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Comparing the Evolution of Spatial Inequality in China and India: A Fifty-Year Perspective

Kiran Gajwani, Ravi Kanbur and Xiaobo Zhang

ACKNOWLEDGMENTS

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ABSTRACT

In the second half of the last century, both India and China have undergone major transitions and have moved to more liberalized economies. This paper relates the observed patterns in regional inequality to major events during this period. Because of China's institutional barriers to migration, regional inequality is much higher than in India. Also, China's decentralization and opening up are closely related to the observed regional inequality – particularly the inland-coastal disparity – since the reform period. From the Green Revolution age to the period of economic liberalization in India, the evolution of regional comparative advantage has shifted from the quality of land to the level of human capital as India integrates with the international market. Therefore, India's states have become clustered into two clubs: more educated and less educated ones.

COMPARING THE EVOLUTION OF SPATIAL INEQUALITY IN CHINA AND INDIA: A FIFTY-YEAR PERSPECTIVE

Kiran Gajwani, Ravi Kanbur and Xiaobo Zhang [1]

I.   INTRODUCTION

Constituting more than one-third of the entire world's population, and six percent world gross domestic product (GDP), China and India play a major role in the future of the world economy. This paper seeks to understand and compare regional inequality in these countries, providing useful information for helping their future path, and knowledge that can be applied to aid the development paths of other developing economies.

The most populated country and the second largest economy in the world measured in terms of purchasing power parity,[2] China has achieved tremendous successes in the last 30 years. With growth in GDP around nine percent per year since the late 1970s, China's achievements in poverty reduction have accounted for nearly three-quarters of developing countries' poverty reduction in the last 20 years (World Bank, 2005a).

Despite such successes, however, challenges still exist. According to the US$1 per day poverty line of income level, approximately 100 million Chinese are considered income poor, and tend to be concentrated in the interior regions (World Bank, 2005a). [3] Under the lower official poverty line, the total number of absolute poor has stayed stagnant around 28 million, if not increasing (CNBS, 2004). Rising inequality may play a part in explaining the recent disappointing performance in poverty reduction. Rapid

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[2] In purchasing power parity (PPP) terms, China's economy is the second largest in the world (WB 2005c).

[3] The US$1/day poverty line was established by the World Bank, and is measured in 1985 PPP prices; it was updated to US$1.08/day in 1993 prices (WB 2006a). If we consider *consumption* levels below $1/day, instead of income levels below $1/day, the number of poor in China rises to around 160 million (World Bank, 2006b).

growth does not guarantee that the poor can share a bigger pie if the distribution of wealth becomes more skewed (Ravallion and Chen, 2004). China's struggle with regional inequality is one major concern in her very impressive list of achievements in the past decades.

With a GDP in 2004 of $691 billion, India, the second most populous country, is the fourth largest economy in the world measured in purchasing parity. [4] After instituting major economic reforms in the early 1990s, India has proceeded along a path of strong economic growth, averaging 6.8 percent annual GDP growth since 1994. Yet problems of poverty prevail. Over 25 percent of the population – approximately 260-290 million people – live below the poverty line, half of whom are concentrated in three of India's poorest states: Uttar Pradesh, Bihar, and Madhya Pradesh (World Bank, 2005b). Three-quarters of the poor live in rural areas, and many empirical studies[5] have found increasing regional inequality – particularly since 1991 when the economic reforms of liberalization and deregulation were instituted – in contrast to the predictions of economic theory that regional disparity in a federal economy will decrease with globalization (Elizondo and Krugman, 1992).

Rising regional inequality will slow the trickle-down effect of growth on poverty reduction (Bhanumurthy and Mitra, 2004). From a poverty reduction point of view, it is important to understand the patterns and causes of China and India's regional inequality, as they still have the largest pockets of poor people in the world.

A comparison of regional inequality in the two countries also has merits on the academic front. According to the prevailing growth theory of convergence, differences in growth across regions should decrease over time as the rates of returns to capital and labor equalize across regions and sectors. However, results of tests of convergence have been full of debate, in large part due to difficulties in controlling for institutional and cultural differences. We can apply this notion of convergence to a comparison of a cross-

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[4] In purchasing power parity (PPP) terms, India's economy is the fourth largest in the world (WB 2005c).
[5] See, for example: Das and Barua (1996), Rao, Shand and Kalirajan (1999), Kurian (2000), Jha (2000), Roy, Venkatraman, Pradhan, and Saluja (2000).

section of countries, or to regions within a single country. Being the two most populous countries and having large regional variations, a comparison of regional inequality in China and India makes an especially interesting and important testing ground for the convergence hypothesis. What are the patterns of regional inequality over a long period of time in these two countries? What are the major driving forces behind the observed patterns of economic space? This paper aims to address these questions by linking the evolution of regional inequality with the major development strategies in the two countries.

In the case of China, Kanbur and Zhang (2005) find that regional inequality over the second half of the last century has been closely associated with major events. From the Great Famine of the 1950s through the opening up that began in the late 1980s, key peaks in inequality coincide with these major events. The core idea of this paper is that under different development strategies, a region's comparative advantage may differ. Take *openness* as an example. During the planning era, China was a closed and primarily agrarian economy. Under this scenario, a region's comparative advantage is determined by its land quality. However, after opening up, China's regional comparative advantage needs to be evaluated at a global context. With openness, the rates of returns to labor - in particular skilled labor in the coastal areas - change, as well as for land. Consequently, the coastal regions enjoy a comparative advantage in proximity to the international market and in access to a large pool of well-educated labor. Coupled with the institutional barriers to labor mobility, though abating recently, China's open door policy has been strongly associated with a widening inland-costal disparity.

The *hukou* system in China, also known as the 'household registration system,' restricts living and working only to areas where one has permission, though it has become more flexible since the 1980s. Liu (2005) shows that obtaining urban *hukou* status before age 15 leads to more time spent in education and improved labor market outcomes. Showing that one major cause of rural-urban inequality is low education and low returns-to-education in rural areas, Liu argues that the *hukou* system plays a large role in China's inequality. Wan and Zhou (2005) show that geography plays an

important but decreasing role, while capital inputs are contributing more and more to China's overall inequality. Their sample uses household data from three provinces and three villages within each province, and they follow a decomposition of inequality using Shorrocks (1999) method with regression analyses.

India has also liberalized its economy recently. In absence of restrictions on migration, does the same story unfold in India? Following up on the spirit of Kanbur and Zhang (2005) on China, this paper uses a similar data series to look at the evolution of regional inequality in India in the latter half of the twentieth century. Over this period, India has also developed a fascinating history. After achieving independence from British rule in 1947, the Indian economy has changed and developed in a multitude of ways. From the first Five-Year Plan in 1951, to the 1991 liberalization reforms, to the tenth Five-Year Plan in 2002, India has been through border wars with China and Pakistan, massively increased agricultural production through Green Revolution technologies, and embarked on an ambitious decentralization plan. While these events have surely played major roles in India's economic growth patterns and spatial income distribution, few studies have focused on the development of inequality in India over the last 50 years.

