freedom granted to individuals and cooperatives to market and transport a wide range of goods over long distances." As far as the mountainous and peripheral regions are concerned, besides local education development, one of the priorities should be the development of transportation and other infrastructure facilities. Good transportation facilities are one of the important pre-conditions stimulating local economic growth. In the absence of infrastructure improvement, high transportation costs are hard to reduce, and slow industrial growth and local economic underdevelopment in the peripheral region is difficult to overcome. Infrastructure development is a costly business, but huge capital investment in transportation and other facilities is crucial for the under-developed regions in Guangdong. Lin's study (1999) also suggests the significance of transportation investment in the poor landlocked regions.

Significantly, as a result of the foreign capital shortage and weak local financial capability, capital investment and subsidies funded by central government are the key to developing transportation facilities in the under-developed regions. In terms of China, some scholars (e.g. Wang and Bai, 1991) have raised concerns about the ability of government subsidies and state-funded capital to stimulate economic growth in the poor regions. However, their argument regarding the negative effects of central subsidies on the less developed regions is not very convincing. Wang and Bai (1991) claim that putting money into the under-developed regions, without considering basic economic principles, can cause serious problems. By relying on subsidies and various aids from the central government of China, or as they call them "blood transfusions" (1991, p. 76). They believe that these regions would lose their own capabilities to develop the local economy. In general, Wang and Bai allege that the contribution of the central subsidies and aids to economic development in the poor regions is extremely limited. For example, external capital has failed to help the poor regions to develop local industries, in areas such as Xizang (Tibet) and Guizhou. Many of these regions are still underdeveloped and backward, and a significant proportion of local residents are very poor. Wang and Bai (1991, p. 83) state that,

The truth of the matter is that subsidies from the national treasury bring about business losses in backward regions. Bigger subsidies mean greater business losses ··· It is a vicious circle: the greater the blood transfusion, the worse the anaemia.

Wang and Bai's argument is partially correct. It is reasonable to claim that central subsidies and aids are not trump card. External capital funded by central government cannot guarantee industrial growth and fast economic development in the less developed regions. In addition, without their own development incentives, the economically poor regions would lose their independent abilities to stimulate the local economy. Of course, state-funded capital investment in transportation construction is sometimes wasted. For example, the construction of Zhuhai's airport[81] has been a painful lesson for Guangdong. This airport construction project which was regarded as "one of the worst examples of the state intervening in economic affairs" has been criticized by scholars, local ordinary citizens and media (e.g. the New Weekly Magazine of China, 23rd July 2001; the Xinhua News Agency, 9th Feb 2006; the Hong Kong Tai Kon Newspaper, 4th Sep 2006). According to data released by the media, the huge investment in Zhuhai's airport construction, which was fully funded by the state, was largely wasted. The real local demand and airport usability were not properly considered by the government. In fact, the actual annual traffic turnover for passengers and goods had recorded only about one-tenth of the planned business capacity of this airport by 2005. In the neighbouring areas of Zhuhai, there are three main international airports within a distance of 150 kilometers or so (Hong Kong, Macau and Guangzhou). Since its completion, there have been extremely limited numbers of the plane arrivals and departures from Zhuhai airport.

However, Wang and Bai's analysis of the effects of state investment on local economic development in the under-developed regions has certain limitations. For example, they think that state funds are merely a 'blood transfusion' to the under-developed regions. They seem to forget the 'blood-making' role of central subsidies of transportation in stimulating local economic growth during the early development stage. However, Wang and Bai (1991) do admit the importance of transportation in developing market economy and goods exchange.

Wang and Bai's analysis has certain important problems. For example, they have grossly under-estimated the contribution made by external capital to improvement of local transportation facilities in the less developed areas. They seem to completely ignore the point that state funding is the only possible and reliable way for these regions to develop their transportation facilities in the initial development period. In fact, even Wang and Bai themselves admit that external capital is essential for the under-developed regions. They state that,

Shortage of funds seems to be an integral feature of backward regions,

---

[81] The construction of Zhuhai Airport started in 1995 and was finally completed at the end of 1996, and was fully funded by the local and provincial governments of Guangdong. According to the data released by the independent media, the total investment in this project was up to 7 billion *yuan*. In terms of many aspects, this airport had the most cutting-edge equipments and facilitates among the airports in China during the 1990s. It was one of the biggest airports at that time. For example, it had the longest airstrip in China. This transportation development project was widely criticized as one of the most wasteful in Guangdong.

hence loans or grants from external sources are a must. (1991, p. 67)

The example of Nipi demonstrates: the significance of state funding and central subsidies in improving the local transportation facilities and stimulating economic growth in the under-developed regions within Guangdong. Nipi Township is located in Wuhua, which administratively covers 31 villages and two neighbourhoods. The total registered permanent population residing in this township is about 80,000. Nipi has been facing severe local financial problems. For example, in 2004, the gross output value of industry and local tax revenue were 58 and 1.7 million *yuan* respectively (Field Interview Data). The extremely weak local financial situation means the local government has difficulty in fulfilling its normal administrative duties, such as payment of civil servants' salaries, public health care provision and basic infrastructure construction. During the interview conversation, the Director of Nipi Township made the following comment:

In general, the government cannot collect much tax revenue. The local financial condition in Nipi is extremely poor. (Interview Data 8, October 2006)

As far as I understand from my field trip research, the case of Nipi Township is not rare in the peripheral and mountainous regions. Many villages, townships and even counties within these regions have been facing severe financial hardship during the reform period. In some areas, land rent and family planning fees (in China, these are regarded as social care fees) are the two most important sources of governmental revenue.

More significantly, the evidence of Gaoyao demonstrates that rapid local economic development can be achieved accompany inter-regional transportation improvement between the mountainous region and developed places. Gaoyao, an administrative city under Zhaoqing, is located in a mountainous region, and therefore suffers from geographical disadvantages. As about 60 percent of its land area consists of hills (*Gaoyao Xianzhi,* 1996) in terms of Mountainous Guangdong, Gaoyao is a fairly representative example. Surprisingly, during the reform period, Gaoyao has made impressive economic development. The GDP per capita was only 1925 *yuan* in 1991, while this figure increased to 9838 *yuan* in 1998, which itself was up by five times compared to the figure in 1991. In 2005, the GDP per capita jumped to 19406 *yuan*: 10 times more than the equivalent figure in 1991 (GSB, 1992, 1999; 2006, various pages). The data presented in Table 11.13 below, illustrate the annual growth of GDP per capita in Gaoyao between 1992 and 2005. During this period, the annual growth rate of GDP per capita was about 18.4 percent. In terms of any comparison, this growth rate is notably high. As far as the gross industrial output value in Gaoyao is concerned, in 1991, the figure was merely 0.3 billion *yuan*; meanwhile, in 1999, the gross industrial output value was up by eight times to 2.7 billion *yuan* on the equivalent figure in 1991. In 2005, the gross output value of industry in Gaoyao further jumped to 6.2 billion *yuan* (GSB, 1992; 2000; 2006, various pages). The data

presented in Table 11.14 demonstrates that the annual growth rate of gross industrial output value in Gaoyao was, indeed, remarkable during the period between 1991 and 2005.

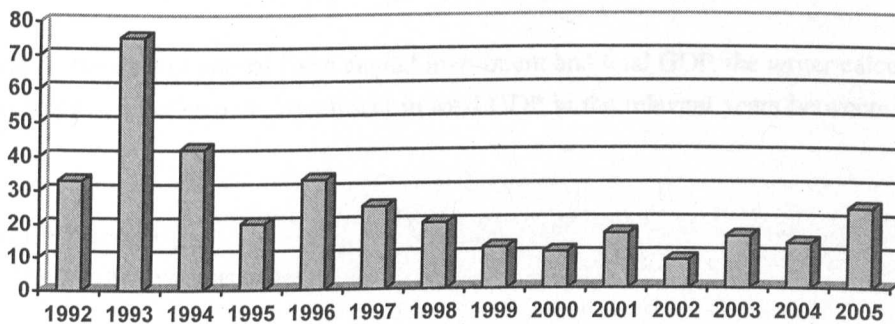*Table 11.13: Annual Growth Rate of GDP Per Capita in Gaoyao City 1992-2005, (unit: %)*
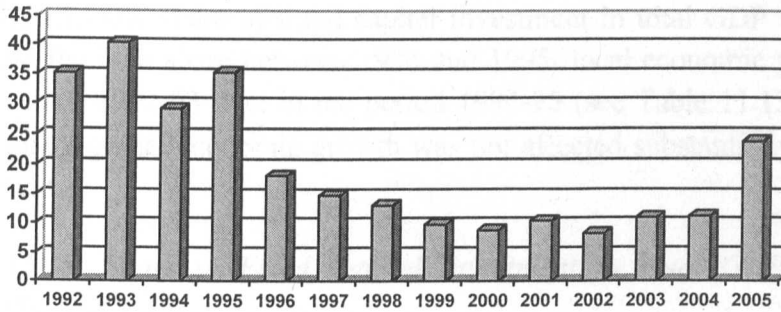
Note: the data of annual growth rate presented in this table were calculated at the 1991 constant price

Source:

GSB (1992-2006, various pages)

Table 11.14: Annual Growth of Gross Industrial Output Value in Gaoyao City 1992-2005, (unit: %)

Note: based on the annual figure of gross industrial output value, which were calculated at the 1991 constant price, the annual industrial growth in Gaoyao was calculated.

Source:

GSB (1992-2006, various pages)

Significantly, local transportation improvement has been one of the important stimulants of the rapid industrial and economic growth in Gaoyao since 1990. In contrast to the early reform period, the total fixed capital investment increased substantially after 1992. In 1993, the total fixed capital investment was 0.41 billion *yuan*, which was more than four times higher than the equivalent figure in 1986. Since 1995, the capital investment in the transportation and other infrastructure construction

has been even impressive. The total fixed capital investment jumped to 2.9 billion *yuan* in 2005 (GSB, various years). In general, the data shown in Table 11.13, 11.14, and 11.15 suggest a close correlation between transportation investment, industrial development and economic growth. Nevertheless, the contribution made by transportation and infrastructure investment to economic growth in Gaoyao should not be overestimated. As far as Gaoyao is concerned, the importance of transportation improvement in stimulating economic development is not so significant. Comparing the relatively low share of fixed capital investment in total GDP between 1992 and 1993 and the high share between 1994 and 1995, local economic growth was higher in the period 1992-93 than in the period 1994-95 (see Table 11.13 and 11.15). This shows that regional economic growth was not affected substantially by infrastructure investment.

Table 11.15: Share of Fixed Capital Investment in Total GDP in Gaoyao City 1990-2005, (unit: %)
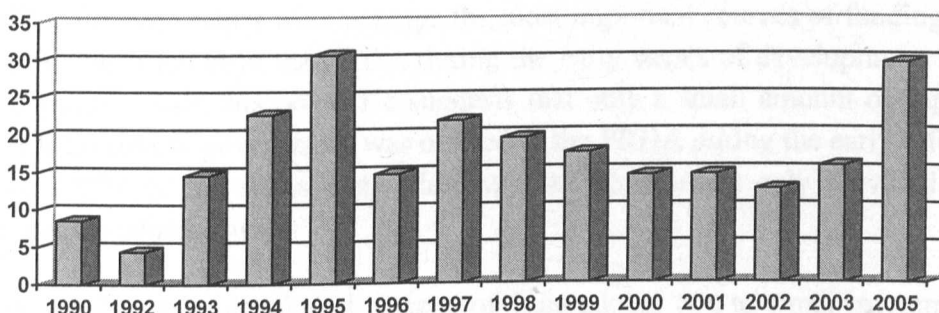
Note: based on the data of annual fixed capital investment and total GDP, the writer calculated the share percentage of fixed capital investment in total GDP in the relevant years between 1990 and 2005.

Source:

1. GSB (1991, pp. 363)
2. GSB (1991-2006, various pages)

Transportation development during the period of economic take-off in Gaoyao has been remarkable. The newly built Xijiang Bridge, which connects Gaoyao with the centre of Zhaoqing and other prosperous regions located in the PRDA, has improved local communication and significantly reduced inter-regional transportation costs and travel time between Gaoyao and the outside world. Gaoyao has been able to expand economic cooperation with the PRDA, and taken the opportunity to develop the precise alloy die-casting industry. In addition, a huge amount of capital investment has been spent on other local infrastructure construction, such as electricity and water supply, telecommunications and urban-rural road building. Moreover, foreign direct investment inflow to Gaoyao has at the same time shown in increasing trend. The actually utilized FDI was 0.2 US$ billion in 2003: twice compared to the equivalent figure in 1994 (0.1 US$ billion). The evidence of Gaoyao suggests that fast economic

development in the mountainous and peripheral regions within Guangdong can be achieved via local transportation improvement. To some extent, the inherited geographical disadvantages hindering regional economic development can be substantially changed.

