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SPATIAL INEQUALITY IN EDUCATION AND HEALTH CARE IN CHINA

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ABSTRACT

While increasing income inequality in China has been commented on and studied extensively, relatively little analysis is available on inequality in other dimensions of human development. Using data from different sources, this paper presents some basic facts on the evolution of spatial inequalities in education and healthcare in China over the long run. In the era of economic reforms, as the foundations of education and healthcare provision have changed, so has the distribution of illiteracy and infant mortality. Across provinces and within provinces, between rural and urban areas and within rural and urban areas, social inequalities have increased substantially since the reforms began.

KEYWORDS: illiteracy, infant mortality rate, spatial inequality in China, polarization

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1. Introduction

Since the start of the reforms in 1978, China has experienced unprecedented economic growth, which has led to spectacular reductions in income poverty (World Bank, 2000; Fan, Zhang, and Zhang, 2002). However, this growth has been accompanied by dramatic increases in inequality, especially in the 1990's. While increasing income inequality has been commented on and studied extensively (Lyons, 1991; Tsui, 1991; Khan et al. 1993; Hussain et al., 1994; Chen and Ravallion, 1996; Aaberge and Li, 1997; Kanbur and Zhang, 1999, 2001; Yang, 1999; Démurger *et al.*, 2002), relatively little analysis is available on inequality in other dimensions of human development. For example, West and Wong (1995) discuss fiscal decentralization and increasing regional disparities in education and health status. However, their study focuses on only two provinces, Shandong and Guangdong. This paper is a contribution to the attempts at filling this gap in our knowledge. Using data from different sources, it presents a picture of the long term evolution of spatial inequalities in education and healthcare in China.

The paper is arranged as follows. Section 2 provides an institutional and historical review of social welfare provision in rural areas and cities. Section 3 describes the spatial distribution of education and health development, respectively, using national level data that go back to the pre-reform period. Section 4 concludes, and an Appendix provides a description of the data used in the analysis.

2. Institutional Changes in Education and Healthcare Provision

Until the 1980s, China's distributional policies manifested a strong urban bias (Lin, Cai, and Li, 1996).[1] The rationing system introduced in the 1950s enabled urban residents to have access to food, housing, education, and healthcare at much lower prices. Almost all urban residents in the working age group had guaranteed jobs in the state or collectively owned firms. Because these jobs were permanent, the so called "iron rice bowl", urban unemployment was virtually nonexistent. These jobs also provided urban residents with many benefits such as free or subsidized education and healthcare. Basically, enterprises and government agencies were responsible for providing social welfare to urban residents.

Compared to the level of social expenditure in cities, rural areas received far less. Nevertheless, the government adopted an alternative strategy in rural areas to promote basic education and healthcare. For healthcare, the focus was on preventive rather than curative healthcare measures. The communes, production brigades, and production teams had authority to mobilize the masses to engage in public health and infrastructure works. With large manpower input, the government could implement various public health campaigns, such as fighting against the four pests (rats, flies, mosquitoes, and bed bugs), expanding nationwide immunization, and training indigenous rural health workers (so called "bare-foot doctors"). By the late 1970s, "bare-foot doctors" and clinics were set up in almost all the villages. As shown in Table 1, the numbers of hospital beds and healthcare personnel per thousand in rural areas rose dramatically from 0.08 and 0.95 to 1.48 and 1.81 from 1952 to 1980, respectively. In general, these public health measures

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[1] This bias still exists today, but in different forms (for example, government invests more in urban than in rural areas; universities post higher admission scores for rural students; and there are still visible and invisible restrictions on migration from rural to urban areas).

were rather successful in controlling infectious and parasitic diseases. Mortality rates specific to infectious diseases declined noticeably in the pre-reform period (Yu, 1992).

Basic education relied largely on the communes. Agricultural collectivization created a large number of "commune schools," making access to basic education much easier. As shown in Table 1, the student-teacher ratio in primary school declined from 35.6 in 1952 to 25.7 in 1980 while the ratio in secondary school decreased from 27.4 to 17.6. By 1980 the enrollment rate among rural children reached was almost 90 percent (Fan, Zhang, and Zhang, 2002).