Most studies of regional inequality in India are generally centered on short time-series or a snap shot of cross-sections. Das and Barua (1996) find that inter-state inequality is rising in agriculture, services, and the unorganized sector from 1970-1992. Their analysis shows that "the Indian economy continues to develop only at the cost of raising regional disparities" (p. 385). However, their dataset extends only to 1992, failing to capture the effects of the 1991 liberalization reforms. Noorbakhsh (2003) and Jha (2004) come closest to the present analysis. Noorbakhsh (2003) conducts a spatial decomposition of India's inequality, examining the influences of rural/urban areas, poverty, literacy, human development, child labor, and child mortality, though only covering the years roughly between 1981 and 2000. He concludes that "[p]olarization seems to be taking place around the dimensions of literacy, female literacy, poverty and composite indices of human development and human poverty, though not exclusive to

these dimensions" (p. 27). Jha (2004) takes a longer view, considering inequality in India since 1951 and presenting an excellent overview of India's history covering this time period. Using data from 1957-1997, Jha focuses particularly on the effect of the 1991 liberalization reforms on poverty and inequality. Examining inequality and poverty after 1991, he finds that inequality has generally risen with India's increased liberalization. However, the analyses do not engage in spatial decomposition analyses as done presently. Also in this paper, we extend the analysis to the year 2003.

Using data from national and state/provincial levels over nearly a half century in China and India, this paper examines the patterns of regional inequality and relates them to the major stages of development. The spatial decomposition of regional inequality in China is focused along rural-urban and inland-coastal components. For India, we examine the spatial decomposition along the lines of rural-urban, inland-coastal, north-south, literacy, and land quality.

The next section walks through the major histories of the two countries over the latter half of the twentieth century. In Section III, we compare the patterns of regional inequality in India and China and explore its major causes. Section IV concludes. Data and technical details are contained in the appendix.

II.   A WALK THROUGH HISTORY

China[6]

The history of Communist China can be broken down into the following six periods: 1949–56, revolution and land reform; 1957–61, the Great Leap Forward and the Great Famine; 1962–65, post-famine recovery; 1966–78, the Cultural Revolution and transition to reform; 1979–84, rural reform; and 1985–present, decentralization, and opening up to trade and foreign direct investment (FDI).

Table 1 lists values of Gini coefficients of real per capita consumption across provinces/states over the entire range of the data, while Figure 1 illustrates that the peaks of inequality occurred during periods (ii), (iv) and (vi): the Great Famine in the late 1950s, the Cultural Revolution of the 1960s and 1970s, and booming global integration starting in the 1980s.
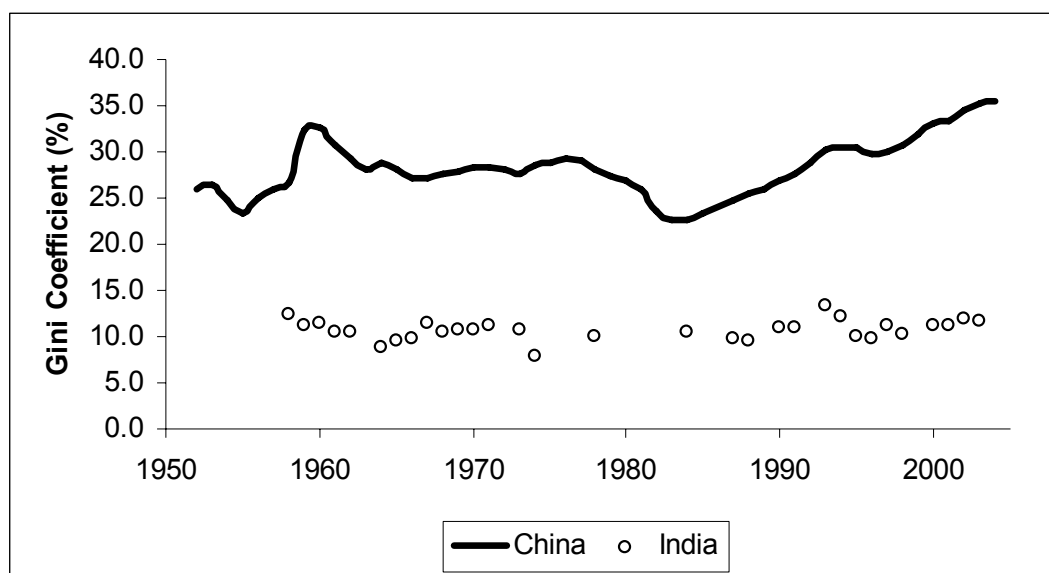
Source: The data for China are from Kanbur and Zhang (2005). The time-series for India is calculated by the authors.

Figure 1.   Regional Inequality in China and India

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[6] This section is largely from Kanbur and Zhang (2005).

Table 1.   Inequalities, Openness and Decentralization in China[1]

Year	Gini	Using GE			Openness	Decentralization
		GE	Rural-Urban	Inland-Coastal		
1952	25.9	10.9	72.3	2.4	9.5	25.9
1953	26.4	11.5	76.1	3.0	9.8	26.1
1954	24.8	10.1	79.1	2.9	9.9	24.7
1955	23.4	8.9	73.3	1.1	12.1	23.5
1956	25.1	10.3	79.6	0.7	10.6	29.6
1957	26.0	10.8	73.8	0.2	9.8	29.0
1958	26.6	11.3	80.8	0.9	9.8	55.7
1959	32.3	16.5	80.1	0.9	10.4	54.1
1960	32.5	16.8	73.7	1.8	8.8	56.7
1961	30.7	14.9	77.5	1.4	7.4	55.0
1962	29.3	13.6	73.2	0.6	7.0	38.4
1963	28.0	12.7	73.1	0.6	6.9	42.1
1964	28.7	13.6	74.5	0.8	6.7	42.9
1965	28.1	12.9	72.7	0.4	6.9	38.2
1966	27.2	12.1	73.0	0.3	6.8	36.9
1967	27.2	12.1	78.6	0.1	6.3	38.7
1968	27.7	12.4	76.3	0.4	6.3	38.7
1969	27.8	12.9	78.5	0.8	5.5	39.3
1970	28.4	13.1	75.4	0.6	5.0	41.1
1971	28.3	13.1	77.0	0.6	5.0	40.5
1972	28.0	13.1	83.2	1.0	5.8	43.7
1973	27.7	12.9	83.3	1.2	8.1	44.4
1974	28.5	13.6	83.2	1.4	10.5	49.7
1975	28.9	14.0	82.3	1.8	9.7	50.1
1976	29.2	14.6	85.6	2.2	9.6	53.2
1977	29.1	14.5	85.8	2.4	8.5	53.3
1978	28.0	13.6	89.3	2.0	9.8	52.6
1979	27.4	12.9	87.3	2.0	11.3	48.9
1980	26.8	12.0	82.7	3.5	12.6	45.7
1981	25.9	10.9	78.9	4.5	15.1	45.0
1982	23.7	9.0	77.8	5.0	14.5	47.0
1983	22.6	8.2	76.0	6.0	14.4	46.1
1984	22.6	8.1	74.6	7.3	16.7	47.5
1985	23.3	8.6	76.4	7.1	23.0	60.3
1986	24.0	9.2	75.0	7.9	25.3	62.1
1987	24.9	9.8	73.7	8.1	25.8	62.6
1988	25.5	10.3	72.5	9.0	25.6	66.1
1989	26.1	10.6	68.8	8.8	24.6	68.5
1990	26.9	11.4	70.8	6.5	29.9	67.4
1991	27.5	12.0	69.9	5.4	33.4	67.8
1992	28.9	13.0	66.2	5.8	34.2	68.7
1993	30.2	14.4	70.4	4.8	32.6	71.7
1994	30.5	14.6	65.1	5.9	43.7	69.7
1995	30.4	14.6	66.1	7.6	40.9	70.8
1996	29.7	13.9	67.0	8.2	36.1	72.9
1997	30.0	14.2	65.5	8.8	36.9	72.6
1998	30.6	14.9	66.9	9.4	34.4	71.1
1999	31.8	16.1	69.7	10.5	36.4	68.5
2000	33.0	17.4	72.1	10.3	40.1	65.3
2001	33.4	17.9	70.2	11.3	39.0	69.5
2002	34.6	19.3	70.7	11.3	43.1	69.3
2003	35.2	19.9	72.3	13.3	52.1	69.9
2004	35.4	20.3	72.0	11.6	59.9	72.3