The point needs to be made that transportation development has also played an important role in the economic take-off of the developed PRDA. Suppose Guangzhou had inherited a good harbour but had failed to develop associated modern port facilities: it would have been hard for this coastal region to capitalize on its natural advantages and develop international trade and export industries. Modern transportation facilities are crucial for both developed and under-developed regions in Guangdong. The key question lies in whether private or non-private sectors are to finance these transportation projects. In the coastal Pearl River Delta, mainly due to the effect of economic scale, favourable geographical location and low transportation costs, the private agents have great incentives to invest in transportation facilities. In general, the private sector was the backbone of funding for infrastructure construction in the PRDA. Private sectors were perhaps the most important sources of funding for infrastructure construction in the PRDA during the early stages of development. Loo (1999) has clearly made this point. He suggests that only a small amount of capital investment from central government was offered to the PRDA during the early reform period. Loo (1999, p. 59) states that, "However, the government only provided the policy but not investment funds."

By contrast, in the under-developed regions of Guangdong, due to small investment returns and limited local financial capability, public investment and subsidies from central and provincial governments, which are largely non profit-driven, are the main source of finance for development of infrastructure. How can economically poor regions improve their backward transportation facilities? The state is the key. This is why a strong state is so important to economic growth in the under-developed periphery during its early development stage; and why the institutional factor is essential to reduce the spatial economic inequality in Guangdong. The main role of the state lies in its influence on infrastructure improvement. It is not my intention to over-estimate the contribution of transportation improvement to balanced regional development within Guangdong, and the causality between economic prosperity and transportation development needs be considered. What is the causality between the transportation improvement and regional economic development in the PRDA? In terms transportation improvement and economic growth, which came first? In my opinion, transportation improvement was one of the key factors in the industrial and economic development of the PRDA. The development experience of Panyu supports this view. Panyu district is a satellite region within Guangzhou, and the development of transportation in this region has been remarkable since 1978. Lin (1999) argues that it is the transportation improvement that has led to the rapid industrial and economic development in Panyu. The causality correlation is that these improvements caused the economic take-off. As he states,

The experience of Panyu, where economic development has long been impeded by the lack of an efficient road transportation network, tends to suggest that the expansion of transport facilitates occurred prior to rather than following the dramatic growth of the local economy. (1999, p. 263)

Lin believes that the transportation improvement has given Panyu the opportunity to benefit from its locational advantage of geographical proximity to Guangzhou. With the improvement of transportation and other infrastructure facilities, agglomeration of the manufacturing parts and furniture industries has steadily developed in Panyu. Moreover, the early development experiences of Shunde, Dongguan and Foshan have similarly shown the important contribution made by transportation improvement to local economic development since 1978.

In general, the case of Guangdong supports this argument that transportation development is one of the key pre-conditions of rapid industrial and economic growth. The early development experiences of local regions within both the developed PRDA and under-developed periphery have demonstrated this point. The negative impacts of backward transportation facilities and high costs of inter-regional transportation on the economic development in the periphery should be properly addressed.

11.5 Empirical Model Analysis

Before making final conclusions regarding the main causes of widening regional development inequality in Guangdong during the reform period, empirical model analysis is necessary. Various factors causing regional disparity have been discussed; nevertheless, it is important to properly estimate the significance of each of these factors in order to explain the unbalanced economic growth among the different regions. In this section, empirical and statistical analysis has been conducted in investigating the main cause of regional development inequality within Guangdong during the reform period. Geographical analysis is presented in the first part. The second part of this section emphasizes regression model analysis. Based on the literature review, two learning hypotheses have been proposed:

Hypothesis 1: coastal location has been an important factor in widening spatial development inequality in Guangdong since 1980.

Hypothesis 2: large market proximity has been the major factor in shaping the core – periphery pattern of regional disparity in Guangdong.

11.5.1 Geographical Characteristics Analysis

Geographical characteristics analysis was developed by Gallup, Sachs and Mellinger (1999). The data presented in Tables 11.16 and 11.17 demonstrate the geographical characteristics analysis for the twenty richest counties and twenty poorest counties in

Guangdong in terms of 2005 GDP per capita. The following important indicators developed by Gallup, Sachs and Mellinger (1999) have been adopted to analyze the impact of coastal location and large market proximity in stimulating regional economic development within Guangdong, such as 'land in the tropics', 'land within 100 km of coast', 'landlocked population', and 'distance to core market'. In addition, this study uses indicators to examine the effect of industrial clusters and economic agglomeration on economic growth, such as 'located within the PRDA' and 'located within a mountainous region'. This detailed analysis of regional geographic characteristics allows the study to properly test the two hypotheses and investigates the key research question: whether or not geography is the major cause of rising regional inequality in Guangdong since 1980.

Table 11.16: Geographic Characteristics of the Twenty Wealthiest County-level Regions in Guangdong

County	2005 GDP per capita (yuan)	Population (10,000)	Land Area (square km)	Land in Tropics (%)	Land within 100 Km of Coast (%)	Population within 100 Km of Coast (%)	Population within 100 Km of Coast or Ocean-navigable River (%)	Landlocked Population (%)	Distance to Core Market (km)	Coastal Density (population per square km)	Interior Density (population per square km)	Located within the PRDA	Located within Mountainous Region
District of Foshan	55706	58	154.7	0	100	100	100	0	28	3749	0	Yes	No
District of Shenzhen	54901	398.9	1240.8	0	100	100	100	0	163	3215	0	Yes	No
Dongguan	52054	162	2465	0	100	100	100	84	61	657	0	Yes	No
District of Huizhou	51197	70.6	1471	0	100	100	100	100	143	480	0	Yes	No
Shunde	50451	114.9	806	0	100	100	100	73	38	1426	0	Yes	No
Panyu	46624	102.9	1314.3	0	100	100	100	46	30	783	0	Yes	No
District of Guangzhou	46579	434.2	1474.6	0	100	100	100	67	0	2944	0	Yes	No
Nanhai	45696	109.7	1073.8	0	100	100	100	80	14	1022	0	Yes	No
Zhongshan	40963	139.5	1800	0	100	100	100	88	94	775	0	Yes	No
Zengcheng	36740	84.2	1741	0	58	89	100	0	63	742	127	Yes	No
District of Zhuhai	34186	54.7	955.2	0	100	100	100	0	140	573	0	Yes	No
Gaoming	33056	29.1	960	0	68	59	100	81	55	263	388	Yes	No
District of Zhaoqing	32269	48	748.3	0	100	100	100	25	73	641	0	Yes	No
District of Jiangmen	31314	59.2	427.9	0	100	100	100	100	98	1384	0	Yes	No
Sanshui	31250	39.1	874	0	100	100	100	10	45	448	0	Yes	No
Huadu	29571	62.8	969.1	0	80	57	100	0	22	462	1393	Yes	No
District of Shaoguan	27937	90.1	2856	0	0	0	0	0	309	0	315	No	Yes
Huiyang	27241	33.9	1188	0	100	100	100	94	160	286	0	Yes	No

Doumen	24905	31.5	674.8	0	100	100	100	20	168	467	0	Yes	No
District of Maoming	21733	119.9	907	0	100	100	100	0	362	1322	0	No	No
Average	38719	112	1205		90	90	95	43.4	103	1082	111		

Note:

1. The definition of the top and bottom twenty county-level regions in Guangdong is based on the ranking of income per capita in 2005 (2005 GDP per capita).

2. The figures of counties' per capita GDP 2005 have been re-estimated according to the findings of the regional price survey report of Guangdong.

3. Landlocked population is defined total population living in landlocked townships within a county.

4. Guangzhou municipality is regarded as the core market.

5. The geographical characteristic "Distance to the core market" developed by Gallup et al, (1999) is used to test the accessibility of other regions to the core region. Accessibility is an important indicator for studying spatial economy and firms' location decisions. Accessibility[82] measurement is strongly linked with distance via transportation costs. In other words, we can measure the accessibility according to the impact of distance between the core and peripheral regions on transportation costs. Therefore, the transport accessibility can be used to analyze the effects of distance and then transportation costs on economic growth of a region.

6. According to Gallup, Sachs and Mellinger (1999), the equation for the coastal density calculation is: coastal population / coast square kilometers = (population * the percentage of population within 100 Km of coast) / (land area * land within 100 Km of coast)

7. According to Gallup, Sachs and Mellinger (1999), the equation for the interior density calculation is: interior population/interior square kilometers = [population * (1 – population within 100 Km of coast)] / [land area * (1 – land within 100 Km of coast)]

Source:

1. The data of land area and population of counties were collected from both GSB (2005) and the Editing Committee of China's Population by Township Yearbook (2002).

2. The raw data of 2005 per capita GDP were collected from GSB (2006).

3. The calculation of land and population of counties within 100 kilometers of coast or ocean-navigable rivers was based on Guangdong Map Press (2006).

4. The calculation of landlocked population of counties was based on Guangdong Map Press (2006).

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[82] Linneker and Spence (1991, p. 33) defined accessibility as follows: "Concepts of accessibility are generally concerned with the opportunities available to people and firms to reach places where they can carry out activities that are important to them such as work, shopping, education and recreation. The interest is in an area's relative position in the transport network whether it is on the edge or at the centre and its interaction with all other areas. Accessibility concept uses the impedance effects of distance, time and generalized transport costs to produce measures of accessibility for each location in a relevant area."

Table 11.17: Geographic Characteristics of the Twenty Poorest County-level Regions in Guangdong

County	2005 GDP per capita (yuan)	Population (10,000)	Land Area (square km)	Land in Tropics (%)	Land within 100 Km of Coast (%)	Population within 100 Km of Coast (%)	Population within 100 Km of Coast or Ocean-navigable River (%)	Landlocked Population (%)	Distance to Core Market (km)	Coastal Density (population per square km)	Interior Density (population per square km)	Located within the PRDA	Located within Mountainous Region
Suixi	4528	99.7	2148.5	0	100	100	100	80	512	464	0	No	No
Qingxin	4433	70	2725	0	0	0	62	80	68	0	257	No	Yes
Longchuan	4279	86.8	3089	0	0	0	0	100	312	0	281	No	Yes
Xinfeng	4242	23.9	2015	0	0	0	0	100	154	0	119	No	Yes
Lianjiang	4237	151.2	2840	100	100	100	100	89	540	532	0	No	No
Yingde	4210	105.1	5671	0	0	0	0	100	138	0	171	No	Yes
Wuchuan	4160	101	845.5	0	100	100	100	73	432	1194	0	No	No
Lechang	4108	51.9	2421	0	0	0	0	100	359	0	214	No	Yes
Lianshan	3883	11.5	1265	0	0	0	0	100	310	0	91	No	Yes
Huilai	3727	114	1253	0	100	100	100	74	390	910	0	No	No
Dapu	3546	52.8	2470.4	0	0	0	0	100	534	0	214	No	Yes
Heping	3454	48	2310	0	0	0	0	100	318	0	208	No	Yes
Yangshan	3393	53	3418	0	0	0	0	100	180	0	155	No	Yes

Zijin	3158	80.1	3627	0	0	0	100	270	0	221	No	Yes
Wengyuan	2984	38.1	2234	0	0	0	100	340	0	171	No	Yes
Lufeng	2970	158.1	1681	0	100	100	51	323	940	0	No	No
Xinning	2806	113.6	2105	0	0	0	100	377	0	540	No	Yes
Fengshun	2686	66.9	2710	0	0	0	100	544	0	247	No	Yes
Liannan	2637	15.5	1306.7	0	0	0	100	230	0	118	No	Yes
Wuhua	1790	124.6	3226.1	0	0	0	100	349	0	386	No	Yes
Average	3562	78	2468	5	25	28	92	334	202	170		

Note: the same as the Table 11.16

Source: the same as the Table 11.16

Arising from data shown in the geographical characteristics analysis of Table 11.16, several general findings, which can be summarized as follows:

1) The majority of the top 20 counties are located within 100 kilometers of the coast or ocean-navigable rivers. Among these 20 counties, 16 counties have 100 percent of land area within 100 kilometers of the coast; three counties have the majority of land area (at least 55 percent) within 100 kilometers of coast. Together, the regions near to the coast account for 95 percent of the 20 richest regions. However, District of Shaoguan is the only landlocked region with high-level economic development.

2) In 16 of the top 20 counties, the population lives within 100 kilometers of the coast (80 percent); moreover, if ocean-navigable rivers are considered, the populations in up to 19 counties live within 100 kilometers of the coast or navigable rivers (95 percent). Nevertheless, District of Shaoguan is the only landlocked county whose people live at long distance from both the coast and navigable rivers (more than 100 kilometers).

3) The distance between the 15 richest counties and Guangzhou is very short: less than 150 kilometers (within one and a half hours driving distance). However, District of Shaoguan and Maoming are relatively distant from Guangzhou, at 309 and 362 kilometers respectively (about four to five hours driving distance).

4) Except for District of Shaoguan, none of the other top 20 counties are situated in a mountainous region; 18 of the top 20 counties are located within the Pearl River Delta region (accounting for 90 percent). By contrast, District of Shaoguan and District of Maoming are the regions located within the periphery of Guangdong.