Overall, in the planned era, although health care and school conditions for rural residents were much worse than their urban cohorts due to an urban-biased policy, basic education and preventive healthcare were widely available. By the late seventies, China's life expectancy and infant mortality rate were much higher than most developing countries, even many middle-income countries (World Bank, 2002). Despite the remarkable achievement in social equity, the collective system had well known economic drawbacks. Since the late seventies, China has implemented a series of rural and urban reforms to introduce market incentives in order to enhance economic efficiency and dynamism. In addition, the center granted local governments more fiscal responsibility to improve their incentives to develop the local economy. Consequently, the redistributive power of central government has declined. With limited help from the center and tight budget constraints, many local governments in poor regions cut spending on social development and let individuals share more healthcare and education expenses (West and Wong, 1995).

In addition to the general fiscal reforms, rural and urban areas have undergone their own reforms. Following the rural economic reform, the communes were dissolved and households became the unit of decision-making, reducing the power of villages and directly affecting the provisions of education and healthcare. Not surprisingly, many rural health clinics have disappeared since the rural reform in the 1970s. The number of hospital beds per thousand has declined from 1.50 to 1.11 from 1985 to 1998 (Table 1). To fill the vacuum, in 1984, the government authorized private medical practices in rural areas. Because private medical practitioners provide their services according to patients' ability to pay, an increasing number of people have to bear the full cost of medical care. The share of out-of-pocket expense in medical care for China as a whole increased from 16% in 1980 to 38% in 1988 to 61% in 2001 (Table 2). Table 3 shows that in 1998 the self-paid share in total health expenses was much greater for rural than for urban areas. After the reforms, most rural residents have been left out of healthcare coverage of any kind and paying for a health visit has become the norm.

Although contested elections have been introduced over the past two decades partly in attempt to improve the efficiency of public goods provision, the gains are not significant for at least two reasons (Zhang et al., 2003). First, privatization has made taxation or levies on rural enterprises more difficult. Second, in many villages, the power is not shared between the party secretary and the elected village head, limiting the impact of elections. It is likely that the increasing rural income inequality would translate into increasing health inequality, as villages do not have much fiscal power to provide public goods and service in poor areas under the current fiscal arrangement.

In cities, many people's livelihood is wrapped up with the fate of state-sector jobs. Unlike the simple objective of profit maximization in private enterprises, state owned enterprises (SOEs) have to bear multiple responsibilities of efficient production and social welfare provision (Bai *et al*., 2001). With greater integration of China into the world market, it becomes increasingly difficult for SOEs to compete with multinationals and private enterprises because of their full range of social obligations. In the initial stage, the government could afford to subsidize the SOEs through low-interest loans. But with the increasing burden of loss, government's support to SOEs has declined. Therefore, since the mid-1990s, the government has carried out ambitious reforms to reduce the noneconomic burden of SOEs by allowing bankruptcy and more open unemployment. Since then, many SOEs have laid off workers and cut health and other benefits. To provide new impetus to the SOEs, the government has launched a series of urban reforms since the late 1980s. The central theme is to transfer welfare-provision obligations such as healthcare and housing from enterprises to social insurance agencies and individuals (China Development Report, 1997). Although China has made progress in reforming the healthcare and pension system, a well-functioning social safety net is still far from in place (Liu et al., 2001). Therefore, the liberalization of the urban welfare system may have made some disadvantaged groups more vulnerable to sudden shocks such as catastrophic illness.

Similar to healthcare, both rural and urban residents are increasingly relying on themselves to pay for education. Table 4 lists the sources for education expenditure, showing that the out-of-pocket education expenses have increased significantly. The government's share in total education expenditure declined from 64.6% in 1990, when

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the data were first available, to 53.1% in 1998, while the share of tuitions and incidental fees rose from 2.3% to 12.5% in the nine-year period. With the increasing out-of-pocket expenses on education, children in the poor families may have difficulties in finishing the basic nine-year schooling, likely leading to more uneven access to education.

This completes our discussion of the institutional changes in education and health care provision in China since the start of the reform process. Sen (1992, 2000) expresses concerns about the social inequality consequences of these policy changes. To what extent did this happen? The next section looks at the evolution of inequality in health and education indicators, viewing them through the lens of spatial inequality.