Notes for Table 1:
1) Data prior to 1979 are adapted from Kanbur and Zhang (2005) and the later years are calculated by authors based on data from China Statistical Yearbooks (various years).
2) The *Gini* coefficient measures overall, inter-provincial inequality.
3) The *GE* measure gives overall, inter-provincial inequality. The GE measure can be decomposed into *within* and *between* group inequality: *Rural-Urban* and *Inland-Coastal* give the percentage of total inequality (measured using GE) that is due to inequality *between* each of these groups.
4) *Openness* is measured using the Trade/GDP ratio: [(exports + imports)/GDP]*100.
5) *Decentralization* is a measure of fiscal decentralization: (Total local government expenditures/Total government expenditures)*100.

From the beginning of the time-series in 1952, we can see that inequality was initially low, but began rising during the Great Leap Forward and the Great Famine, peaking in 1960. Though inequality fell in the period following the Great Famine, it rose again during the Cultural Revolution, peaking in 1976. While inequality again fell during the rural reform period, it then began to increase in the mid-1980s and has continued on an increasing path since. This steadily increasing inequality coincides precisely with China's opening up to trade and foreign direct investment, and decentralization efforts. The Gini and Generalized Entropy values in Table 1 show that inequality measures from 1994 onwards are in fact the *highest* of all preceding years.

Measures of decentralization and openness are also given in Table 1, from which we can see both values taking a leap in 1985, coinciding with the third and continual upswing in Chinese inequality. China's implementation of a more decentralized structure provided incentives for local governments to aim for strong economic growth. Due to historical disadvantages of certain regions, however, this decentralized structure led to disparate growth rates across regions and, therefore, to worsening regional inequality. Additionally, largely agricultural regions have less of a revenue base vis-à-vis those regions with industrial and more diverse economic compositions.The trend toward greater openness in trade started in the mid-1980s, after virtually no changes in activity since the 1950s, as shown from the values in Table 1. Since the 1980s, China has also become the leading recipient of FDI among all developing countries, as well as touting annual growth in exports of 11 percent on average. To facilitate fast development and integration into the world economy, China implemented many 'coastal-biased' policies – such as special tax breaks and economic zones – to encourage FDI in coastal areas. The result, while leading to very successful development in coastal regions and integration of China in the world market, has been a grossly uneven distribution of gains across provinces. An example makes this point clear: coastal Guangdong changed its labor productivity rank among China's provinces from 14th in 1978 to being one of the top provinces in 2003, while inland Sichuan moved from 15th to 23rd in the same time frame. This is merely an example of a countrywide trend among China's provinces.

India

India's recent history can be divided into three major periods: : before 1966, the pre-Green Revolution period, characterized by lower levels of GDP growth; 1966–90, higher levels of growth due in large part to introduction of Green Revolution technologies; and 1991–present, higher levels of growth due to liberalization reforms (see Jha 2004). This third period was also witness to the implementation of the 73rd Constitutional Amendment, in which India made major strides in formal decentralization at a sub-state level.[7]

Table 2 lists several measures for India's inequality, level of trade openness, and level of decentralization over almost 50 years. In the pre-1966, pre-Green Revolution years, we observe decreasing inequality. The ending of the *Zamindari* system – a feudal-type system in which peasants pay a landlord, who owns all the land, for the right to farm the land – occurred in this period immediately following India's independence (Jha, 2004). The observed falling Gini values during this time may possibly be attributed, in part, to gains to poor peasants as a result of no longer needing to pay fees to a landlord.

Use of semi-dwarf, high-yielding varieties of seeds, and the adoption of irrigation and fertilization techniques starting in 1966, led to the 'Green Revolution' that helped India become self-sufficient in grain production by the late 1970's. Some of the many results of this phenomenal agriculture achievement were a drastic drop in poverty – particularly rural poverty – improved nutrition, and higher incomes. However, due to the adoption of semi-dwarf wheat varieties in India's Northwestern states which have superior irrigation facilities, regional inequalities widened (USLOC, 2005). From Table 2, we see that in 1969, both the Gini and GE values begin an upward trend. Though briefly dipping downwards in 1974 and 1984, this upwards trend continued slowly from 1969 through to the late 1990s. The values in Table 2 indicate a jump in the inequality measures in 1997, continuing on an upward trend until the end of the data set. This jump

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[7] India's 73rd Constitutional Amendment was proposed in 1992, passed by both Houses of Parliament in 1993, and required each state to detail its plans for decentralizing powers to the three tiers of Panchayats. Most states held their first elections in 1995 and after.

in 1997 may be attributed to India's economic reforms of the 1990s, to which we now turn.

Following the Seventh Five-Year Plan (1985-1990), the 1990-1991 crisis hit, provoked by the cumulative effect of political instability at home, the collapse of India's largest trading partner – the Soviet Union – and the Gulf War that resulted in higher oil prices and affected exports to the Middle East. With growth falling, inflation soaring and a public sector deficit at nearly 10 percent of GDP, India turned to the International Monetary Fund and began major economic policy reforms, centered around liberalization (Roy, 2001). The aforementioned upswing in inequality in the mid-1990s potentially illustrates a lagged effect of increased inequality correlated with India's increased openness.

Some say liberalization first started in 1966 with a devaluation of the rupee (Das and Barua, 1996). However, despite previous attempts at greater liberalization, heavy protectionist barriers stood in place in India for decades prior to the early 1990's (IEO, 1997). In 1988, 75-80 percent of items imported to India were subject to import restrictions, as compared to less than 5 percent for Malaysia, Thailand and the Republic of Korea, 10 percent for the Philippines, and 22 percent for Indonesia (Majumdar, 2001). Complicated export procedures led India's share of world exports to decline from nearly 2 percent in 1950 to 0.5 percent in 1990. This closed economy created many problems, and resulted in the post-1991 reforms being heavily focused on liberalizing India's economy.

The liberalization brought about by these reforms significantly changed the landscape of India's economy. Theoretically, one may expect to see decreasing inequality as a country becomes more open and liberal with trade. However, Ravallion (2003) reviews the literature on globalization and inequality, showing that empirical studies provide an ambiguous answer to what is the effect of increased liberalization on inequality. The upward swing in inequality illustrated in Figure 1 shows the coinciding of liberalization policies and increased inequality in India.