5) There are generally close correlations between population density, geographical location, and economic growth. The rich coastal counties in Guangdong tend to have generally higher population density than the landlocked regions.

6) None of the top 20 counties are located in the tropics.

In terms of the characteristics analysis shown in Table 11.17, several general conclusions can be drawn:

7) Of 20 least developed counties, 14 are landlocked (70 percent); and they are distant from both the coast and ocean-navigable rivers (more than 100 kilometers).

8) Among these 20 poorest counties, five have up to 100 percent of land within 100 kilometers of the coast (accounting for 25 percent); one county has very little land area within 100 kilometers of coast or navigable rivers [about 15 percent of the land in Qinxin County is adjunct to the navigable Xi Jiang (West River)].

9) The populations in 14 of 20 poorest counties live in landlocked regions, which are geographically distant from the coast and navigable rivers (more

than 100 kilometers); the majority of the populations in the other six counties are living in landlocked areas (more than 50 percent).

10) Among 20 least developed counties, the population in five (Suixi, Lianjiang, Wuchuan, Huilai and Lufeng) live in places located near to the coast (within 100 kilometers).

11) In terms of the road distance between the 20 least developed counties and Guangzhou, in 18 counties, the general distance is significantly longer than 150 kilometers (more than four hours driving time). In particular, the road distances between Lianjiang, Dapu, Fengshun and Guangzhou are more than 500 kilometers, at 540, 534 and 544 kilometers respectively. However, Qinxin County is relatively close to Guangzhou: at just 68 kilometers.

12) None of the 20 poorest counties are located within the Pearl River Delta; all of them are situated in peripheral or mountainous regions. Most of these regions are remote and mountainous.

13) Most of these under-developed counties tend to have lower population density than the top 20 counties within Guangdong: although the three coastal regions of Wuchuan, Huilai and Lufeng, have relatively high population density.

14) Except for Lianjiang, none of the bottom 20 counties are located in the tropics.

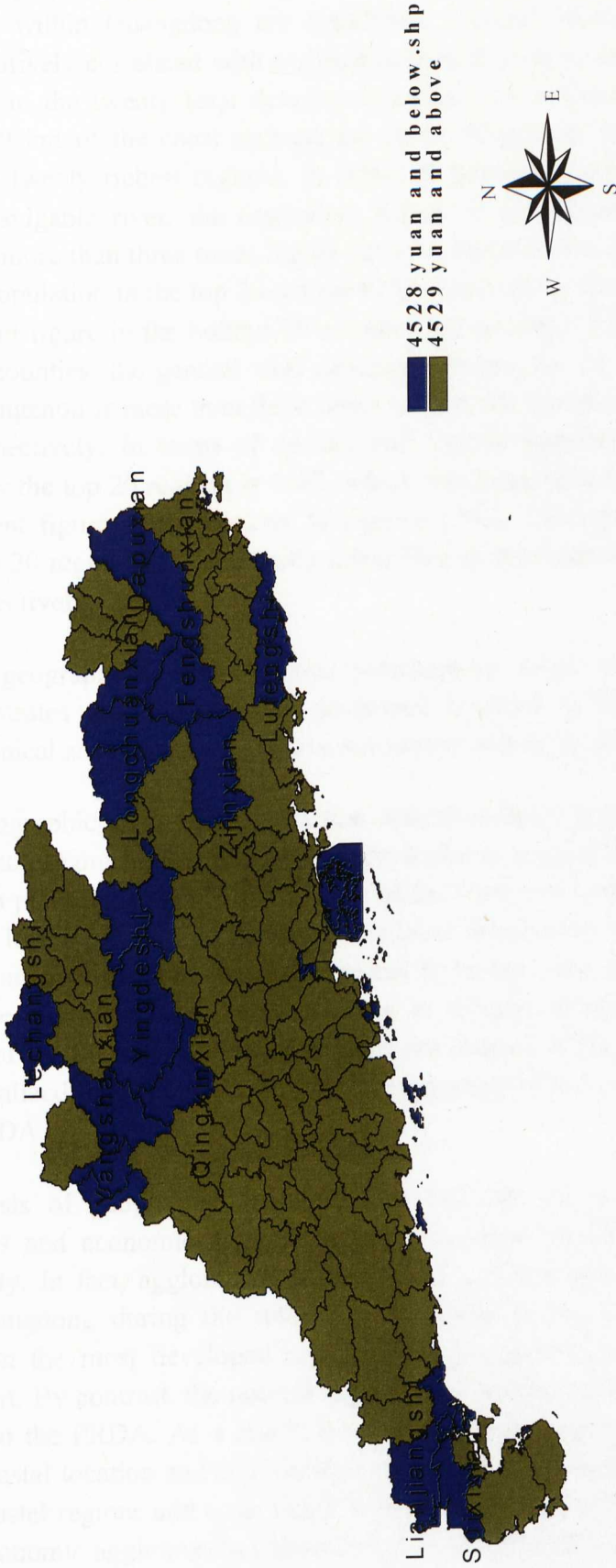*Map 11.1: Spatial Distribution of the Twenty Richest Regions in Guangdong, 2005*[83]

the spatial distribution of the top 20 richest regions in Guangdong

21733 yuan and above.shp
21732 yuan and below

N
E
S
W

Shaoguangshi

Maomingshi
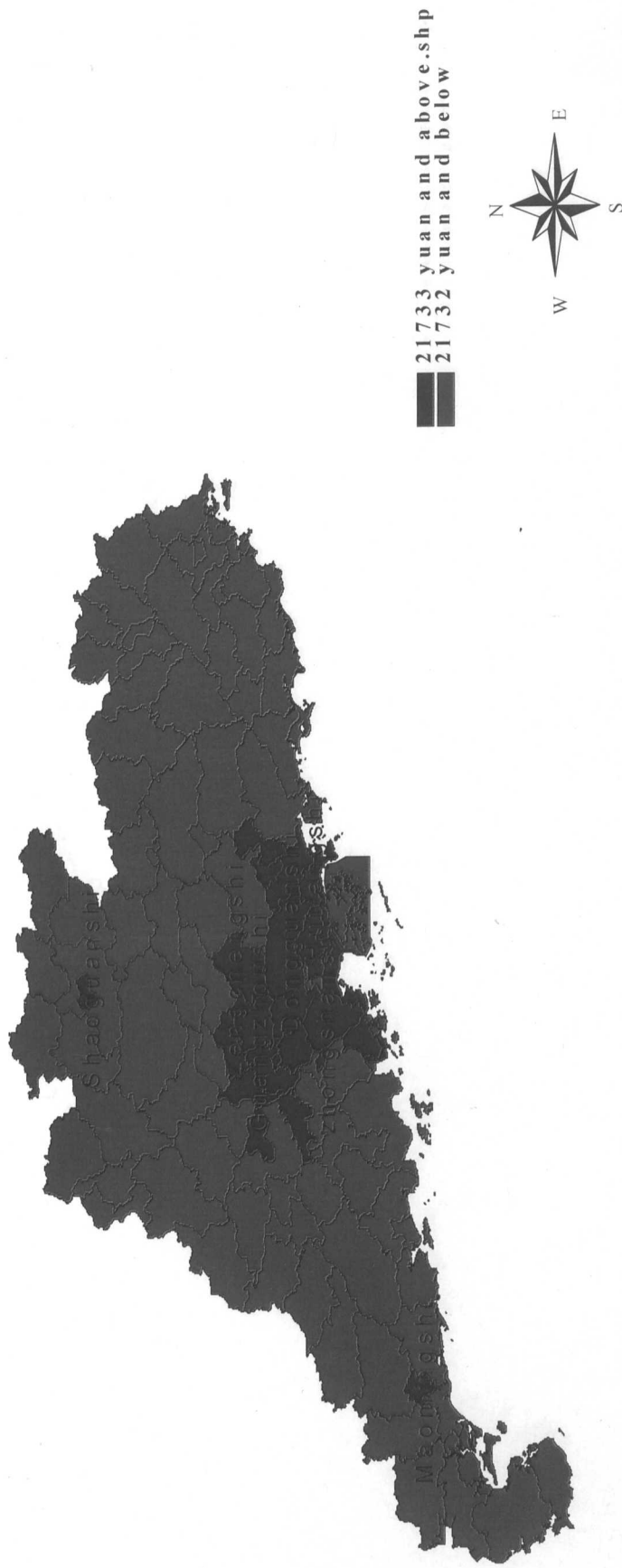
[83] Based on the ArcView GIS 3.3 Software, Map 11.1 and 11.2 have been developed. In order to generate a fair and consistent comparison of regional income inequality during the reform period between 1980 and 2005, the county-level administration division of Guangdong set up in the GIS Map adopted the 1980 regional division of Guangdong, which is available on the official website of the Administration Division of China (www.xzqh.org).

Map 11.2: Spatial Distribution of the Twenty Poorest Regions in Guangdong, 2005[84]

the spatial distribution of the bottom poorest regions in Guangdong

4528 yuan and below .shp
4529 yuan and above

Lechangshi

Yangshanxian
Liangchuanxian
Fengshanxian
Dapuxian
Lianshan

Yingdeshi
Zijinxian
Luhengshi

Qingxinxian

Lianjiangshi

Suixianxi

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[84] Owing to the data setting in this map software of Guangdong Province, the income data in Hong Kong and Macau were originally set as zero; this is the reason why these regions are viewed as two of the poorest regions in Guangdong. As we can see, this is certainly not correct, but due to a technical mistake. I hope that the reader can be aware of this issue and ignore it.

In general, the geographical effects on regional economic development and widening spatial inequality within Guangdong are significant. Coastal location and market proximity are positively correlated with regional economic growth. In contrast to the equivalent figure in the twenty least developed regions (25 percent), the land and people within 100 km of the coast account for up to 90 percent of total area and population in the twenty richest regions. In terms of population within 100 km of coast or ocean-navigable river, the equivalent figure in the richest regions is 95 percent, which is more than three times higher than the figure in the poorest counties. The landlocked population in the top 20 counties (43.4 percent) is considerably lower than the equivalent figure in the bottom 20 counties (92 percent). Relative to the 20 most developed counties, the general road distance between the 20 least developed counties and Guangzhou is more than three times longer; the specific figures are 103 and 334 km respectively. In terms of coastal and interior population density, the coastal density for the top 20 regions is 1082, which was more than five times higher than the equivalent figure in the bottom 20 regions (202). The interior population density in the top 20 regions is significantly lower than in the bottom 20 counties, at 111 and 170 respectively.

The analysis of geographical characteristics presented in Table 11.16 and 11.17, therefore demonstrates that most of the developed counties in Guangdong have inherited geographical advantages which have stimulated economic development.

However, the geographic analysis suggests that coastal location probably is not the most important factor contributing to regional development inequality in Guangdong during the reform period. As significant number of the least developed regions do in fact have coastal location (up to 30 percent). The local populations in five of the 20 poorest counties are live close to the sea. It seems to be the case that large market proximity is more important than coastal location in influencing regional economic growth as none of the 20 least developed regions are located within or close to the Guangzhou-centralized Pearl River Delta: whilst 90 percent of the richest places are located in the PRDA.

Moreover, analysis of geographic characteristics indicates the strong effects of industrial clusters and economic agglomeration on regional growth and widening regional inequality. In fact, agglomeration has played a crucial role in the regional economy of Guangdong during the reform period. This is because geographical distances between the most developed regions and Guangzhou-centralized PRDA are generally short. By contrast, the poorest regions have suffered from long distance and travel time to the PRDA. As a result, it is reasonable to argue that geographic advantages of coastal location and large market proximity have stimulated economic growth in the coastal regions and contributed to their prosperity; while, large market proximity and economic agglomeration have had more effect than coastal location on widening spatial inequality in Guangdong since 1980.

11.5.2 Regression Analysis

In order to statistically test the precise contribution made by the various independent factors to regional economic development in Guangdong Province during the reform period, linear regression model analysis has been applied in this study.

11.5.2.1 Proposed Regression Proxies

'Average growth rate of GDP per capita 1991-2005', which fairly reflects the general economic prosperity and level of economic development within the different regions in Guangdong, was selected as the dependent variable in this regression model analysis. As discussed earlier in this chapter, the crucial role played by geography in regional economic development in Guangdong needs to be considered. It is logical to expect that the correlation between the geographical factors and the local economic growth in Guangdong will be close. Therefore, geography proxies should be added into the regression analysis. Based on this consideration, the independent predictor 'Land within 100 km of coast' was chosen to test the relative contribution made by coastal location to economic growth. This variable ideally illustrates the various coastal distances for the county-level regions. Moreover, the variable 'Distance to the core market' was selected as the independent variable to measure the role played by large market proximity and transportation costs in influencing regional economic disparity. The statistical significance of industrial clusters and economic agglomeration to regional development can also be illustrated and properly analyzed. 'Distance to the core market' analyzes the correlation between geographical distance and spillover effects generated by industrial clustering and economic agglomeration. This variable is measured by the relative geographical distance from all regions to Guangzhou: the domestic economic centre of Guangdong.