3. Spatial Inequality in Education and Health over the Long Run

We are interested in the evolution of social inequality in China over the long run, comparing the planned era with the more recent era of market reforms. As noted in Kanbur and Zhang (2001), although the ideal requirement for this exercise is household level survey data stretching back over fifty years, such data is simply not available for China. Analysts focusing on interpersonal inequality as revealed by household survey data have had to analyze much shorter periods or with severely restricted regional coverage--a few years for a few provinces, and mainly in the recent period. An alternative approach, as in Kanbur and Zhang (2001), is to view inequality through the lens of spatial inequality, meaning by this variations across provinces, sub-divided by rural and urban areas. Apart from the fact that such regional inequality is interesting in its own right, the advantage of taking this perspective is that data is more readily available at the national level for much longer periods. As shown in Kanbur and Zhang

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(2001) and in Table 5, regional income inequality calculated at the provincial level with a rural-urban divide has increased. The Gini coefficient rose from 29.3 percent in 1978 to 25.6 percent in 1984 and then to 37.2 percent in 2000. The question for this paper, however, is: what has happened to social inequality? We look at the spatial inequality of education and health outcomes in turn.

3.1 Education Inequality

Focusing on the years for which census or sample survey data is publicly available at the national level, we initially arrive at rural and urban illiteracy rates for the years 1964, 1981, 1990 and 1995.[2] Using the published data at the county or district level,[3] we calculate illiteracy rates at the national level as well as their regional inequalities for these years. The upper panel of Table 6 presents the levels of illiteracy for overall, rural, and urban China. Several striking features stand out from the table. First, the illiteracy rate has declined steadily over the years, reflecting the success of nine-year compulsory education and the high primary-school enrollment rate. Second, there exist large rural-urban and gender-gaps. In 1995, the rural illiteracy rate was 78% higher than the urban illiteracy rate. The illiteracy rate among females is more than twice as high as the male illiteracy rate, suggesting a strong gender bias against girls. Moreover, it appears that the gender gap has increased between 1990 and 1995.

Table 7 further displays the spread in the illiteracy rate across rural and urban areas, with the Gini and Generalized Entropy (GE) as inequality measures. The GE

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[2] The data in 1964, 1981 and 1990 are from the census, while the information in 1995 is from a one percent population survey.
[3] County refers to rural areas while the term of district is used in cities. This forms the basis for our rural/urban classification.

family of measures is discussed further in Kanbur and Zhang (2001)—the specific member of the family used in this paper is the famous Theil measure of inequality. Inequality is calculated using the population weighted values of illiteracy for spatial units at the highest level of disaggregation for which data is available. In the top panel of Table 7, the first two columns show that the Gini and the GE at the national level declined from 1964 to 1981 and then increased from 1981 to 1995. The same pattern holds true for inequalities across rural areas, as shown in the third column for the GE measure. The fourth column shows that across urban areas inequality in illiteracy increased from 1964 to 1981, but has stabilized since then.

As is well known, the GE family of inequality measures can be decomposed into the sum of a within and a between group component, for any given partitioning of the population into mutually exclusive and exhaustive groups. The fifth and sixth columns of Table 7 present the evolution of the within and the between group components of inequality. Both components rose in the post-reform period. Using the within-inequality and between-inequality, we can calculate the polarization index following the method outlined by Zhang and Kanbur (2001).[4] As shown in the last column in Table 7, rural and urban areas became increasingly polarized from 1981 to 1995.

The above inequality analysis, based on more disaggregated data, offers a snapshot for each of four years. To check whether the findings are robust over a long continuous period, we calculate regional inequality in rural illiteracy rate from 1978 to 1998, when the data at provincial level are available in various issues of *China Rural Statistical Yearbook*. Figure 1 graphs the regional Gini coefficients of per capita income and illiteracy rate. As clearly shown in Figure 1, the regional inequality in illiteracy

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[4] The polarization index is defined as the ratio of between-inequality to within-inequality.

across rural areas has increased, consistent with the analysis based on data at the county and district level as shown in Table 7. The rural regional income inequality, measured by the Gini coefficient, increased by from 13.7 percent to 24.1 percent in the period of 1978-1998, but the Gini coefficient of rural illiteracy worsened even more rapidly, from 14.5 percent to 32.4 percent.