Table 2.   Inequalities, Openness and Decentralization in India[1]

Year	Gini (nominal)	Gini (real)	Using GE						Openness	Decentralization
			GE (real)	Rural-Urban	Inland-Coast	North-South	High-Low Literacy	High-Low Irrigation		
1958	12.1	11.7	2.1	43.0	2.4	1.7	5.1	10.8	0.7	
1959	12.7	10.7	1.9	35.1	8.2	8.8	3.9	11.3	0.8	
1960	11.8	10.8	1.9	40.2	1.2	2.2	5.2	18.9	0.8	47.9
1961	11.8	10.1	1.6	40.6	2.7	2.2	6.5	12.1	0.8	47.2
1962	10.9	9.8	1.5	51.0	0.0	0.0	13.7	15.0	0.8	48.1
1964	10.0	8.4	1.2	67.7	0.1	0.1	10.3	19.2	0.8	50.0
1965	9.0	9.5	1.5	49.3	2.8	0.1	2.1	19.7	0.8	46.4
1966	8.5	9.8	1.6	42.3	5.6	3.0	0.1	15.7	1.2	45.4
1967	9.4	11.4	2.1	44.7	6.1	5.0	0.6	13.7	1.2	46.4
1968	8.8	10.5	1.8	53.5	6.3	6.8	0.3	15.6	1.1	46.1
1969	10.5	10.7	1.9	52.4	0.4	0.0	6.9	15.7	1.0	45.5
1970	10.3	10.6	1.9	57.8	0.4	0.1	5.0	15.6	1.0	48.6
1971	11.1	11.3	2.0	64.2	0.0	0.4	9.4	15.0	1.0	49.9
1973	11.3	10.8	2.0	51.1	0.4	0.1	9.9	13.6	1.4	49.9
1974	8.6	8.0	1.1	53.2	0.8	0.0	6.3	19.3	2.1	48.3
1978	12.3	10.1	1.6	37.5	0.0	2.5	7.6	12.1	2.7	48.6
1984	11.5	10.5	1.8	61.4	6.7	10.7	21.7	12.8	5.2	47.7
1987	13.2	9.8	1.5	68.0	3.4	4.7	15.3	11.1	5.8	46.0
1988	12.6	9.6	1.5	68.7	3.4	6.4	15.9	9.4	6.6	45.1
1990	13.6	10.9	1.9	68.7	1.1	2.6	10.4	8.3	9.4	46.7
1991	13.9	10.9	1.9	71.1	1.5	2.2	11.4	12.0	11.1	45.9
1993	14.5	13.4	2.8	64.9	6.5	6.9	17.8	10.9	15.7	45.2
1994	14.5	12.2	2.4	66.6	5.1	8.0	18.2	9.4	17.6	47.9
1995	14.7	9.8	1.7	60.1	4.7	13.0	15.8	7.6	21.3	47.2
1996	14.7	9.7	1.6	72.6	2.8	7.7	12.2	11.0	23.6	48.1
1997	16.1	11.1	2.0	60.4	6.4	14.7	19.0	6.0	24.9	50.0
1998	17.6	10.2	1.7	67.3	5.5	9.5	15.6	11.4	26.7	46.4
2000	16.9	11.2	2.0	67.8	5.1	10.9	22.2	9.8	32.1	45.4
2001	18.2	10.8	1.8	69.8	12.1	17.8	24.8	9.9	32.0	46.4
2002	19.7	11.8	2.2	74.4	10.2	15.6	20.5	10.8	35.7	46.1
2003	19.0	11.4	2.1	67.6	9.7	15.9	23.3	7.9	38.2	45.5

Notes for Table 2:

1) The years are not continuous because in some years the consumption expenditure data are not available.

2) The *Gini* coefficient measures overall, inter-state inequality.

3) The *GE* measure gives overall, inter-state inequality. The GE measure can be decomposed into *within* and *between* group inequality: *Rural-Urban*, *Inland-Coastal*, *North-South*, *High-Low Literacy*, and *High-Low Irrigation* give the percentage of total inequality (measured using GE) that is due to inequality *between* each of these groups.

4) *Openness* is measured using the Trade/GDP ratio: [(exports + imports)/GDP]*100.

5) *Decentralization* is a measure of fiscal decentralization: (Total state government expenditures/Total central and state government expenditures)*100.

Decentralization was India's other major policy implemented in the 1990s. The enactment of the 73rd Amendment to the Constitution was a major step towards strengthening local governance in India, giving *Panchayats Raj Institutions* (PRIs) constitutional status by specifying a three-tier structure of Panchayats and bestowing upon them decision-making power in 29 areas. *'Panchayats'* - meaning 'village councils' and requiring a minimum of five members elected every five years ("panch" means "five") - have been present in Indian society for centuries and traditionally served as the village governments (PCGI, 2001; Montes, 2002). Currently, India has about 500 districts, 6000 blocks and 230,000 village Panchayats.[8] While the creation of three levels of PRIs was mandatory for all states meeting certain requirements, each state can exercise discretion in choosing which areas to assign to the PRIs, as well as how the PRIs will be funded.

Developing a theoretical framework, Bardhan & Mookherjee (2000) examine the role of *decentralization* on anti-poverty program delivery and, subsequently, inter-regional equality. Their model illustrates a potential for increased political capture in poorer regions, resulting in decentralization leading to greater inequality. Preliminary work by Gajwani (2004) finds empirical support for this claim, showing significantly less gain from decentralization for poorer states vis-à-vis wealthier states.

To the extent that decentralization can lead to increases in a country's openness[9], the effects of China's and India's decentralization on inequality may be two-fold. If openness actually leads to increases in inequality, and decentralization alone may be expected to lead to increases in inequality (as per Bardhan and Mookherjee 2000) *and* increases in openness, the *overall* effect of decentralization may lead to greatly worsening inequality.

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[8] See Mahal, Srivastava and Sanan (2000) for a detailed description of functions, duties, et cetera of each level of each state's Panchayats.
[9] Alesina and Spolaore (1997) present a theoretical argument of a positive openness-decentralization link, demonstrated empirically by Alesina, Spolaore and Wacziarg (1997) and Gajwani (2004). Garrett and Rodden (2001) find support for a negative link.

III.   PATTERNS AND CORRELATES - COMPARING CHINA AND INDIA

Having briefly presented the relevant history of China and India since the mid-twentieth century, this section compares the patterns of regional inequality and relates them to each country's major events. Table 1 reports two commonly used inequality measures: the Gini coefficient and GE index when $c=0$,[10] based on real expenditures in China. In addition, rural-urban and inland-coastal polarization measures are listed, which equal the percentage of between-group inequality in overall GE. Concerning the discrepancy between nominal and real inequality (Milanovic, 2005), we present both nominal and real Gini coefficients for India in Table 2. Figure 1 plots the real regional Gini coefficient in China, and the nominal and real regional Gini coefficients in India.

Several findings are apparent from the comparison in Figure 1. First, in terms of levels, China's regional inequality has been consistently higher than India's. The degree of restrictions on migration might be a key reason for the observed pattern. Fully removing the institutional barriers to migration in China is a slow process, while India has never created institutional barriers to prevent rural people from migrating to cities.