Before the other regression proxies can be considered, the issue of a specific year's bias affecting the reliability and credibility of regression model analysis should be addressed. It is important to understand the potential problems of conducting a regression analysis dependent on particular year. Due to bias and individual events, the independent variable calculation based on any single year might have significant negative effects on the reliability of the time-series regression analysis. Therefore, in order to eliminate any potential bias and ensure the quality of regression model analysis, it is essential to take independent variables which are based on several years' statistical calculations. Before running the regression model analysis, several independent variables, based on the original statistical figures for the past 10-15 years from 1991 to 2005, were carefully estimated and calculated. Thus, these independent proxies can objectively represent the potentially important factors affecting regional economic growth: the effectiveness and credibility of this regression analysis can be largely guaranteed.

Official statistics for Guangdong clearly demonstrate that a large amount of FDI has flowed into this coastal province during the reform period. Foreign capital might have

made a positive contribution to economic growth. It is inappropriate to eliminate this factor from the regression. Nevertheless, due to a lack of reliable data, the independent variable 'Average ratio of FDI in GDP 1996-2005' was chosen to measure the relative importance of FDI in stimulating regional economic growth in Guangdong. From this variable, we can evaluate the importance of foreign direct investment. Moreover, the role of the state needs to be considered in regression analysis. The independent variable 'Average ratio of tax revenue in GDP 1991-2005' was adopted to measure the significance of the state to economic development. In addition, the independent variable 'Average ratio of capital construction investment in GDP 1991-2005' was selected to estimate the contribution of state capital investment to economic growth. More significantly, the role played by the institutional factor in economic growth can be properly estimated. This proxy is more accurate than fixed capital investment in measuring the significance of transportation investment to economic growth.

Besides the proxies discussed above, educational factors and human capital should be taken into account in the regression analysis. The development experience of many nations suggests that education is a key factor in economic and industrial development. However, it is difficult to fully evaluate the significance of education, as it can be affected by many integral aspects, such as school enrolment rates, ratio of university graduates in total population, and illiteracy rates, not to mention the data problem in Guangdong. Choosing the right educational proxy is not straight-forward. Based on the comparison analysis, the independent variable 'Average percentage of illiterate people in total population aged 15 and above 1990-2000' was chosen to estimate the contribution made by human capital and education to regional economic growth and industrial development within Guangdong during the reform period. This predictor can fairly reflect the potential importance of educational factor to local economic growth. It is apparent that the more negative this variable is, the more significant education and human capital are. These average figures would properly demonstrate the relative development of local education in the different areas during the reform period, as the annual ratio of illiterate people to total population would not change substantially in the short term. Owing to the data problem, some other independent predictors like middle school enrolment rates have not been available for every county in Guangdong since 1978. Moreover, the quality of annual percentages of total number of university graduates in per 10,000 populations 1980 – 2005 is not consistent. Some individual figures are biased and the data in a few regions apparently cannot be trusted: for example, the equivalent figures in District of Guangzhou and District of Meizhou are extremely high. As a result, estimation of the role played by education and human capital in influencing economic development would be seriously distorted by depending on this poor quality predictor.

The last independent predictor 'GDP per capita in 1991' was selected to measure the variation of economic performance between the economically poor and rich regions since 1978. By estimating this variable, the credibility of so-called 'backwardness advantages' proposed by the neoclassical growth economists can be evaluated. In

terms of neoclassical growth theory, the economic growth rates in the initially under-developed areas will be faster than in the rich regions, which begin from a relatively high development stage. This is because economic growth in these poor regions starts from a base below the steady-state level. Barro and Sala-i-Martin (1995, p. 29-30) state that,

In other words, [the neoclassical model] the model prtedicts conditional convergence in the sense that a lower starting value of real per capita income tends to generate a higher per capita growth rate, once we control for the determinants of the steady state. (Bold content added)

In general, seven important independent predictor proxies which represent the five potential main factors (state, geography, foreign capital investment, transportation investment and education) contributing to economic growth and regional inequality within Guangdong, were selected in this study. Andy Field (2005) highlights that selection of the independent variables and predictors for regression model analysis should be based on previous literature review. Therefore, the chosen new variables deserve to be analyzed by the regression model.

Excluding a few newly established regions where local data currently is not available, 97 county-level administrative units were included in the sample base. The full original dataset utilized in the regression model is presented in Appendix 6. Some basic descriptive statistics of this regression model have been summarized in Table 11.18 below.

11.5.2.2 Interpretation of Regression Analysis Results

According to the t-statistics data presented in the regression analysis (see Table 11.19), all predictors have generated various kinds of effects on economic growth. In particular, the relative importance of the distance predictor is significant. The distance to the core market ($t (89) = -5.627$, $p <.001$) is undisputedly the most significant predictor of average growth rate of GDP per capita between 1991 and 2005. Therefore, it is possible that this independent variable will most accurately predict regional economic growth. In addition, land within 100 km of coast ($t (89) = 5.088$, $p < .001$) is an important predictor affecting the growth rate of GDP per capita. It suggests that land within 100 km of coast is a good indicator of regional economic development in Guangdong. The positive correlation between coastal geography and regional economic growth should be properly addressed. The magnitude of the t-statistics, indicates that distance to core market and land within 100 km of the coast these are the main determinants of regional economic growth.

Education and human capital are other important factors contributing to regional economic development, which can be illustrated from the average percentage of illiterate people in total population aged 15 and above ($t (89) = -4.489$, $p < .001$). The negative sign shown in this proxy suggests that education is relatively important to

regional economic growth. The regression analysis illustrates that illiteracy has negatively affected the local economic growth in the least developed regions: thus contributing to the widening regional income inequality within Guangdong. Spatial educational variance has accounted for unbalanced regional development during the reform period indicating that education is important to economic growth.

Moreover, the strong negative effect of GDP per capita 1991 in predicting the local economic growth in Guangdong is evident (t (89) = -3.690, p < .001). The negative sign shown in this proxy suggests that economic growth in the initially economically rich regions (high GDP per capita 1991) has not been faster than the growth in the poor areas (low per capita GDP 1991) during the reform period. It indicates that the backwardness advantages account for economic growth in the underdeveloped counties.

As far as other independent predictors are concerned, regression analysis seems to suggest that, although less significant than geographical and educational factors, foreign capital has contributed to economic growth and industrial development: which can be demonstrated from the average ratio of FDI in GDP 1996-2005 (t (89) = 1.041, p >.05). The contribution made by foreign capital to economic growth needs to be recognized: but, at the same time, its significance should not be overvalued.

By contrast, capital construction investment has only slightly contributed to regional economic development and industrial prosperity in Guangdong, and its effect is insignificant (t (89) = .622, p > .05). The regression analysis suggests the important role played by state-oriented infrastructure investment in regional economic growth. The gaps in capital construction investment between the developed and least developed regions have contributed to the widening regional disparities within Guangdong since 1978. During the early development stage, investment in transportation is essential for economic growth in the underdeveloped regions. However, the empirical results of regression model analysis seems to predict that local tax revenue might be an unimportant factor in economic development (t (89) = -.320, p > .05). It indicates that whilst state and preferential policies matter, they might not have made a large contribution to regional economic development. The claim by number scholars, the strong state as a determinant of economic growth, has not been supported by this regression analysis. Both capital construction investment and local tax revenue are two factors that have been statistically insignificant in regional economic growth in Guangdong during the reform period. This interpretation of regression model results can be confirmed from the standardized coefficient beta values.

In terms of general interpretation, there are some important points that can be summarized from the regression analysis. First, coastal location has played an important role in development of local economic disparity within Guangdong since 1978. One of the key geographical differences between the developed and least developed regions is their coastal proximity. The previously discussed arguments of

the importance of the coastal factor in stimulating economic growth and widening regional economic inequality in Guangdong are empirically supported by this regression analysis.

Secondly, more significantly, this regression analysis indicates that the geographic factor of large market proximity (Hong Kong and Guangzhou) has been statistically more significant than coastal location in shaping regional development inequality since 1978. The statistical figures of 'distance to the core market' reflect the crucial contribution made by the spillover effects of industrial clusters and economic agglomeration in boosting development in the Pearl River Delta, and also widening the core – periphery pattern of spatial economic disparity in Guangdong. A significant amount of variation in the average growth rate of GDP per capita has been generated from this independent distance predictor. It clearly suggests that the contribution made by large market proximity and industrial clusters to economic growth should not be overlooked. In fact, economic agglomeration has been extremely significant in causing spatial development disparity since 1978. Owing to the absence of regional agglomeration centre in the periphery, and the weakness of economic spillover to the peripheral region, from the industrial cluster in the PRDA, these least developed areas have lacked a powerful growth engine to boost local economic development. Large market proximity is possibly the driving force behind the core – periphery pattern of spatial economic inequality in Guangdong. Moreover, the close relationship between distance to the core market and average GDP growth rate indicates that the high costs of inter-regional transportation seriously hinder the economic growth in the underdeveloped peripheral region.

Thirdly, as a result of the statistical insignificance shown in regression analysis, the claim that the state and peripheral policies have contributed significantly to regional inequality between the PRDA and periphery is not empirically supported. The effect of the state on regional development is very small. Governmental institutions are probably not a key factor in the widening regional inequality within Guangdong during the reform period. This argument is supported by the regression analysis of two independent variables; these are the average ratios of tax and capital construction investment in GDP 1991-2005. Nevertheless, regression analysis suggests that foreign capital as a cause of regional development disparity is important but not significant. FDI seems to be relatively important in explaining economic disparity since 1978: but it is of far less significance than geography and education. Fourthly, the educational factor has been important to analysis of local economic growth. Education and human capital make a difference to GDP growth and economic prosperity: whilst lack of educational development contributes to economic underdevelopment and local poverty in the peripheral and mountainous regions.

The overall negative correlation between GDP growth rate and tax does not necessarily indicate that the role of the state can be completely ignored. In fact, the opposite is true. As far as Guangdong is concerned, state investment in infrastructure is necessary to stimulate economic growth of the least developed regions during the

early developmental stage: as the coefficient analysis of capital construction investment in predicting GDP growth discussed earlier. However, one important point needs to be highlighted here. Owing to the shortage of reliable data, personally, I have reservations concerning regression analysis results in Guangdong.

Table 11.18: Descriptive Statistics

	Mean	Std. Deviation	N
Average growth rate of GDP per capita 1991-2005 (%)	12.590	3.3833	97
Land within 100 km of coast (%)	51.61	47.734	97
Distance to the core market (km)	273.39	161.571	97
Average ratio of FDI in GDP 1996-2005 (%)	7.071	6.4259	97
GDP per capita 1991 (*yuan*)	2474.86	2254.157	97
Average ratio of tax in GDP 1991-2005 (%)	4.010	2.0777	97
Average ratio of capital construction investment in GDP 1991-2005 (%)	16.279	6.4236	97
Average percentage of illiterate people in total population who are aged 15 and above 1990-2000 (%)	11.6511	4.01473	97

Table 11.19: Coefficients (a)

Model		Non-standardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	19.781	1.527		12.950	.000	16.746	22.816					
	Land within 100 km of coast (%)	.031	.006	.434	5.088	.000	.019	.043	.308	.475	.383	.778	1.285
	Distance to the core market (km)	-.011	.002	-.507	-5.627	.000	-.014	-.007	-.482	-.512	-.424	.698	1.432
	Average ratio of FDI in GDP 1996-2005 (%)	.051	.049	.097	1.041	.301	-.046	.149	.266	.110	.078	.651	1.536
	GDP per capita 1991 (*yuan*)	-.001	.000	-.568	-3.690	.000	-.001	.000	.146	-.364	-.278	.239	4.178
	Average ratio of tax in GDP 1991-2005 (%)	-.074	.232	-.046	-.320	.750	-.534	.386	.122	-.034	-.024	.281	3.565
	Average ratio of capital construction investment in GDP, 1991-2005 (%)	.032	.051	.060	.622	.535	-.069	.133	.202	.066	.047	.607	1.646
	Average percentage of illiterate people in total population aged 15 and above, 1990-2000 (%)	-.373	.083	-.443	-4.489	.000	-.538	-.208	-.378	-.430	-.338	.583	1.715

a Dependent Variable: Average growth rate of GDP per capita 1991-2005 (%)

11.6 Final Conclusion

This chapter has emphasized the main cause analysis of spatial development disparity in Guangdong during the reform period. In general, geography has been the driving force behind regional inequality within this southern province. As far as Guangdong is concerned, geography has been far more significant than other factors in determining economic growth. Both the geographical and regression analyses have clearly supported this argument. Coastal location has played an important role in stimulating regional economic development in Guangdong since 1980. Relative to the landlocked regions, many coastal places have made impressive economic achievements since 1978. In particular, coastal location grants the developed regions, such as the PRDA, the opportunity to actively participate in international economic trade and cooperation; more significantly, it strengthens the development capability and regional competitiveness of the coastal regions by lowering transportation costs.