Figure 2 plots the evolution of regional inequality in the provision of primary and secondary education. We calculate the Gini coefficients of student/teacher ratios in the two sectors using provincial data. The inequalities in the two ratios show a similar pattern, except for the Cultural Revolution period (1966-1976) when the middle school education system was disrupted. The regional inequality in the provision of public education has increased since the late 1970s, reflecting the fiscal decentralization policy in the reform period.

3.2 Health Inequality

Similar to education inequality, we first look at the health outcomes using more disaggregated population census or survey data. The lower panel in Table 6 reports the levels of infant mortality rate (IMR). For China as a whole, IMR declined dramatically from the 1960s to 1980s and then leveled off. IMR in rural areas was significantly higher than in cities and the gap widened from 1.5 in 1981 to 2.1 in 1995. The ratio of female to male IMR increased dramatically from 0.9 to 1.3 over the same period, probably an outcome of family planning policy, as rural residents in general prefer to have boys.

Using the data set, we can further examine the regional distribution of IMR. As shown in the lower panel of Table 7, overall regional inequality increased from 1981 to

1995, so did the within-rural, within-urban, and between rural-urban inequalities. It seems that the regional variation in health outcome has enlarged over the reform period in both rural and urban areas.

To understand the driving forces behind the observed changes in health outcome, we further investigate the distribution of healthcare provision. Based on the last four columns of Table 1, we graph the urban-rural ratios of healthcare personnel and hospital beds per thousand people in Figure 3. Figure 3 shows that the density of healthcare personnel and facilities in cities has been much higher than that in rural areas. For example, in 1980, hospital beds and healthcare personnel per 1000 people in cities were 4.57 and 7.82, respectively, compared to 1.48 and 1.81 in rural areas. Moreover, as shown in Figure 3, the gap between rural and urban areas has grown. The enlarging difference in access to healthcare appears to be a contributing factor to the widening gap in IMR between rural and urban residents.

While Figure 3 provides a rural-urban comparison at the national level, Figure 4 graphs the regional distribution of the above two variables using data at the provincial level. Regional inequality declined steadily in the planned era but leveled off since the late 1970s. The picture in Figure 4 is in contrast to the increasing trend of rural-urban disparity shown in Figure 3. This is probably due to the fact that the provincial level data used in Figure 4 does not have a rural-urban divide, masking the large variation in this dimension within a province.

4. Conclusion

In this paper, we have described the institutional and historical background on the public provision of education and healthcare and examined the patterns and evolution of social inequality. In the era of market reforms, the old foundations of education and healthcare provision have eroded. First, the increasing fiscal decentralization has reduced the central government's redistributive power. Second, increasing competition has doomed SOEs, as it is difficult to serve well the dual task of profit maximizing and welfare provision. As a result, a large number of SOEs have laid off employees and reduced welfare benefits. Third, weak governance at the village level makes it difficult to finance pubic infrastructures in rural areas. Fourth, governments cannot mobilize vast manpower in public works as they did in the planned era, because labor must be adequately compensated in the market economy.

With this background, we examine the spatial patterns of social development indicators. Not surprisingly, the changing distribution in outcome of education and public health has reflected the evolution of underlying institutions in the process of economic transformation. Social inequalities in both rural and urban areas have increased since the economic reforms. In particular, the rural-urban gap is still large and increasing.

It has been argued by many observers that to ensure a long-term sustainable development, China should adopt a broad-based development strategy. A healthy and well-educated labor force is a key asset to ensuring China's success in incorporating the challenges of WTO accession. However, the increasing economic integration will greatly intensify market competition, which will likely further weaken the central government's

ability to redistribute wealth among provinces, and it will reduce the role of SOEs as social welfare providers. In addition, the increasing shocks associated with global integration may further worsen social inequality and dampen sustainable economic growth. The facts of social inequality presented in this paper call for more attention to improving the mechanism of education and healthcare provision and reforming the fiscal arrangement between local and central governments so as to ensure more equitable education and health outcomes.