Second, nominal and real inequalities follow each other quite well until 1994. From 1994 onwards, they diverge, with real inequality levels consistently lower than nominal values. However, from the year 2000 onwards, they move in the same direction, albeit with a gap in between. Considering the heated debate on the comparability problem between the 55th round (1999/2000) of the NSS survey and previous surveys (Deaton and Kozel, 2005), it is necessary to check whether the discrepancy is due to a comparability problem or our adjustment of the price index. Table 3 compares Gini coefficients based on five different sets of expenditures. The second and third columns are the nominal and real inequality measures reported in Table 2. The figures in the fourth and fifth columns are based on 'inequality adjusted' and 'inequality and inflation

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[10] c is a parameter defined in GE measures of inequality. It represents the weight given to differences in incomes at different parts of the income distribution, and can take on any value. A value of $c=0$ means differences in incomes in the lower tail of the income distribution are given more weight than differences between incomes in the upper tail of the distribution.

adjusted' expenditures from the *National Human Development Report 2001* (PCGI, 2002). Kijima and Lanjouw (2003) make a concerted effort to adjust the 1999/00 survey to restore comparability with previous surveys. The last column is calculated based on their adjusted expenditures. However, they do not report the data in Jammu and Kashmir which is included in the calculations in other columns.

Table 3.   Gini Coefficients in India based on Nominal and Real Consumption Expenditures

Year	Nominal	GKZ adjusted	NHDR – inequality adjusted	NHDR - inequality and inflation adjusted	KL
1984	11.5	10.5	10.7	10.7	
1994	14.5	12.2	13.3	10.4	
2000	16.8	11.2	14.9	11.9	8.9

Note: The figures are calculated by the authors based on unadjusted and adjusted per capita expenditure data. The nominal expenditures are those reported directly in the NSS surveys. Özler, Datt, and Ravallion (1996) have made every effort to adjust the expenditure data for the period of 1958 to 1993. We expand their series by adjusting the expenditures using the CPI data from the Indian Labour Journal since then. The National Human Development Report 2001 (PCGI, 2002) also reports the 'inequality adjusted' and 'inequality and inflation adjusted' expenditures at the state level with a rural-urban breakdown. Kijima and Lanjouw (2003) adjust the 2000 NSSO data to make it more comparable with previous NSSO rounds of household survey data. However, they do not report the data in Jammu and Kashmir. Therefore, the Gini coefficient for the last column is based on 15 states as opposed to 16 states in other columns.

All of the inequality measures based on adjusted expenditures are greater than the nominal measures. In terms of magnitude, the GKZ adjusted values are closest to the NHDR inequality and inflation adjusted values. The Gini coefficient based on the adjusted expenditures by Kijima and Lanjouw (2003) is 8.9, lower than any other estimation. The comparison reinforces Milanovic's (2005) observation about the existence of a discrepancy. However, while we find that the nominal inequality is lower than real inequality for per capita GDP, Milanovic's finding is of higher nominal inequality. But because the GDP data do not have a rural and urban divide, the two findings are not totally comparable. Therefore, whether the nominal or real expenditures/GDP are more accurate for measuring inequality remains an open question. To maintain consistency with the analysis of China, we use real inequality measures for India throughout the remaining analysis.

Third, patterns of regional inequality in China are more variable than in India, particularly before 1978. The second half of the twentieth century witnessed the Communist Revolution, the Great Leap Forward, the Great Famine, the Cultural Revolution, and the economic reforms in China, with three peaks of inequality coinciding with these major events. India, being a democratic regime, has not undergone such extreme events as in China, therefore exhibiting a smoother pattern in regional inequality during this period.

Fourth, the acceleration of regional inequality coincides with the timing of economic liberalization in the two countries. China's opening up started after the success of rural reforms in the mid-1980s, while India's economic liberalization has sped up after 1991. This result reinforces the findings by Milanovic (2005), which are based on regional GDP data.

Next we look at the components of between-group inequality along different dimensions. Following the policy debate in China, Table 1 reports rural-urban and inland-coastal polarizations: the ratio of between-group inequality to total inequality as defined in Appendix I. In India, the debate on inland-coastal disparity is not as pronounced as in China. A more diversified classification, such as north-south, high literacy and low literacy states, has appeared in the policy arena. Therefore, Table 2 presents decompositions along more dimensions than in China.[11]

Figure 2 further plots rural-urban polarization indices in China and India over a long time period. Before the early 1980s, China's rural-urban polarization was consistently higher than that of India. In the 1950s, in order to carry out the heavy-industry development strategy, China implemented a strict *Hukou* system to limit migration, creating an enormous rural-urban gap; China's rural-urban gap is one of the highest in the world (Eastwood and Lipton, 2000). With the success of rural reforms from the late 1970s to the middle 1980s, farmers' incomes significantly increased. Therefore

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[11] Although there are some discrepancies in nominal and real inequality measures, the decomposition analyses based on nominal and real expenditure give rather consistent findings. To save pages, we report only decompositions based on real expenditures. The results for nominal ones are available upon request.

the gap has narrowed and leveled off at around 60 since then. During almost the same period, India started the reform process and the rural-urban inequality rose to a level similar to China's.[12]
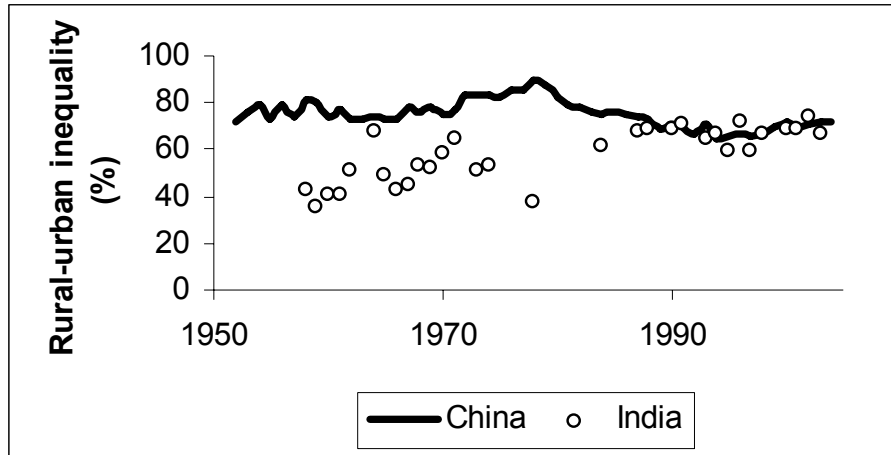

Figure 2.   Rural-Urban Inequality in India and China

Fiscal decentralization and trade liberalization are the two most important aspects of the economic liberalization policies in the two countries over the past two decades. We employ two policy variables – the degree of fiscal decentralization and the degree of openness – to examine their relationship with the patterns of regional inequality. Figures 3 and 4 graph the evolution of decentralization and regional inequality in China and India. Both figures show a pattern of co-movement between fiscal decentralization and regional inequality.[13] It seems that greater decentralization increases regional inequality during the economic transition from a planned economy to a market economy. Under a central planning system, the central government has large powers to allocate and utilize financial revenues to achieve the goal of equity at the expense of efficiency.   With economic reforms, the central government has granted local governments more autonomy in allocating their resources and more responsibilities, but perhaps at the cost of equity.

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[12] The polarization measures does not show much difference between the two countries in the later years, although China's rural-urban gap in terms of mean expenditures in rural and urban areas is much higher. The reason is that China's within-rural and within-urban inequalities are also much larger. It should be aware that the polarization measure is defined as the ratio of mean difference to overall inequality.

[13] Due to data limitations, the fiscal decentralization variable starts only from 1970.