However, in the context of Guangdong, the coastal location factor alone is not sufficient to guarantee economic growth. The evidence of Zhanjiang and Shantou indicates that coastal location is not the only force behind regional economic development, and the contribution made by industrial clusters and economic agglomeration is more significant. Zhanjiang and Shantou have both suffered from the disadvantages of long distance to the Guangzhou-centralized Pearl River Delta. High transportation costs have negatively hindered the foreign direct investment inflow to these two regions. In addition, small areas located in the peripheral and mountainous regions have been unable to enjoy benefits of economic agglomeration due to the lack of a powerful regional economic centre. Regional economic centres located in the periphery are not able to compete with powerful core centres in the PRDA such as Guangzhou and Shenzhen. Thanks to the strong effects of industrial agglomeration in major regions like Guangzhou, Shenzhen and Dongguan, other small areas located in the PRDA have been able to enjoy the benefits of the strong spillovers generated by industrial clusters of local industrial clustering or spillover effects from economic agglomeration, which have contributed to the economic backwardness in the mountainous and peripheral regions. Hence, the peripheral region in Guangdong has been behind in terms of economic growth during the two reform decades.

Due to the implementation of 'reform and open-door' policies since 1978, and the geographical advantages of coastal location and large market proximity, economic and productivity factors, such as capital and labour, have gravitated towards the PRDA. Moreover, many industries and companies have chosen to locate in the PRDA. The strong tendency of industrial clusters and regional economic agglomeration in this region is evident. The analysis of regional industrial distribution in Guangdong in terms of both the municipality and county-level clearly suggests that the spatial distribution of industrial sectors and economic activities is very unequal. The PRDA has enjoyed tremendous benefits contributed by the industrial clusters and taken advantage of the economic scale. Economic agglomeration and industrial clusters have dramatically stimulated regional economic and industrial development in the PRDA: agglomeration effects have played a crucial role in further strengthening industrial and economic convergence in the PRDA.

My general argument is this: the contribution made by the self-reinforcing feature of industrial cluster to sustainable regional economic development in the PRDA has been particularly significant during the second stage of the reform period (since 1994). As far as Guangdong is concerned, the advantage of coastal location was important for regional economic development during the early reform period (between 1978 and 1993); while the continuance of rapid economic growth and maintenance of economic prosperity in the PRDA during the second stage of the reform period lies in the long-term advantages attributable to economic agglomeration. This is precisely why Dongguan, Huizhou, Foshan and many other places have further made impressive economic achievements; by contrast, Shantou, Zhanjiang, Meizhou and other regions located in the periphery have failed to maintain their economic prosperity and have continually declined since 1978. Owing to transportation cost reduction, the advantage of superior coastal location has become less significant in the economic development of the PRDA. The locked-in agglomeration effects are the main force behind the fast industrial and economic development in this region. The scale economies and the other external economies generated from the industrial clusters and economic agglomeration are the key to sustainable economic development in the PRDA.

In general, the core – periphery pattern of widening spatial economic inequality within Guangdong is mainly caused by the double-strengthening mechanism of geographical location and economic agglomeration. These two factors are at the same time crucial and interdependent. On the one hand, location and transportation advantages have not only attracted economic factors to the core region, but also attracted many semi – manufacturing – oriented industries to relocate to Guangdong. On the other hand, more significantly, the strong spillover effects of industrial clustering and economic agglomeration have reinforced the inherited advantages of coastal proximity and economic competitiveness of this region, and contributed to sustainable economic growth in the PRDA. In addition, the concentration of manufacturing industries and other economic activities tends to further attract more industries and companies to the PRDA; enabling the regions within the PRDA to further enjoy the benefits of economic agglomeration. Relative to the PRDA, the economic development in the peripheral region has been negatively affected; and the periphery has been unable to enjoy the benefits of agglomeration due to factors such as small market size, long distance, and a shortage of labour.

As a result, this double-strengthening mechanism inevitably leads to the tendency of widening spatial inequality between the core and peripheral regions within Guangdong. This mechanism can be regarded as the strong backwash effect shaping the unbalanced regional distribution of industries and other economic activities; in addition, this strong backwash effect strengthens the tendency of core – periphery pattern of spatial economic disparity in Guangdong. The improvement of transportation facilities provides efficient and speedy transport access for the PRDA, and further reinforces its geographical advantage and reduces transportation costs. However, the combination of landlocked topography and weak agglomeration effects has doubly hindered local economic growth in the mountainous and peripheral regions. To my understanding, this double-strengthening mechanism has been strong enough to stop any spread effect, which might have stimulated economic growth in the less developed regions and narrowed the widening spatial disparities. In the absence of strong intervention by the state, it seems that the core – periphery pattern

of regional economic inequality in Guangdong during the reform period is inevitable and will continue to exist.

Lastly, in the context of Guangdong, the improvement of transportation and other infrastructure facilities is an essential pre-condition of regional economic development. In order to weaken the negative effects caused by unfavourable topography, and to reduce the geographical isolation of the peripheral region, good transportation is badly needed. In terms of under-developed areas of Guangdong, owing to the effect of small investment returns and limited local financial capability, state-funded capital investment and other subsidies from the central and provincial governments of China, which are largely non profit-driven, are probably the best sources of finance for infrastructure development. The role of the state in stimulating economic growth in under-developed regions, and reducing spatial economic inequality within Guangdong, is so important during the early development stage. A modern transportation network is key to industrial and economic growth in the economically backward periphery. Nevertheless, good transportation alone cannot guarantee fast economic growth, as it is not the only determinant of regional growth. Education, institutions and human resources are also crucial to regional economic development.

Chapter 12 General Conclusion

During the post-1978 period, the general economic development in Guangdong has been impressive. In economic terms, Guangdong has become one of the most developed and prosperous regions in China. However, the economic growth rates of its various regions have been dramatically different. This southern development-pioneer province has been facing the severe challenge of unequal spatial growth and regional inequality during the reform period. It is known that rapid economic growth has mainly occurred in the Guangzhou-centralized PRDA; in this region, the average income per head has been much higher than in the other regions. By comparison, economic development in the peripheral and mountainous regions is very slow. The average per capita income in these regions has been substantially lower than the equivalent figure in the PRDA. In addition, although regional human inequality within Guangdong has declined during the reform period, regional disparity still exists. Therefore, it is justified to argue that the peripheral region has not enjoyed the same level of economic development as the PRDA during the reform period. As a result, a core (the PRDA) – periphery (the combination of western, eastern and mountainous Guangdong) pattern of regional disparity has naturally formed. More significantly, the development tendency of this regional inequality has been divergent rather than convergent. Inequality between the core and peripheral regions did exist in the early reform period; nevertheless, regional disparity has been continuously widening since 1980. This trend has become more severe since the start of the second reform period in 1991.

The developing model of regional inequality within Guangdong is different from the predominant coast – inland type of inequality of other Chinese regions. The spatial inequality in this southern province demonstrates the extreme developed core – under-developed periphery pattern. Without question, the small PRDA is the economic growth engine; the industrial output and gross domestic product generated in this region account for a large proportion of Guangdong's total figures. In many ways, the development of Guangdong is outstanding and worthy of recognition. Nevertheless, the post-1978 development record of Guangdong has been marred by its rising regional disparity, and personally, I think that Guangdong's development model is not as desirable and successful as many people claim. The spatial income gap between the developed core and under-developed peripheral regions within Guangdong is vast. The serious regional variation has been identified by this study as one of the worst cases of spatial disparity in China during the reform period. Although land area and population size may be very different, as far as the changing tendency of regional inequality is concerned, Guangdong seems to be on the way, developmentally, to becoming another Brazil or Nepal. The economically poor periphery should have grown faster during the reform period; the people living in this region deserve more after almost two decades of reform and opening-up.

Widening region income inequality did not only occur in Guangdong: it is also prevalent in other regions of China. In terms of inter-provincial income inequality, the gap between the wealthy (e.g. Shanghai) and poor (e.g. Guizhou) regions is notable. Moreover, in a comparison of large regions, income variation between the prosperous eastern and impoverished western regions is evident. In general, the key message generated from the case of China is that the developing trend of regional income inequality is a divergent one. The regional convergence suggested by the neoclassical

growth economists has not been supported by hard data. Moreover, the inverted U-curve hypothesis of regional income inequality has not occurred to any appreciable extent during the reform period. Similarly, worldwide evidence has also largely rejected the arguments proposed by neoclassical growth theory. In particular, the high-speed economic development in East Asia has serious challenged this theory. In contrast to other regions of the world, economic growth rates in East Asia are still outstanding; this is especially true of China. According to the neo-classicists (e.g. Krugman, 1994), the dramatic economic growth in this region has been based on the accumulation of physical capital and labour, but not on technological progress. However, post-war development experience of the East Asian countries seems to disprove this argument. Technological progress as shown in the growth of total factor productivity does make a difference to economic growth. This can even be related to recent technological development in China.

Moreover, the outweighing of backwash effects by spread effects at high levels of economic development does not necessarily happen. The real power of spread effects to influence regional convergence is perhaps largely determined by economic agglomeration and geography, not by the stage of economic development. The power of backwash effects to increase regional economic disparity is extremely difficult to overcome. By contrast, spread effects are unlikely to overtake the backwash effects and contribute to regional economic convergence. In that sense, Hirschman's growth pole and Friedmann's core – periphery models are credible and need to be adhered to. A large body of evidence from both developing and developed countries illustrates that high levels of economic development have not contributed to the reduction of spatial economic disparities. In general, the development tendency of regional economic divergence is acknowledged. The majority of world evidence does not support a classic hypothesis of inverted U-curve pattern of regional disparity.

The post-1978 state-designated reform and decentralization policies enabled the geographical advantages of Guangdong to be realized. The combination of geography and fiscal decentralization has been the most important factor in shaping regional inequality in Guangdong during the reform period. On the one hand, coastal location is important for stimulating regional economic development. Relative to the landlocked regions, many coastal places have made impressive economic development since 1980. The coastal advantage with low transportation costs has contributed to the rapid economic success of the PRDA. As far as the peripheral region is concerned, high transportation costs, which are mainly caused by the inherited remote and landlocked features of geography, have generated negative effects on the development of foreign trade, export-oriented industries and other economic activities. This is especially true of the mountainous areas. In contrast, coastal location offers the developed regions more opportunities to participate in international economic activities. Moreover, reduction of transportation costs enhances development capability and reinforces the regional competitiveness in the coastal regions. Nevertheless, coastal location is not powerful enough to ensure economic growth, neither is widening spatial disparity caused by coastal location alone.

Industrial clusters and economic agglomeration, which are mainly contributed by large market proximity (Hong Kong and Guangzhou), are more significant than coastal location in shaping unbalanced regional development and widening regional

income inequality within Guangdong. The two geographical advantages of coastal location and large market proximity are both crucial to economic development. It is clear that both Zhanjiang and Shantou have suffered economically due to their long geographical distance from the prosperous Pearl River Delta. High transportation costs negatively affect the foreign capital inflow to these two regions. Moreover, the absence of a powerful regional economic centre like Guangzhou, has prevented a large number of places in the peripheral region from enjoying economic agglomeration benefits. It is the case that regional centres such as Shantou, located in the periphery, still need to develop their local economy and lack the power to support economic development in the surrounding areas. The shortage of local industrial cluster and the weak effects of economic agglomeration both have to be taken into account for the economic underdevelopment in the peripheral region; especially in mountainous areas. As far as industrial and economic development is concerned, the peripheral region in Guangdong has lagged behind the PRDA during the reform period.

The development tendency of industrial clusters and regional economic agglomeration toward the PRDA is notable. The empirical analysis of the regional distribution of industrial output value suggests that the share of industrial sector and economic activities in different regions within Guangdong is very unequal. The level of industrial development in the individual regions differs widely. In seeking the scale economies, large markets and the industrial cluster effects, the labour-intensive and export-oriented manufacturing industries tend to converge on the PRDA; this is also true of the high-technology and skills-oriented industries. In general, the PRDA has taken advantage of the economic scale and enjoyed the benefits contributed by industrial clusters; and the contribution made by economic agglomeration effects is crucial for further strengthening the industrial and economic convergence in the PRDA.

Relative to the early reform period, the importance of the self-reinforcing feature of industrial cluster in stimulating the economic growth in the PRDA is even more significant during the second stage of the reform period (since 1994 or so). The coastal location advantage was more important for economic growth during the early reform period (between 1978 and 1993); however, the continuing dramatic economic development in the PRDA during the second stage of reform period mainly depends on economic agglomeration. This is an important reason why places such as Dongguan and Foshan have continued to achieve rapid economic growth. As far as the PRDA is concerned, economic prosperity lies in agglomeration economies. Self-reinforcing agglomeration effects are an important force contributing to fast industrial and economic development. By contrast, Shantou, Meizhou and many other places located in the periphery have failed to maintain their economic prosperity during the pre-reform period and continue to decline.