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Data Appendix

Per capita expenditure, population, hospital beds, healthcare personnel, school enrollment, teacher-student ratios, and education expenditures prior to 1999 are from *Comprehensive Statistical Data and Materials on 50 Years of New China* (China State Statistical Bureau, 2000). The information on per capita expenditure and population for 1999 and 2000 are from *China Statistical Yearbook* (China State Statistical Bureau, 2000 and 2001). The healthcare coverage data in 1998 is from *China Health Yearbook 1999* (Ministry of Health, 1999) and the sources of health expenditures are *China: Long-Term Issues and Options in the Health Transition* (World Bank, 1992) and the website of Ministry of Health, http://www.moh.gov.cn/statistics/digest03/t28.htm.

The IMR and illiteracy data are compiled from published provincial and national statistical volumes of the population censuses of 1964, 1981 and 1990, and the one-percent population survey of 1995. For 1964, we only have IMR for the national level, from *China: The Health Sector* (World Bank, 1984). For 1981, 1990 and 1995, the official data report IMR at the provincial level with a rural-urban and gender disaggregation for each province. When calculating regional inequality in illiteracy, we use the population weighted IMR for provinces with a rural and urban divide. Banister and Zhang (2002) provides a more detailed discussion on the data issues related to IMR.

The illiteracy data are available for 1964, 1981, 1990 and 1995, with disaggregation down to the "county" and "district" level. The gender divide is available for 1990 and 1995 but not for 1964 and 1981. The counties correspond to the rural and the districts correspond to the urban part of the divided reported at the province level for the IMR data. When calculating regional inequality in illiteracy, we use the population

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weighted illiteracy rates for counties and districts, without a gender divide. Since the

rural-urban divide is only available at the province level for IMR, within rural and within

urban variations are much more disaggregated for illiteracy than for IMR. The rural

illiteracy data at the provincial level annually from 1978-1998 is from *China Rural

Statistical Yearbook* (China State Statistical Bureau, various issues).

Note that, according to the preface of the *1995 China 1% Population Sampling

Survey* (China State Statistical Bureau, 1997), the definition of rural counties and urban

districts in the 1995 sampling survey has changed slightly from previous census

information, so the rural urban divide in 1995 may not be strictly comparable to the

earlier years.

Table 1: Education and Healthcare in China, 1952-1998

Year	Primary school enrollment rate (%)	Primary school graduates entering secondary schools (%)	Student/teacher ratio in primary school	Student/teacher ratio in secondary school	Hospital beds per 1000 people (city)	Hospital beds per 1000 people (rural)	Healthcare personnel per 1000 people (city)	Healthcare personnel per 1000 people (rural)
1952	49.2	96.0	35.6	27.4	1.46	0.08	2.71	0.95
1957	61.7	44.2	34.1	27	2.08	0.14	3.60	1.22
1962	56.1	45.3	27.6	24.8	3.88	0.45	5.07	1.50
1965	84.7	82.5	30.1	21.2	3.78	0.51	5.38	1.46
1970	n.a.	71.2	29.1	22.4	4.03	0.85	4.71	1.22
1975	96.8	90.6	29.0	21.1	4.46	1.23	6.70	1.41
1978	95.5	87.7	28.0	20.5	4.70	1.41	7.50	1.63
1979	93.0	82.8	27.2	19.1	n.a.	n.a.	n.a.	n.a.
1980	93.9	75.9	26.6	18.5	4.57	1.48	7.82	1.81
1981	93.0	68.3	25.7	17.6	n.a.	n.a.	n.a.	n.a.
1982	93.2	66.2	25.4	17.6	n.a.	n.a.	n.a.	n.a.
1983	94.0	67.3	25.0	17.6	4.62	1.47	8.37	1.99
1984	95.3	66.2	25.2	18.4	n.a.	n.a.	n.a.	n.a.
1985	96.0	68.4	24.9	18.4	4.48	1.50	7.81	2.06
1986	96.4	69.5	24.3	18.4	4.87	1.46	8.36	2.01
1987	97.2	69.1	23.6	17.9	5.22	1.46	8.72	1.97
1988	97.2	70.4	22.8	16.7	5.56	1.41	8.98	1.92
1989	97.4	71.5	22.3	15.8	5.71	1.38	9.08	1.89
1990	97.8	74.6	21.9	15.7	5.81	1.37	9.15	1.89
1991	97.8	75.7	22.0	15.7	5.86	1.36	9.17	1.89
1992	97.2	79.7	22.1	15.9	6.02	1.33	9.34	1.86
1993	97.7	81.8	22.4	15.7	6.06	1.30	9.24	1.83
1994	98.4	86.6	22.9	16.1	6.18	1.22	9.37	1.75
1995	98.5	90.8	23.3	16.7	6.09	1.19	9.31	1.73
1996	98.8	92.6	23.7	17.2	6.08	1.16	9.24	1.71
1997	98.9	93.7	24.2	17.3	6.10	1.14	9.25	1.72
1998	98.9	94.3	24.0	17.6	6.08	1.11	9.16	1.71