When a spatially large country opens up, certain regions with geographic advantages will benefit more from easy access to the international market. In China's case, the coastal region has attracted most of the FDI (Zhang and Zhang, 2003). In India, the policy debate has been mainly focused on the north and south. Figures 5 and 6 illustrate the correlates of openness and inland-coastal inequality in China and India, respectively.[14] The correlation between openness and inland-coastal inequality in China appears to be strong. Both series were stagnant through the early 1980s and then took off. The relationship is less obvious in India's case. India's trade patterns are different from China's, in that India's service sector plays a larger role than the manufacturing sector. In a country dominated by trade in manufactured goods, such as China, nearness to a port becomes a critical factor. However, in countries with intensive trade in the service sector, the physical geographic requirement may become less important than the soft human capital, as may be the case in India.
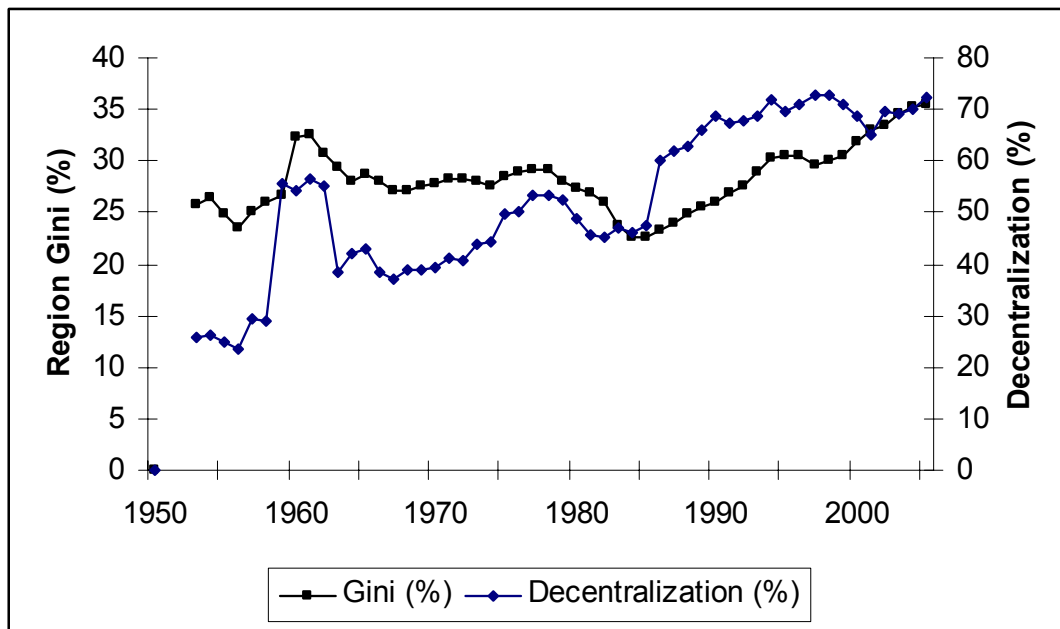
Source: Caculation by authors.

Figure 3.   **Decentralization and Regional Inequality in China**

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[14] The coastal states include Andhra Pradesh, Gujarat, Maharashtra, Karnataka, Kerala, Orissa, Tamil Nadu, and West Bengal.
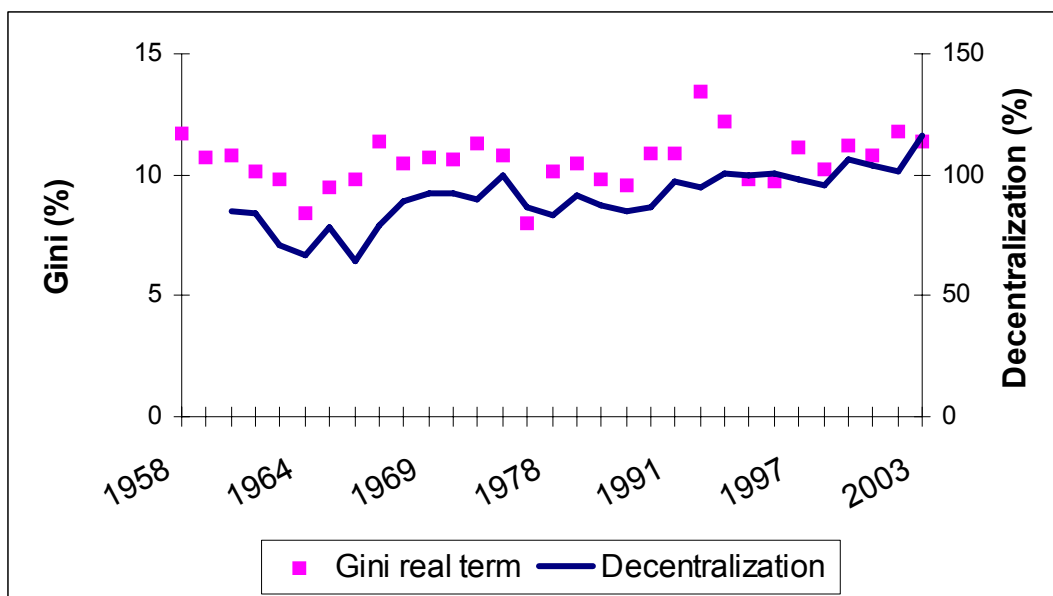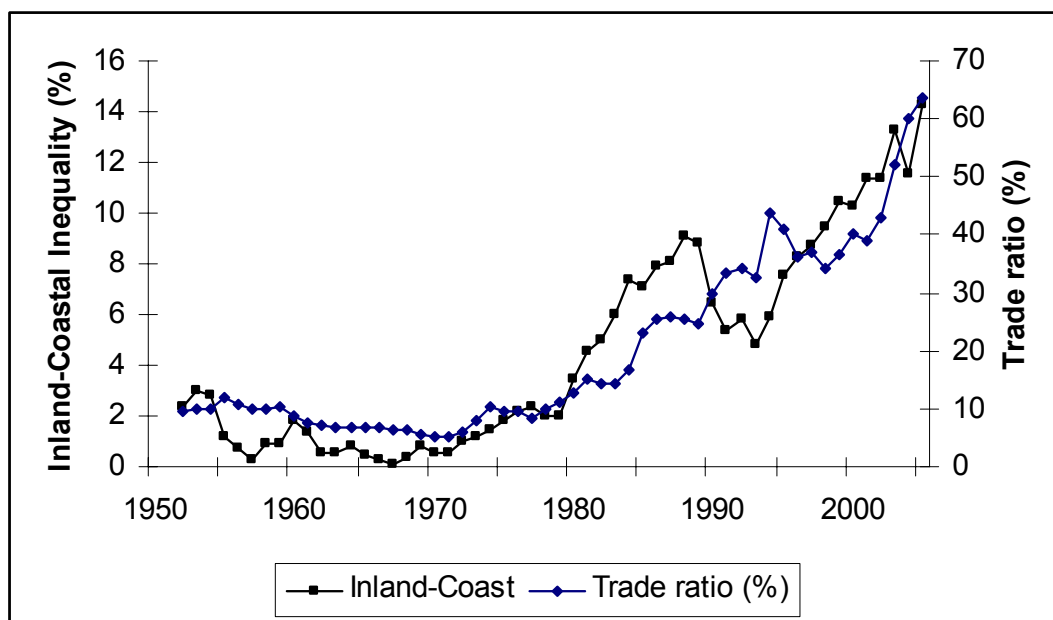
Figure 4.   Decentralization and Regional Inequality in India

Source: Calculations by authors.