In the cause analysis of widening regional inequality in Guangdong, interpretation of regression results shows education to be an important factor in regional disparity. Regional variation of educational development and human skills is a significant element of the unbalanced regional economic growth in Guangdong. The enormous gaps in educational development between the developed and underdeveloped regions within Guangdong are confirmed by this study. Therefore, in the least developed regions, one of the priorities should be educational development: this is especially

true of basic education. Foreign investment has been indispensable to economic growth in Guangdong since 1978. Nevertheless, FDI is far less significant than geography and education, as foreign capital is not a fully independent factor in economic development in Guangdong. Without inherited geographical advantages and the institutional factors, the huge amount of foreign capital inflow to Guangdong (especially the PRDA) is difficult to conceive. The issue of reverse causation needs to be considered in the analysis of foreign capital and economic growth. High investment return which is caused by dramatic economic development in the PRDA might have been an important attractant of more foreign capital to this region. By contrast, because of low investment returns and insufficient economic scale, investors would lack the will to put foreign investment into underdeveloped regions. In that sense, economic growth might not be mainly contributed by FDI, but by other factors. The FDI might be a sub-development outcome of economic growth. In terms of Guangdong, the positive impacts of FDI on regional economic growth are not significant.

Furthermore, the unequal regional distribution of state-oriented preferential policies in Guangdong is acknowledged as having made a difference to the enlarging core – periphery pattern of spatial inequality in Guangdong. However, more importantly, the contribution by the state and its preferential policies to the economic growth in Guangdong is insignificant and extremely limited. The state is far less important than other factors in stimulating economic development. As discussed in this study, numerous regions like Shantou and Zhanjiang, which benefited from special development policies designated by the central government of China, have failed to achieve rapid economic development. Therefore, it is logical to claim that the rapid industrial development and economic success in the PRDA has not on the whole been contributed by institutional factors and state-oriented development policies. The argument of some scholars that preferential policies and the strong state are the determining factors in regional economic development in Guangdong is not supported by this study. Without inherited geographical advantages, state development policies can do very little to stimulate economic development. The evidence of Guangdong suggests that geography is the key to local economic growth rather than the state.

Moreover, during the reform period, specific regions within Guangdong have benefited economically from the legacy of historical industrial development. The development experience of Shaoguan is a classic example. The fast expansion of defence and other heavy industries before 1978 established a strong basis for economic growth in Shaoguan District during the post-1978 period. The dramatic economic development in this region should be mainly credited to its historical legacy of expansion of heavy industries during the Maoist era. The significance of Mao's industrial development policy and state-funded capital investment during the pre-reform period cannot be overlooked in the analysis of current economic development. It is difficult to understand the present without addressing the past. However, significantly, geography plays an important role in forming the historical legacy.

Significantly, in the context of Guangdong, the improvement of transportation and other infrastructure facilities is an essential precondition for boosting economic development. In order to reduce the negative effects of inland topography on regional development in the hills region, and to reduce geographical isolation, transportation

development is essential. Owing to low investment returns and limited local financial capability, state-funded capital investment is probably the most important source of finance for transportation development projects in the under-developed periphery. In that sense, the role of the state is crucial: particularly in boosting economic growth in the underdeveloped regions during the early development stage. The development experience of many regions, located in both the PRDA and peripheral region, suggests that fast economic growth cannot be achieved without addressing the poor transportation first. Whilst improvement of transportation cannot guarantee economic growth, I believe that modern transport networks are, nevertheless, vital to development; and local governments in the periphery should pay more attention to transportation and other basic infrastructure.

In general terms, as far as Guangdong is concerned, the core – periphery pattern of widening regional economic inequality is mainly caused by the double-strengthening mechanism of both geographic and economic agglomeration effects. Significantly, these two forces are highly correlated. On the one hand, economic development and prosperity in the PRDA has benefited substantially from its coastal and market proximity. The individual regions located in the PRDA have good access to the large markets and low transportation costs. These advantages have not only attracted the various economic factors to converge in the core PRDA, but also many semi-manufacturing-oriented industries have moved to this region. The PRDA benefits from the double-strengthening mechanism in the fast development of the export-oriented manufacturing industries. On the other hand, more significantly, the strong spillover effects generated from the industrial cluster have reinforced the advantages of coastal proximity: leading to further economic growth. Moreover, this regional convergence tends to attract still more industries to the PRDA. As a consequence, the self-reinforcing feature of the agglomeration effect has naturally developed in this region.

As a result, this double-strengthening mechanism has inevitably led to widening of spatial inequality between the core and peripheral regions within Guangdong during the reform period. Coastal location, large market proximity and agglomeration effects have doubly contributed to the dramatic industrial development and general economic growth in the PRDA. By contrast, the mixture of landlocked and mountainous topography and lack of economic agglomeration has doubly interrupted local economic growth in the peripheral region of Guangdong. This is one of the important conclusions drawn from this research. This double-strengthening mechanism has been sufficiently powerful to hinder any spread effects, and to prevent stimulation of economic growth in the underdeveloped regions. Owing to free market economy and the absence of the strong state, personally, I do believe that the core – periphery pattern of regional economic inequality in Guangdong since 1978 has been very severe and will continue to widen: mainly as a result of this mechanism.

It is important to note that extremely severe regional income disparity could trigger political instability. Severe regional inequality would negatively affect social harmony. Many scholars maintain that historical revolutions and rebellions in China often had their causes in inequality. More significantly, regional inequality leads to the problem of poor health and overall human development. Long-term economic growth cannot be achieved under the condition of widening regional disparity. Balanced regional growth is crucial to political stability and human development. As far as development

aspects such as wealth, education and health are concerned, the worsening regional disparity within China during the reform period is striking. The evidence of Guangdong clearly demonstrates this point. This southern province reflects the overall regional disparity in China during the post-1978 period. Considering this is a nation with egalitarian principles and socialist characteristics, this problem should be resolved urgently by the state. Although the point of revolution has not been reached, regional disparity is creating China's biggest challenge. Widening spatial disparity and long-term economic development will not stand side by side. Moreover, the solution to many of China's existing problems of poverty, health inequality, educational underdevelopment and pollution, lie in regional equality.

Without question, this research has certain limitations. First, there is the problem of data quality. Although the regional income inequalities within Guangdong demonstrate an upward trend during the reform period (as shown in the per capita income Gini coefficient and CV), as discussed earlier, the GDP statistics in China and Guangdong have suffered from manipulation, embellishment and inaccuracy. This is especially true of the rural and underdeveloped areas. In addition, mainly due to backward statistical techniques, a lack of professional statistical personnel, and a shortage of financial capability in the statistical offices, some statistics collected by the local officials are not so reliable; and these problems also cause discrepancies between central and local statistics departments. Therefore, measurement of regional disparity should be approached with extreme caution.

Secondly, the interview sample size should ideally be larger in order to fully ensure research reliability. Thirdly, in terms of the regional inequality measurement within Guangdong, the migrant population issue should be systematically addressed. Considering the fast economic development and prosperity in this region, it is reasonable to expect an increasingly large number of migrant workers to move to Guangdong during the reform period. The impact of migrant workers on regional income inequality can only be analyzed when reliable data of migrant populations in every individual region becomes available. Fourthly, the effects of education and human capital on regional economic growth have not been systematically examined by this research. Regression analysis indicates that the contribution made by educational development to economic growth in Guangdong is statistically significant. Therefore, there is some evidence suggesting that education might also be an important factor affecting the regional disparity in Guangdong.

Moreover, the contribution made by natural disasters to the slow industrial and economic growth in the underdeveloped regions should be addressed; such as severe flooding, heavy snow and earthquakes. History reveals that China is not unused to these natural disasters: this is especially true of the economically poor regions. For example, many of the least developed areas in Shaoguan (e.g. Wengyuan and Ruyuan) were badly affected by the heavy snowstorms of Feb 2008; many economically poor regions within Sichuan Province like Wenchuan and Beichuan were seriously damaged by the earthquake of May 2008. It is plausible to expect these powerful natural disasters to hinder local economic growth within the poor regions. However, it is not appropriate to further discuss the issues of education and natural disaster in this research. These issues are far beyond the analysis scope of this PhD research: although, personally, I maintain the view that the negative impacts of natural disaster on economic development should not be underestimated. As far as China is concerned,

previous studies have rarely discussed this issue. More attention should be given to this field of research in the future.

Appendix

Appendix 1: Report of Commercial Price Surveys in Different Regions within Guangdong (Unit: *yuan*)

Commercial Product	Unit	District of Guangzhou	Meixian County	Wuhua County	District of Chaozhou	District of Shenzhen	District of Zhaoqing	Average price
Meat and Vegetables								
Pork Rib	500 gram	11.5	9. 85	9. 6	9. 5	12	9.5	10.3
Pork Meat	500 gram	6. 8	6. 2	6. 5	6. 8	6. 8	6	6.5
Cucumber	500 gram	1. 5	1. 3	1	0. 9	1. 8	1.5	1.3
White Gourd	500 gram	0. 75	0. 65	0. 65	0. 59	1	0.7	0.7
Aubergine	500 gram	1. 4	0. 6	1	1. 99	1. 5	1	1.24
Balsam Pear	500 gram	1. 65	0. 65	1. 5	0. 99	1. 7	1	1.24
Tomato	500 gram	1. 7	1. 3	1. 8	1. 58	1. 8	1.5	1.61
Rice and Fruit								
Rice	500 gram	1. 7	1. 49	1. 5	1. 55	1. 65	1.75	1.6
Water Melon	500 gram	1. 45	1. 2	1. 38	1. 2	1. 7	1.04	1.3
Apple	500 gram	4. 95	5	5. 1	4. 2	4. 9	5.8	4.99
Drinks								
Milk	250 ML	1. 8	2	1. 9	2. 03	1. 9	1.8	1.9
Orange Juice	500 ML	2. 3	2. 6	2. 8	2. 3	2. 7	2.9	2.6
Energy Drink (Red Bull)	200 ML	5. 1	5	5. 2	5	4. 8	5.1	5
Beer	640 ML	4. 6	4. 3	4. 5	4. 2	4. 8	4.2	4.4
Pure Water	350 ML	1	1. 1	1. 1	1	1	1.1	1
Coca Cola	2 L	5	5. 8	5. 8	5. 8	4. 9	5.3	5.4
Bread and Noodles								
Bread	450 gram	6. 7	6. 7	6. 4	6. 6	6. 5	6.5	6.5
Noodles	100 gram	1. 5	1. 5	1. 4	1. 35	1. 4	1. 4	1.4

Wine								
Red Wine	750 ML	26.5	29.5	27.5	27.5	29.8	25.8	27.7
Oil								
Cooking Oil	5 L	67	68	69	65.5	70	67	67.7
Other Daily Commodities								
Toothpaste	120 gram	6.7	6.6	6	6.5	6.8	7.3	6.6
Shampoo	200 ML	15.6	15.5	15.5	16.9	16.7	16.2	16
Gas	Bottle	88	78	80	83	90	75	82
T-shirt	Unit	45	47	47	43	48	44	45.6
Education								
Tuition Fee for primary student (level one)	Unit	170	145	142	147	180	152	156
Tuition Fee for junior student (level one)	Unit	230	200	205	210	245	220	218
Medical Commodities								
Influenza treatment	Unit	25	24	22	20	26	23	23
Appendectomy	Unit	4000	3800	3700	3650	4000	3900	3841
Blood Test	Unit	15	22	24	18	20	18	19.5
Gastroscopy Test	Unit	300	180	173	185	290	190	220
Alexipharmic Pill	Bottle	2.14	2	2.1	1.9	2.2	2	2
Bebeerines Pill	Bottle	1.6	1.4	1.45	1.5	1.7	1.3	1.5
Antibiotic Pill	Bottle	4.1	3.5	3.45	3.9	4	3.8	3.8
Anti-cold Pill	Bottle	1.52	1.3	1.25	1.4	1.5	1.42	1.4
CT Test	Unit	600	600	595	580	610	590	595
Industrial Commodities								
Steel	Ton	3800	4250	4300	4400	4300	4000	4034
Cement	Ton	270	280	300	310	290	275	287

Note:
1. All price surveys were based on the same product with same weight;
2. The price of commercial products was collected from the average price of both the local supermarket and agricultural market on 15th August, 2006;
3. The prices of medical care fees and products were collected from the local people's hospital on 18th September, 2006;
4. The prices of industrial products were collected from the average prices of local industrial products marketed on 24th September, 2006

Appendix 2: Average Annual Sunshine Hours in Various Regions within Guangdong, 1980 – 2004 (unit: hour)