Source: *Comprehensive Statistical Data and Materials on 50 Years of New China* (China State Statistical Bureau, 2000).

Table 2: Recurrent Health Expenditures by Source of Finance

Year	Per capita expenditure (1980 yuan)	Government budget (%)	Social expenditure (%)	Personal expenditure (%)
1965	4.7	28	56	16
1970	5.1	27	57	15
1975	8.6	28	55	16
1980	10.9	28	56	16
1981	12.1	27	55	18
1982	13.9	26	53	20
1983	15.8	25	51	23
1984	17.3	25	50	25
1985	19.4	23	47	29
1986	22.0	22	45	32
1987	23.4	19	46	35
1988	26.3	18	44	38
1991	37.7	23	38	39
1995	51.7	17	33	50
2000	95.5	15	24	61
2001	101.7	16	23	61

Source: The data from 1965 to 1988 are from *China: Long-Term Issues and Options in the Health Transition* (World Bank, 1992), Annex Table 9.1. Information for later years are from the website of the Ministry of Health, http://www.moh.gov.cn/statistics/digest03/t28.htm. The health expenditure data from 1991 to 2001 are converted to 1980 yuan using the national consumer price index.

Table 3: China's Healthcare Coverage in 1998 (Yuan per capita)

	Cities	Countryside	Total
Totally public paid	16.0	1.2	5.0
Labor related	22.9	0.5	6.2
Semi-labor related	5.8	0.2	1.6
Insurance	3.3	1.4	1.9
Cooperative	4.2	6.6	5.9
Self-paid	44.1	87.4	76.4
Other	3.7	2.7	2.9

Source: *China Health Yearbook 1999* (Ministry of Health, 1999), p 410.

Table 4: Sources of Education Expenditure

Year	Total education expenditure (100 million yuan)	Government budget (%)	Social expenditure (%)	Tuitions and incidentals (%)
1990	659.4	64.6	33.1	2.3
1991	731.5	62.8	34.6	2.5
1992	867.1	62.1	35.0	2.9
1993	1059.9	60.8	36.2	3.0
1994	1488.8	59.4	36.7	4.0
1995	1878.0	54.8	40.9	4.4
1996	2262.3	53.6	41.3	5.1
1997	2531.7	53.6	40.8	5.6
1998	2949.1	53.1	34.4	12.5

Source: Calculated by authors based on Table A-14 in *Comprehensive Statistical Data and Materials on 50 Years of New China* (China State Statistical Bureau, 2000), p 14.

Table 5: Regional Inequality

Year	Gini
1978	29.3
1979	28.6
1980	28.2
1981	27.0
1982	25.6
1983	25.9
1984	25.6
1985	25.8
1986	26.8
1987	27.0
1988	28.2
1989	29.7
1990	30.1
1991	30.3
1992	31.4
1993	32.2
1994	32.6
1995	33.0
1996	33.4
1997	33.9
1998	34.4
1999	36.3
2000	37.2

Note: The figures for Gini coefficients are calculated based on population weighted per capita expenditure at the provincial level with a rural-urban divide. The data sources for 1978-1998 and 1999-2000 are *Comprehensive Statistical Data and Materials on 50 Years of New China* (China State Statistical Bureau, 2000) and *China Statistical Yearbook* (China State Statistical Bureau, 2000 and 2001), respectively. See Kanbur and Zhang (2001) for details of the calculation.