Figure 5.   Openness and Inland-Coastal Inequality in China

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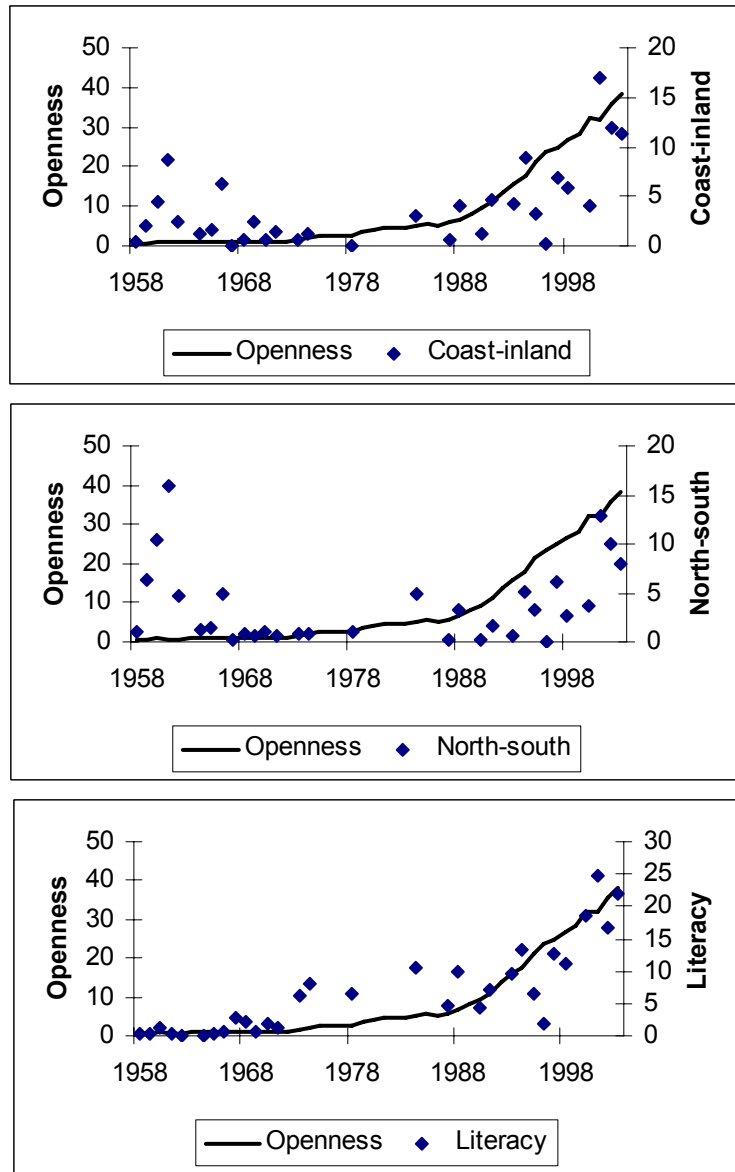
Figure 6.   Openness and Polarization along Different Dimensions in India

In Figure 6, we also present openness and north-south inequality in India.[15] The pattern is similar to the inland-coastal inequality. The widening polarization between the south and the north since the early 1990s may be due to differences in initial education levels: the literacy rate in the south was 54 percent compared to 39 percent in the north in

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[15] The southern states include Andhra Pradesh, Gujarat, Maharashtra, Karnataka, Kerala, and Tamil Nadu.

1981.[16]   The southern people, being more educated, are better placed to exploit new economic opportunities in the wake of globalization. When decomposing inequality into two groups based on whether the literacy level is above or below the national average, it appears the correlation between literacy polarization and openness is stronger that the inland-coastal and north-south polarizations (Figure 6).[17]

During the Green Revolution era, land quality may have been a more important factor in determining a region's comparative advantage, but in an increasingly integrated world, the rate of returns to education in India may have risen. To test this idea, we further classify Indian states into those with a value below the Indian average and those above based on the ratio of irrigated land in total arable land in 1970.[18] Figure 7 presents the polarization measures for literacy and irrigated land. In general, land quality plays a more dominant role than literacy in affecting the overall regional inequality prior to the mid-1980s: the ending of the Green Revolution period. However, literacy has since become a more prominent divide. This finding is consistent with Noorbakhsh (2003) that polarization has primarily taken place in the dimension of literacy since the 1980s.

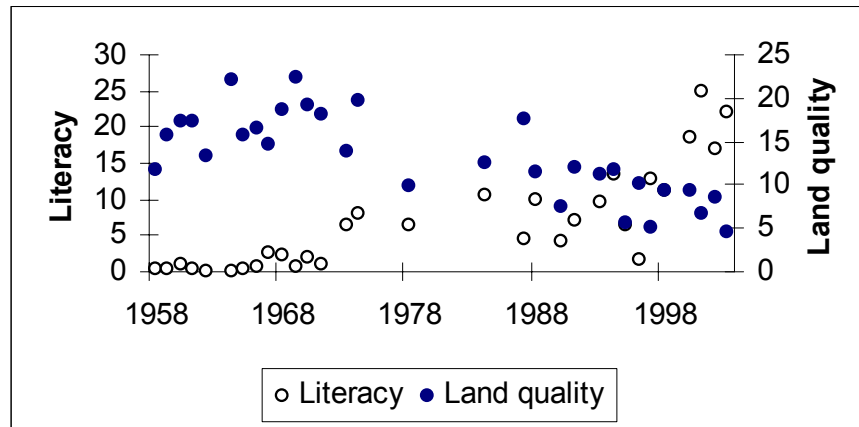**Figure 7.   The Contributions of Literacy and Land Quality Inequalities
to Overall Regional Inequality**

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[16] Calculations done by the authors based on literacy data at the state level from *National Human Development Report 2001* (PCGI, 2002).
[17] The literacy data is for 1981 and available from *National Human Development Report 2001* (PCGI, 2002).
[18] These are the earliest data at the state level that we can find.

IV. CONCLUSION

This study examines patterns of regional inequality and tries to understand the driving forces behind its changes in China and India, using data covering most of the latter half of the twentieth century. We find that the evolution of inequality matches different political-economic periods in history.

By decomposing inequality into components due to inequality between rural-urban, inland-coastal, northern-southern, high-low literacy, and high-low irrigation areas, we see a shift in the contributions to China's and India's inequality. Disparities between rural and urban areas are accounting for a decreasing share of provincial inequality in China, while the inland-coastal divide is playing an increasingly larger role. The rapid increase in China's inland-coastal disparities in the 1980s and 1990s is correlated with the increasing openness and decentralization reforms of that period. In India, along with the transition from the Green Revolution to economic liberalization, the determinants of regional comparative advantage have also shifted from the quality of land to the level of human capital, thereby defining the landscape of regional inequality along different dimensions. Therefore, India's states have become clustered into two clubs: more educated and less educated ones.

The empirical findings are also relevant to the ongoing debate on globalization's effects on regional inequality in developing countries. Convergence or divergence of a nation's economy is dependent upon not only its domestic polices but also on its openness. Our results here show that openness has lead to changes and increases in regional inequality via providing more favorable conditions for growth for coastal and better-educated regions. The implications for policy are a need to pay careful attention to those regions which are less able to take advantage of gains from openness. In China, this refers to inland regions, while in India this means less educated regions.