Year	Northern Region	North-Eastern Region	North-Western Region	Eastern Region	Central Region	Western Region
1980	1754.1	1811.1	1945.8	1989.2	1921.8	2036.5
1985	1701.6	1926.7	1613.3	1900.6	1406	1868.4
1990	1613.9	1893.1	1542.8	1921.3	1648.7	1877.4
1995	1420.6	1868.7	1704.6	2038.3	1559.6	1828.3
1996	1626.5	1965.7	1796.9	2094.8	1564.7	2042.3
1997	1349.1	1490.2	1454.9	1985.8	1209.8	1895.1
1998	1578.3	1689.6	1546.1	1917.5	1469.4	1994
1999	1564	1819.7	1699	2237	1599.5	2050.7
2000	1497.2	1672.6	1714.1	2126.3	1609.2	1855.3
2001	1613	1884	1559.2	2199.8	1651	1794.6
2002	1506.4	1813.2	1521.7	2266.6	1566.5	1783.8
2003	1821.1	2030.1	1762.6	2341.5	1741.6	2144.5
2004	1818.5	2117.1	1640.2	2433.5	1767.4	2024.7
Average	1604.9	1844.7	1653.9	2111.7	1593.5	1938.1

GSB (2005, pp. 43)

400

Appendix 3: Average Annual Temperature in Various Regions within Guangdong, 1980 – 2004 (unit: °C)

Year	Northern Region	North-Eastern Region	North-Western Region	Eastern Region	Central Region	Western Region
1980	20.7	21.5	22.5	21.2	22.2	23.4
1985	20.2	20.9	22	21.1	21.6	22.6
1990	21.1	21.5	22.8	21.8	22.6	23.4
1995	20	20	22.2	21.6	22.3	23
1996	19.9	21.4	22.4	21.9	21.6	23.3
1997	20.4	21.3	22.7	22.1	22	23.7
1998	21.2	22.5	23.3	23	22.8	24.5
1999	20.8	21.9	22.7	22.6	22.5	24
2000	20.4	21.9	22.6	22.5	22.5	23.8
2001	20.5	22	22.5	22.7	22.6	23.8
2002	21	22.3	22.8	23	23	24.1
2003	20.9	21.9	22.9	22.6	23	24.4
2004	20.8	21.6	22.6	22.6	22.8	23.2
Average	20.6	21.5	22.6	22.2	22.4	23.6

GSB (2005, pp. 43)

Appendix 4: Average Annual Precipitation in Various Regions within Guangdong, 1980 – 2004 (unit: mm)

Year	Northern Region	North-Eastern Region	North-Western Region	Eastern Region	Central Region	Western Region
1980	1459.4	1461.7	1586.1	1369.1	1492.2	2274
1985	1360.2	1607.8	1726.9	1481.3	1706	2411.3
1990	1436.6	1709	1284.8	2236.9	1239.5	1510.2
1995	1506.9	1171	1766.4	1512.2	1752.4	2082.9
1996	1633.1	1361.5	1693.1	1409	1683.4	1222.6
1997	2045.3	1847.5	1815.3	2040.9	1997.3	2344.3
1998	1862.3	1458.2	1737.5	1593.6	1736.1	1266.4
1999	1314.3	1033.8	1318.7	1517.4	1620.4	1392.6
2000	1565.8	1850.9	1318.2	1486.7	1798.9	1762.7
2001	1689.8	1560.3	1889.2	1947.9	2678.9	2314.5
2002	1814.9	1110.3	1480.9	1409.7	1866.7	2263.3
2003	1388.2	1415.2	1251.8	1406.6	1338.7	1372.4
2004	1156.3	1251.8	1034.7	1379.7	1636.5	1068.5
Average	**1556.3**	**1449.1**	**1531**	**1599.3**	**1734.3**	**1791.2**

GSB (2005, pp. 43)

Appendix 5: Preferential Policies of Foreign Direct Investment Designated by the State: Development Type and Date in China

Region	Time Opened	Tax[1] Preferential	Direct[2] Approval
Fujian Province*			
1 SEZ (Xiamen)	1980	1980	-
Guangdong Province			
3 SEZs (Shenzhen, Zhuhai & Shantou)	1979-80	1979-80	1979
Coastal Ports and Industrial Cities (Guangzhou, Zhanjiang)	1984	1984	1984
Coastal Open Region (PRD)	1985	1987	-
Coastal Open Cities	1985	1988	-
Open Coastal Economic Zones	1985	1991-93	-
Central Reform Testing Zone**	1988	-	-
Shanghai			
Economic and Technological Development Zones	1984	-	-
Shanghai Pudong New Area	1984, 1990	1991-93	1984
Hi-tech Industrial Development Zone	1985	-	-
Other Coastal Provinces			
Coastal Ports and Industrial Cities	1984-90	-	1992
Open Coastal Economic Zones	1985	1991-93	-
Coastal Open Region (Yangtze Delta)	1985	1987	-
Hi-tech Industrial Development Zones	1985	-	-
Economic Strategic Development	1987	-	-
Hainan SEZ	1988	-	-
Tax Protection Districts	1990-92	1990-93	-
Coastal Open Areas/Cities	1992	-	1992
Open Inland Capital Cities, Border Regions and River Bank Areas	1992	-	1996
Chongqing	1997	1997	1997

Notes:

[1] Time for implementation of taxation preferential policies

[2] Delegation of power to local government on direct approval of FDI projects

* Open areas other than SEZs are found under 'Other Coastal Provinces'.

** Applied to whole of Guangdong province.

1) Coastal Open Region (PRD): Included a total of 31 cities/counties in Pearl River Delta (PRD)

2) Open Coastal Economic Zones: 293 cities/counties in the nation were included; the zone also included the non-PRD cities.

3) Coastal Open Region (Yangtze Delta): Included 28 cities and 8 areas along the Yangtze River.

4) Tax Protection Districts: 15 bonded areas or districts established mainly in coastal cities (i.e., Shanghai Pudong New Area, Tianjin, Futian of Shenzhen, etc.) since 1990. The districts served to initiate entrepot trade and manufacturing exports. Taxes for enterprises within the areas will be in accordance with preferential tax policies. Such bonded areas were named 'Tax Protection District' (from direct Chinese translation).

5) Open Inland Capital Cities, Border Regions and River Bank Areas: A total of 18 cities. In addition to the 18 inland open cities being announced, border regions (13 border cities) and riverbank areas (6 port cities) were also allowed to receive FDI with specific policies implementation.

Source: compiled from China Economic Yearbook and Yearbook on China Opening.

Reproduced from Ng and Tuan (2001, pp. 1058)

Appendix 6: Original Data Set for Regression Analysis

Region	Average growth rate of GDP per capita 1991-2005 (%)	1991 GDP pc (yuan)	Land within 100 Km of Coast (%)	Distance to the Core Market (Km)	Average ratio of FDI in GDP 1996-2005 (%)	Average ratio of tax in GDP 1991-2005 (%)	Average ratio of capital construction investment in GDP 1991-2005 (%)	Average ratio of illiteracy people in total population aged 15 and above 1990-2000
District of Foshan	11.7	12130	100	28	11	10	29	5.1
District of Shenzhen	11.3	12274	100	163	16.4	9	31.3	2.07
Dongguan	17.2	5636	100	61	26.2	7	25.3	5.6
District of Huizhou	16.6	6159	100	143	23.1	8	22.8	5.61
Shunde	18.1	5030	100	38	7.2	7	19.4	8.43
Panyu	20.1	4333	100	30	7.3	6	22.2	8.34
District of Guangzhou	12.6	8836	100	0	9.1	8.6	27.7	4.72
Nanhai	16.5	5531	100	14	6.2	6.5	18	7.41
Zhongshan	17.1	4546	100	94	15.7	6.1	22.5	7.93
Zengcheng	20.6	1965	58	63	12.3	4	16	7.83
District od Zhuhai	10.8	8911	100	140	27.1	7	28.5	4.71
Gaoming	19.8	2715	68	55	9.5	4.5	16	8.4
District of Zhaoqing	15.1	4572	100	110	4.5	6.5	24	7.58
District of Jiangmen	9.9	8372	100	98	8.1	9	14.9	5.43
Sanshui	14.6	4874	100	45	8.8	6	17.1	9.33
Huadu	20.4	2484	80	22	8.1	4.2	17	8.68
District of Shaoguan	11.2	6710	0	309	7	9.2	12.8	6.25
Huiyang	16.9	3225	100	160	18.4	4.1	17.8	9.62
Doumen	13.4	4500	100	168	25.2	5.2	26.9	11.48
District of Maoming	12.1	4610	100	415	1.6	7.2	26.4	9.24
Xinhui	15.2	2964	100	111	9.9	6	15	9.43
District of Yangjiang	17.4	2138	100	257	2.8	2.2	16.3	9.53

Heshan	15.5	2818	95	74	8.5	4.3	15	8.31
Gaoyao	18.4	1925	0	120	8.4	3.6	17.7	12.57
Sihui	14.4	2677	0	82	9.2	4	12	10.67
Kaiping	14.9	2719	100	136	6.9	4.5	13.1	9.59
District of Yunfu	13.2	2845	0	174	4.2	2.2	17.1	11.11
Huidong	15.3	2464	100	192	12.9	2.7	13	14.25
District of Zhanjiang	11.2	3744	100	492	2.9	6.7	28.8	10.64
District of Chaozhou	10	2040	100	469	3.2	3	13.7	10.86
District of Shantou	9.8	4305	100	460	10.5	10.8	25	11.77
District of Meizhou	10.4	3099	0	433	9.6	5.2	18	5.27
District of Jieyang	16.4	1367	100	437	7.1	5.5	24.6	6.33
Boluo	16.7	1785	40	124	17.7	3.2	17.9	10.88
Deqing	17.7	1563	0	182	5.9	3.1	16.1	10.25
Conghua	14.7	2143	45	61	4.7	4.6	16.3	9.56
District of Heyuan	13.2	1102	0	205	21.3	3.3	33	10.61
Enping	12	2632	100	200	8.1	3.4	8.3	10.15
Taishan	13	2254	100	150	10.9	4.4	14	8.01
District of Shanwei	13.3	1668	100	318	11.4	5	22.7	16.33
Dianbai	17.2	1382	100	397	1.7	2	11.3	18.77
Chenghai	14.6	1583	100	454	5.3	4.5	14.9	12.53
Puning	14.7	977	100	394	4.1	3	10	7.68
Jiedong	16.8	1357	100	457	2.4	1.8	10	8
Xinxing	11.3	2162	0	170	2.3	3.1	10.3	11.2
Huazhou	13.4	1550	45	447	0.9	1.6	6.1	12.52
Gaozhou	14.4	1382	40	398	1.2	2.2	13	14.53
Chaoan	11.9	2040	100	488	4	2	9.4	10.98
Luoding	13.6	1650	0	256	2	2.2	14.2	10.49
Xinyi	18	882	0	485	0.6	2.1	8.3	14.69

Fengkai	11.2	1929	0	245	5.2	3	12.7	11.7
District of Qingyuan	13	1624	0	102	4.6	2.6	30	12.73
Longmen	12.8	1359	0	179	4.8	3	16.9	12.65
Meixian	11.8	1680	0	425	2.6	4.2	11.5	9.45
Renhua	10.3	1976	0	354	7.1	4.5	13.2	12.42
Haifeng	13.4	1380	100	292	4.9	2.1	13.3	16.29
Nanao	11.2	1775	100	580	27.9	6	25	19.81
Yangdong	14.5	1123	100	250	4.3	2.4	11.1	14.47
Yangxi	12.9	1290	100	311	3.1	1.5	9.2	18.16
Guangning	12.1	1403	0	139	8.9	3.3	13	12.81
Yunan	10.9	1540	0	264	0.4	1.8	12.8	12.09
Pingyuan	9.9	1099	0	442	3.8	3.4	11.1	13.29
Jiaoling	9.8	1642	0	462	3	4	10.4	10.2
Jiexi	12.7	991	30	435	2	1.8	8.8	8.4
Lianping	14.6	863	0	237	3.7	3.1	19.4	15.77
Raoping	11.1	1295	55	516	5.8	2.7	8.2	11.3
Luhe	14.6	848	100	374	2.8	2.5	21.2	10.52
Shixing	9.2	1632	0	390	18	3.2	13	13.82
Leizhou	7.1	1559	100	558	0.5	2.3	8.2	15.26
Yangchun	11	1290	50	266	2.8	2.2	10	13.58
Ruyuan	11.2	1230	0	345	21.7	6.5	7.8	13.89
Nanxiong	9.1	1629	0	412	3.7	3.4	14.7	17.36
Huaiji	12.2	1070	0	201	3.9	2.5	11	12.53
Xuwen	8.6	1564	100	646	0.6	4.2	12	13.88
Fogang	11.5	1051	0	90	10.5	4	27.1	11.79
Lianzhou	9.8	1186	0	318	3.6	4	22	13.09
Dongyuan	10.7	1114	0	227	8.3	2.1	21	13.96
Suixi	6.4	1946	100	512	0.4	3	6.9	14.8

Qingxin	10	1195	0	68	7.3	2.3	24.2	15.8
Longchuan	14.3	664	0	312	3.4	2.2	21.6	11.21
Xinfeng	10.8	1017	0	154	9	3.1	21.6	13.33
Lianjiang	7.4	1560	100	540	1	2	10.4	13.34
Yingde	8.5	1387	0	138	4.5	2.6	9.4	15.84
Wuchuan	9.3	1248	100	432	1	3.4	11.5	14.87
Lechang	7.9	1415	0	359	3.4	3.3	14	13.99
Lianshan	7.6	1541	0	310	0.7	3.1	9.2	11.18
Huilai	8.7	1183	100	390	3.2	1.1	11	18.82
Dapu	9.6	1010	0	534	1.9	3.1	19.3	11.59
Heping	12.2	700	0	318	4.3	1.7	16.6	12.25
Yangshan	8.6	1094	0	180	0.6	3	14.7	16.02
Zijin	9.2	923	0	270	5.4	2.3	8	14.89
Wengyuan	7.3	1127	0	340	4.2	2.7	13.3	12.4
Lufeng	9.3	863	100	323	3.7	2.5	16.1	28.92
Xingning	8.9	864	0	377	2.4	3.5	11.6	21.06
Fengshun	9.6	762	0	544	3.4	3.2	18.3	10.07
Liannan	6.4	1123	0	230	1.8	4.2	20	15.45
Wuhua	7.4	667	0	349	2.4	3.1	6.1	11.84

Source:

1. Land area data was collected from both GSB (2005) and the Editing Committee of China Population by Township Yearbook (2002); based on this raw data, the land within 100 km of coast for all individual regions within Guangdong was calculated.