Table 6: The Levels of Illiteracy Rate and Infant Mortality Rate (IMR)

	Year	National	Rural	Urban	Rural/Urban	Female	Male	Female/Male
Illiteracy rate								
	1964	50.2	52.5	29.0	1.8			
	1981	33.9	35.9	20.3	1.8			
	1990	21.2	23.4	16.7	1.4	29.7	13.3	2.2
	1995	17.9	21.8	12.2	1.8	25.5	10.3	2.5
IMR								
	1964	180.0						
	1981	26.9	37.0	24.8	1.5	25.9	27.9	0.9
	1990	29.5	32.2	19.3	1.7	31.8	27.4	1.2
	1995	39.2	44.8	21.1	2.1	45.0	33.7	1.3

Note: For data sources, see Data Appendix.

Table 7: Regional Inequality in Illiteracy Rate and Infant Mortality Rate (IMR)

	Year	National Gini	National GE	Rural GE	Urban GE	Within Rural-Urban GE	Between Rural-Urban GE	Rural-Urban Polarization (%)
Illiteracy rate								
	1964	29.7	17.5	16.6	11.5	16.3	1.1	6.7
	1981	23.1	8.5	5.9	15.5	6.9	1.6	23.2
	1990	25.1	10.7	9.3	10.9	9.6	1.1	11.5
	1995	30.8	17.0	14.2	11.1	13.3	3.6	27.1
IMR								
	1981	22.4	9.3	12.5	6.5	7.9	1.3	16.5
	1990	29.4	13.9	12.8	8.0	12.1	1.8	14.9
	1995	34.8	19.4	19.4	14.8	15.6	3.8	24.4

Note: For data sources, see Data Appendix. The GE measure is parameterized so as to make it the Theil measure of inequality. National inequality in illiteracy is calculated using population weighted illiteracy rates at the county and district levels. Rural inequality covers all the counties while urban inequality covers all the districts. The official data report IMR only at the provincial level with a rural-urban divide but does not report information at the county and district level. The rural-urban distinction at the provincial level for IMR data is consistent with the county-district classification used in the illiteracy data for each of the years covered. Note, however, that the definition of rural counties and urban districts in the 1995 sampling survey has changed slightly from previous census information, so the rural urban divide in 1995 may not be strictly comparable to the earlier years. Rural-urban polarization is defined as the ratio of Between Rural-Urban GE to Within Rural-Urban GE. For a discussion of polarization measures, see Zhang and Kanbur (2001).
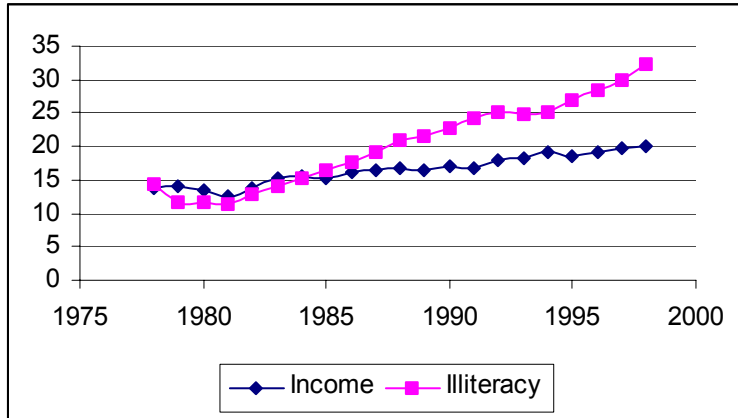
Figure 1: Twenty Years of Rural Inequality in Income and Illiteracy Rate