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APPENDIX – DATA AND MEASURES

The China Data

All data and calculations are shown in Table 1. GDP values over the entire period 1952-2000 come from the *China Statistical Yearbook* (2001). The per capita consumption data (at the provincial level) from 1952 to 1998 come from *Comprehensive Statistical Data and Materials on 50 Years of New China* (CNBS 1999), while various issues of the *China Statistical Yearbook* provide the consumption data for later years. The consumption expenditures are comparable across years. For details on the construction of the data series, see Kanbur and Zhang (2005, Data Appendix).

Population data were used as weights in order to calculate the inequality measures. Data on total and rural population from 1952 to 1977 come from *Comprehensive Statistical Data and Materials on 50 Years of New China* (CNSB 1999) and *Regional Historical Statistical Materials Compilation* (*1949–1989*) (CNSB 1989). Data of total and rural population from 1978 to 1998 are from *Comprehensive Agricultural Statistical Data and Materials on 50 Years of New China* (CNSB 2000). Values for total and rural population after 1998 come from *China Statistical Yearbooks* and *China Agricultural Statistical Yearbooks* (CNSB 1999-2005).

Decentralization is approximated as the ratio of local to total government expenditures, representing an estimate of *fiscal* decentralization.[19] The 1952 data come from *Comprehensive Statistical Data and Materials on 50 Years of New China* (CNSB 1999), while the 1953–2000 data are available in the 2001 edition of the *China Statistical Yearbook* (CNSB 2001). Data after 2000 are from the 2006 edition of *China Statistical Yearbook* (CNSB 2006).

Measuring China's openness to trade was done via the commonly used Trade/GDP ratio. Data on total exports and imports from 1952-1998 come from

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[19] In the literature, three broad types of decentralization are generally referred to: *administrative, fiscal* and *political* decentralization. See, for example, von Braun and Grote (2002) and Litvack and Seddon (2000) for an in-depth discussion of each type.

Comprehensive Statistical Data and Materials on 50 Years of New China, while values for 1999-2004 are found in the 2006 edition of *China Statistical Yearbook* (CNSB 2006).

The India Data

All data and calculations are presented in Table 2. GDP data for 1957-2003 come from the *Handbook of Statistics on Indian Economy* (2005, Table 2), available from the Reserve Bank of India website (http://www.rbi.org.in). The population data – used for weighting the inequality measures – come from the Census of India publications for every ten-year interval from 1951-2001. Values in-between each interval are interpolated by assuming constant growth in each of the nine intervening years.

It has been noted in the literature (Milanovic, 2005) that inequality measures based on *real* and *nominal* expenditures, in particular over a long time period, may result in discrepancies. By comparing inequality measures based on nominal and real per capita expenditures in India, Milanovic (2005) finds that the real-based regional inequality is higher than that calculated from nominal GDP. Therefore, we consider both nominal and real expenditures at the state level for India. There are 16 states in our sample. With rural and urban components for each state, we have 32 observations per year for 31 years from 1957 to 2003. Several missing values are interpolated to ensure each year has the same number of states.

We obtained India's nominal per-capita monthly expenditure data from Özler, Datt, and Ravallion (1996) and the *National Sample Survey Organization* (NSSO) for the entire 1957-2003 time series (http://mospi.nic.in/mospi_nsso_rept_pubn.htm). These expenditure data come from the NSSO household surveys and are presented at the state level, and are available for most of the years from 1957-2003, dependent upon the schedule of the NSSO. The data for the period of 1957-1994 are obtained from the World Bank's *A Database on Poverty and Growth in India* (Özler, Datt, and Ravallion, 1996). Summary reports can be downloaded directly from the NSSO website, where we obtained the expenditure data for the years of the survey between 1995-2003.

For measures of real expenditures, we use nominal expenditures and state-level Consumer Price Index (CPI) measures for rural and urban areas; the CPI for Agricultural Laborers (CPIAL) is used to deflate expenditures in rural areas, while the CPI for Industrial Workers (CPIIW) is used for urban expenditures. These price indices data come from Özler, Datt, and Ravallion (1996) for the years in between 1957-1994, and from the *Indian Labour Journal* for 1995-2003.

India's fiscal decentralization is measured as the ratio of total state expenditures to central government expenditures. Due to difficulty in obtaining data before 1960, our decentralization variable is constructed for the years 1960-2003. From 1970 onwards, all expenditure data are available from the on-line database *Indiastat* (indiastat.com). Data from 1960-1969 were obtained from the Ministry of Finance *Indian Public Finance Statistics* publication, available in the National Institute of Public Finance and Policy Library in New Delhi, India.

The Trade/GDP ratio was again used to measure India's openness to trade. Data on total exports and imports for the entire 1952-2003 range were obtained from the International Monetary Fund's *International Finance Statistics* online database (http://ifs.apdi.net/imf/about.asp).

The state-level irrigation data are from Fan, Hazell and Thorat (1999) and the state-level literacy data are from *National Human Development Report 2001* (PCGI, 2002).

Measures

We use per capita consumption expenditure data at the provincial/state level with a rural and urban divide over a long time period: the China data cover 1952-2000, while the India data cover most of the years from 1957-2003. Therefore, we are measuring regional inequality by holding all the observations the same within each unit.

Applying population weights to data on per capita consumption/expenditure, we obtain a measure of real per-capita consumption/expenditures.[20]   Using all of the information gathered, we construct two measures of inequality: (i) the standard Gini coefficient of inequality and (ii) a measure from the decomposable generalized entropy class (GE) of inequality measures (Shorrocks, 1980, 1984).[21]   The benefit of using this latter measure is that it is *additively decomposable*, allowing inequality across groups to be broken down into *within-group* inequality and *between-group* inequality.

A member of the decomposable GE class of inequality measures is defined as:

$$
I(y)= \left\{ \begin{array}{ll} & c \neq 0,1 \\ & c = 1 \ . \\ & c = 0 \end{array} \right.
$$

(1)

In the above equation, y_i is the ith income measured in local currency unit, μ is the total sample mean, $f(y_i)$ is the population share of y_i in the total population, and n is total population. For parameter c less than 2, the measure is transfer sensitive, in the sense that it is more sensitive to transfers at the bottom end of the income distribution than those at the top. The key feature of the GE measure is that it is additively decomposable. For K exogenously given, mutually exclusive and exhaustive, groups indexed by g:

$$

$$

(2)

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[20] Owing to data availability, we use per capita *consumption* measures for China and per capita *expenditure* measures for India.
[21] Details of calculations using this measure can be found in Kanbur and Zhang (2005).

Where

$$c \neq 0,1$$

$$\square \quad c = 1 \quad .$$

$$c = 0$$

In equation 2, I_g is inequality in the gth group, μ_g is the mean of the gth group and e_g is a vector of 1's of length n_g, where n_g is the population of the gth group. If n is the total population of all groups, then $f_g = n_g/n$ represents the share of the gth group's population in the total population. The first term on the right hand side of (2) represents the within-group inequality. The second term is the between group, or inter-group, component of total inequality. For simplicity, we present results in this paper only for c = 0. The within-group inequality part in (2) represents the spread of the distributions in the subgroups; the between-group inequality indicates the distance between the group means. Following Zhang and Kanbur (2001), we define the ratio of the between-group inequality in total inequality as a polarization index. In other words, it measures the contribution of the between-group inequality.

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