2. The calculation of land within 100 kilometers of coast was also based on The Map of Guangdong, 2006.

3. The data of distance to the core market was collected from The Map of Guangdong, 2006, People's Transportation Press (2005) and Li, et al, (1999).

4. The calculation of individual average ratios of foreign direct investment, local tax revenue and capital construction investment in total GDP for the county-level regions within Guangdong was based on the original data source from GSB (1991-2006, various pages).

5. The calculation of average percentage of illiterate people in total population aged 15 and above was based on Population Census Office of Guangdong Province (1992; 2002, various pages).

6. The data of GDP per capita 1991 was collected from GSB (1992).

Appendix 7: Administration Boundaries of Guangdong's Municipalities (31 December 2004)

City	County, County-Level City and District Placed under the City	Numbers of Townships, Towns and Ethnic Community Townships and Neighbourhoods Placed under Municipality
Guangzhou City (10 Districts & 2 County-rank Cities)	Yuexiu District,Dongshan District,Haizhu District, Liwan District, Tianhe District,Baiyun District, Huangpu District,Fangcun District,Huadu District, Panyu District,Conghua City,Zengcheng City	39 Towns,124 Neighbourhoods
Shenzhen City (6 Districts)	Futian District, Luohu District,Yantian District, Nanshan District, Bao 'an District, Longgang District,	51 Towns
Zhuhai City (3 Districts)	Xiangzhou District, Jinwan District,Doumen District,	15 Towns, 8 Neighbourhoods
Shantou City (6 Districts, 1 County	Jinping District,Longhu District,Chenghai District, Haojiang District,Chaoyang District,Chaonan District, Nan 'ao County	32 Towns, 37 Neighbourhoods
Foshan City (5 Districts)	Chancheng District, Nanhai District,Shunde District, Gaoming District, Sanshui District,	23 Towns, 18 Neighbourhoods
Shaoguan City (3 Districts,4 Counties, 1 Autonomous County & 2 County-rank Cities)	Zhenjiang District,Wujiang District, Qujiang District,Lechang City, Nanxiong City,Renhua County,Shixing County, Wengyuan County, Xinfeng County, Ruyuan Yao Ethnic Community Autonomous County	109 Towns, 8 Neighbourhoods, 1 Township, 1 Ethnic Community Township
Heyuan City (1 District & 5 Counties)	Yuancheng District, Dongyuan County,Heping County,Longchuan County, Zijin County, Lianping County	97 Towns, 4 Neighbourhoods, 1 Ethnic Community Township
Meizhou City (1 District, 6 Counties & 1 County-rank City)	Meijiang District, Xingning City,Meixian County,Pingyuan County,Jiaoling County, Dapu County, Fengshun County, Wuhua County	104 Towns, 6 Neighbourhoods
Huizhou City (2 District, 3 Counties)	Huicheng District, Huiyang District, Huidong County,Boluo County, Longmen County,	66 Towns,13 Neighbourhoods, 1 Ethnic Community Township
Shanwei City (1 District, 2 Counties & 1 County-rank City)	Urban District,Lufeng City, Haifeng County, Luhe County	42Towns,10Neighbourhoods
Dongguan City		28 Towns, 4 Neighbourhoods
Zhongshan City		19 Towns, 5 Neighbourhoods

Jiangmen City (3 Districts & 4 County-rank Cities)	Pengjiang District, Jianghai District, Xinhui District, Taishan City, Kaiping City, Heshan City, Enping City	67 Towns,17 Neighbourhoods
Yangjiang City (1 District, 2 Counties & 1 County-rank City)	Jiangcheng District,Yangchun City,Yangdong County,Yangxi County	39Towns, 11 Neighbourhoods
Zhanjiang City (4 Districts, 2 Counties & 3 County-rank	Chikan District, Xiashan District,Mazhang District, Potou District,Leizhou City,Lianjiang City, Wuchuan City,Suixi County,Xuwen County	86 Towns, 29 Neighbourhoods, 2 Townships
Maoming City (2 Districts, 1 County & 3 County-rank Cities	Maonan District, Maogang District,Xinyi City, Gaozhou City,Huazhou City, Dianbai County	88 Towns, 19 Neighbourhoods
Zhaoqing City (2 Districts, 4 Counties & 2 County-rank Cities)	Duanzhou District, Dinghu District,Sihui City,Gaoyao City, Guangning County, Deqing County, Fengkai County,Huaiji County	96 Towns, 11 Neighbourhoods,1 Ethnic Community Township
Qingyuan City (1 District, 3 Counties, 2 Autonomous Counties & 2 County-rank Cities)	Qingcheng District,Yingde City, Lianzhou City, Fogang County,Qingxin County, Lianshan County of Zhuang and Yao Ethnic Communities, Liannan County of Yao Ethnic Community, Yangshan County	77Towns, 5Neighbourhoods, 3 Ethnic Communities Townships
Chaozhou City (1 District, 2 Counties)	Xiangqiao District,Raoping County, Chaoan County	41Towns, 9 Neighbourhoods
Jieyang City (1 District, 3 Counties & 1 County-rank City)	Rongcheng District, Puning City, Jiedong County, Jiexi County, Huilai County	65 Towns, 16 Neighbourhoods, 2 Townships
Yunfu City (1 District, 3 Counties & 1 County-rank City)	Yuncheng District,Luoding City, Xinxing County, Yu 'nan County, Yun 'an County,	55 Towns, 10 Neighbourhoods
Total of Guangdong	21 prefecture-level cities, 23 county-rank cities, 41 counties, 3 autonomous counties, 54 districts under city governments, 5 townships, 7 ethnic community townships, 1,188 towns, 415 neighbourhoods	

GSB (2005)

Appendix 8: Status of Interviewees and Interview Questions

Interview Location	Interviewee Occupation	Interviewee
Guangzhou District	State-oriented Enterprise Worker	Male
Guangzhou District	State-oriented Enterprise Worker	Male
Guangzhou District	University Student	Male
Guangzhou District	University Student	Female
Guangzhou District	Private Enterprise Manager	Male
Guangzhou District	Private Enterprise Manager	Male
Guangzhou District	Retired Government Official	Female
Guangzhou District	Retired Government Official	Male
Guangzhou District	Retired State-oriented Enterprise Worker	Male
Guangzhou District	State-oriented Enterprise Worker	Female
Guangzhou District	Foreign-oriented Enterprises Employee	Female
Guangzhou District	Foreign-oriented Enterprises Employee	Male
Guangzhou District	Farmer	Male
Guangzhou District	School Teacher	Female
Guangzhou District	Government Official	Female
Meixian	School Teacher	Female
Meixian	Farmer	Male
Meixian	Farmer	Male
Meixian	Farmer	Female
Meixian	Village Head	Male
Meixian	Township Government Official	Male
Meixian	Private Enterprise Worker	Female
Meixian	Private Enterprise Owner	Male
Meixian	State-oriented Enterprise Employee	Male
Meixian	Farmer	Female
Meixian	Farmer	Male
Meixian	Private Enterprise Worker	Male
Meixian	Farmer	Male
Meixian	School Student	Female
Meixian	Farmer	Female
Wuhua	Farmer	Male
Wuhua	Farmer	Female
Wuhua	Private Enterprise Worker	Male
Wuhua	Private Enterprise Owner	Female
Wuhua	Farmer	Male
Wuhua	Farmer	Female
Wuhua	Farmer	Male
Wuhua	Village Head	Male
Wuhua	Township Government Official	Male
Wuhua	Sales Assistant in Grocery Shop	Female
Wuhua	State-oriented Enterprise Worker	Male
Wuhua	Farmer	Female
Wuhua	Village Head	Female
Wuhua	Farmer	Male
Wuhua	Farmer	Male
Guangzhou District	Vice-Governor of Guangdong	Male
Guangzhou District	Director of the Guangdong Economic, Trade and Planning Committee	Male
Guangzhou District	Vice-Director of the Guangdong Transportation Commission	Male
Guangzhou District	Director of the Guangdong Agriculture Commission	Male

Guangzhou District	Vice-Director of Yuexiu District	Male
Meixian	Party Committee Secretary of Meixian	Male
Wuhua County	Director of Wuhua County	Male
Guangzhou District	Scholar in the Social Science Academy of Guangdong	Male
Guangzhou District	Scholar at Sun Zhongshan University	Male

Interview Questions for Ordinary people (English Translation)

1) In terms of personal income, how do you rate your own living conditions in contrast to those in your neighbourhood? Please select from the following answers (Lower; similar; higher; don't know)

2) In terms of personal health, how do you rate your own living conditions in contrast to those in your neighbourhood? Please select from the following answers (Lower; similar; higher; don't know)

3) How do you judge your personal income in the area where you have been living during the reform period? Please select from the following answers (Low; middle; high; don't know)

4) During the last two decades, has your personal income been changing? Please select from the following answers (increasing; decreasing; more or less the same)

5) In your opinion, what has been the economic development in the region where you have been living since 1980? (Very quick; quick; slow; don't know)

6) Relative to the other regions in Guangdong, what is your opinion with regard to the economic growth in the region where you have been living since 1980?

7) If you think that the economic growth in your region has grown quickly during the reform period; from your point of view, what is the main cause? Please select from the following answers (geographical location; role of the state; foreign direct investment; or the other). And why?

8) If you think that the economic growth in your region has been slow during the reform period; from your point of view, what is the main cause? Please select from the following answers (geographical location; role of the state; foreign direct investment; or the other). And why?

9) Do you agree with the argument that Guangdong has been facing unbalanced regional development?

10) Do you agree with the argument that Guangdong has been facing the challenge of widening regional disparity?

11) How do you judge the regional inequality in Guangdong during the reform period? Please select from the following answers (Very serious; serious; not so serious; too small)

12) In your opinion, why do you think that Guangdong has been facing unbalanced regional development?

13) Can you just confirm that I understand your view correctly? You are suggesting …? Did I miss something you had said earlier?

14) What kind of job do you do?

15) What is your occupation?

16) In terms of all sources (e.g. salary, profit, remittance), what was the total annual income from all members of your family in 2005? Please select from the following answers (Less than 5000 *yuan*; between 5000 and 8999 *yuan*; between

9000 and 14607 *yuan*, more than 14608 *yuan*)

17) In general, how much do you receive every month after deducting all family expenses?

Interview Questions for Elite (English Translation)

In your opinion, what is the most important challenge concerning economic development in Guangdong today?

1) Do you agree with the argument that Guangdong has been facing unbalanced regional economic development between the counties located in the PRDA, Eastern, Western and Mountainous Regions?
2) How do you judge the unequal regional development in Guangdong during the reform period? Please select from the following answers (Very serious; serious; not so serious; too small)
3) What has been the main reason that some regions have grown more quickly than others within Guangdong since 1980?
4) In your opinion, what are the causes leading to the widening regional economic inequality in Guangdong during the reform period?
5) In your opinion, what are the key factors shaping the varying economic development of Guangdong's counties during the reform period? Please select from the following answers (e.g. geographical location; role of the state; foreign direct investment; or the others). And why?
6) From your point of view, how do you judge the role played by geography in shaping the widening regional disparity in Guangdong? And Why?
7) Do you believe that preferential state policies play an important role in regional development in Guangdong? And why?
8) What is the main cause of widening regional inequality in Guangdong during the reform period? And why do you think that?
9) In your opinion, relative to prosperous regions located in the PRDA, what has been the main cause of the economic backwardness of Wuhua County during the reform period?
10) In your opinion, what has been the key factor contributing to the economic preeminence of Guangzhou District since 1980?
11) Can you just confirm that I understand your view correctly? You are suggesting …? Did I miss something you had said earlier?

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