Note: The income inequality measure is the Gini coefficient, calculated by authors based on population weighted per capita expenditure at the provincial level in rural areas. The data are from *Comprehensive Statistical Data and Materials on 50 Years of New China* (China State Statistical Bureau, 2000). The illiteracy inequality measure is also the gini coefficient, calculated from population weighted province level data on rural illiteracy rates. The data source is *China Rural Statistical Yearbook* (China State Statistical Bureau, various issues).
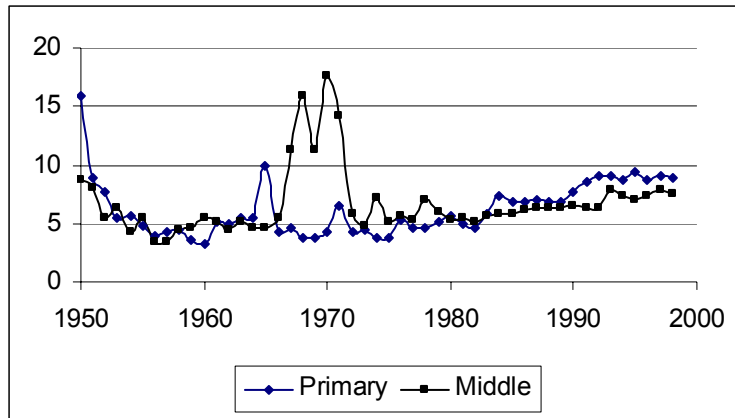
Figure 2: Regional Inequality in student/teacher ratio

Note: The figure reports regional Gini coefficients of student-teacher ratios in primary and secondary schools calculated by authors based on population weighted provincial data from *Comprehensive Statistical Data and Materials on 50 Years of New China* (China State Statistical Bureau, 2000).
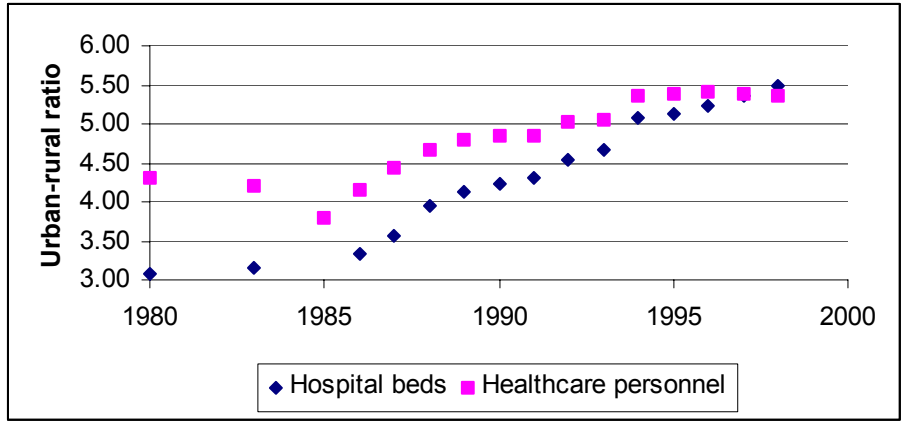
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Figure 3: Urban-Rural ratios in Hospital Beds per Thousand People and Healthcare Personnel per Thousand People

Note: The vertical axis measures the urban-rural ratios of hospital beds per thousand people and healthcare personnel per thousand people, based on data at the national level reported in the last four columns of Table 1.
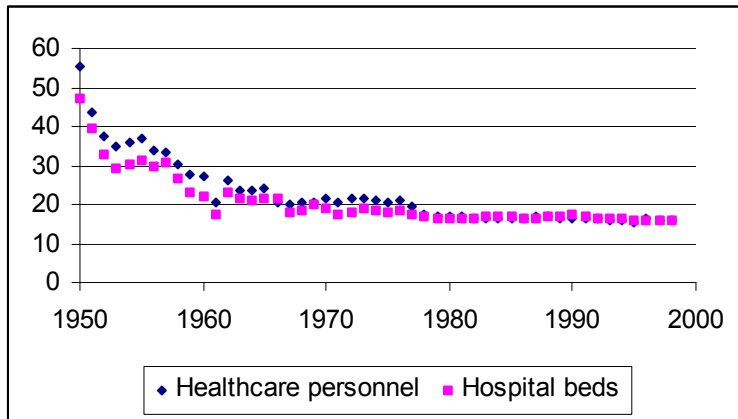
Figure 4: Regional Inequality in Healthcare

Note: The vertical axis represents regional Gini coefficients of healthcare personnel and hospital beds per thousand people calculated by authors based on provincial data from *Comprehensive Statistical Data and Materials on 50 Years of New China* (China State Statistical Bureau, 2000).