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## Economic Growth and Regional Inequality in India

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**Abstract**

Is regional inequality increasing or decreasing in India? This paper examines trends in regional inequality, i.e., between states and between rural and urban areas. In addition to income and consumption inequality, other indicators of development such as education and health are also considered. Consistent with previous studies, inequality of average incomes and consumption between urban and rural areas and between states has been increasing in recent years. This mainly results from relatively rapid income growth in the top deciles of both rural and (especially) urban sectors. At the same time, persons in the lower deciles have continued to make modest gains. As a result poverty and infant mortality rates continue to decline in both rural and urban sectors, and literacy continues to increase. Indeed, urban-rural gaps in most of the indicators relevant to the poor are shrinking, and the states with the worst initial conditions have made the most progress, especially when measured over longer periods of time. Thus, while inequality among individuals is recently on the rise, most indicators of regional inequality among the poor suggest movement toward convergence.

## I. Introduction

A number of studies have documented the rise in income and consumption inequality among individuals in India, especially in the years since the reforms in the early 1990s (Deaton and Dreze, 2002, Gajwani et al., 2006, Jha, 2004). These studies have also shown that state-level *average* incomes are diverging and that the urban-rural gap is increasing. The purpose of this paper is to focus on indicators that are particularly relevant to the poor and over a longer time frame. As is already known, all-India poverty rates have continued to decline (Deaton and Dreze, 2002, NSSO, 2006, Chen and Ravallion, 2008). What is less well known is that the greatest reductions in both rural and urban poverty have occurred in the poorest states, and the urban-rural gap in poverty rates has declined, albeit modestly. Trends in literacy rates are similar: The urban-rural gap is declining, and the greatest increases in both rural and urban literacy have occurred in the states which began with the lowest rates.<sup>1</sup> Infant mortality rates have declined by almost half since the early 1960's, and the states with the highest rates have seen the largest declines. One reason is the sharp increase in access to clean water, which doubled in rural areas and thus reduced the urban-rural gap. Increases in access to clean water in both urban and rural areas have been the greatest in the states which began with the least access. Thus, indicators of development for the poor show substantial progress, and urban-rural gaps and interstate differences have generally been declining.<sup>2</sup>

Can this picture of continued progress for the poor and declining regional inequality be reconciled with previous findings of increasing inequality in India? The answer is “yes,” and the reconciliation involves two parts. First, some studies have focused on the relatively few years since the reforms of the early 1990s. For example, Deaton and Dreze (2002) focus their discussion of growing regional inequality on the seven years from 1993-94 to 1999-

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<sup>1</sup> The male-female gap in literacy rates has declined only modestly, however.

<sup>2</sup> The title of Kurian's (2000) paper, “Widening Regional Disparities in India,” would seem to suggest otherwise. However, the paper focuses on existing disparities – which are indeed “wide” - rather than their changes over time.

2000, reflecting the data available at the time of writing and seeking to specifically address the effects of the reforms. This paper takes a longer view, examining trends extending further back in time – in some cases to the early 1960s. When viewed in this longer time frame, a pattern of regional convergence emerges.

Second, and more subtly, recent changes in the income distribution among individuals have to some extent masked continued progress among the poor. As previously documented, inequality among individuals as measured by Gini coefficients and other indicators has increased. The main reason is the relatively rapid growth of incomes among the richest individuals. For example, NSSO data indicate that between 1993-94 and 2004-05 consumption increased twice as fast among the top ten percent (the highest decile) of people than the other deciles (Ministry of Finance, 2008). Consequently, measures of inequality among individuals increased. Furthermore, this was true in both urban and rural areas, so inequality increased within those areas as well. The average increases in urban areas were slightly larger than in rural areas, so the gap in average consumption between urban and rural areas increased. Finally, the richest people tend to be concentrated in the richest states, so average consumption increased slightly more in the richer states than the poorer ones.

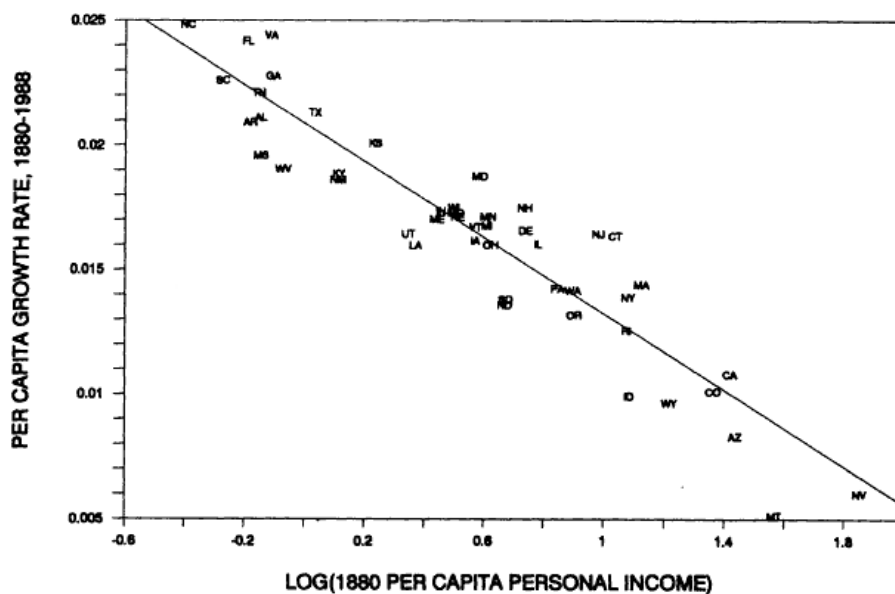
At the same time, however, consumption continued to increase for those of more modest means, i.e. the other nine deciles, including those near the bottom of the distribution. As a result, poverty rates declined. Furthermore, the NSSO data suggest that consumption increased faster among the rural poor than the urban poor, leading to modest convergence between urban and rural incomes at the low end of the distribution. And other indicators that are highly relevant to the poor – such as literacy and infant mortality – show the same pattern of continued progress. In short, the fact that the rich got richer does not imply that the poor got poorer – indeed the opposite appears to be the actual outcome.

Section II describes trends in average incomes and consumption, while section III addresses poverty rates. Sections IV and V are devoted to basic indicators of education and health. Section VI takes a different approach, estimating “structural” models of the relationship between the level and growth of consumption on the one hand, and literacy, urbanization and initial consumption on the other. Section VII concludes.

## II. Trends in Income and Consumption per Capita

Trends in regional inequality are often described in terms of convergence and divergence. States are said to be converging if differences between them are shrinking, and diverging if differences are increasing. Barro and Sala-i-Martin (1992) showed that per capita incomes among states in the USA converged dramatically between the late 19<sup>th</sup> and late 20<sup>th</sup> centuries.<sup>3</sup> As shown in Figure 1, the states that were initially poorer enjoyed higher rates of income growth, so the poorer states at least partially caught up with the richer states. In mathematical terms, the notion of convergence is represented by the downward slope of the regression line.

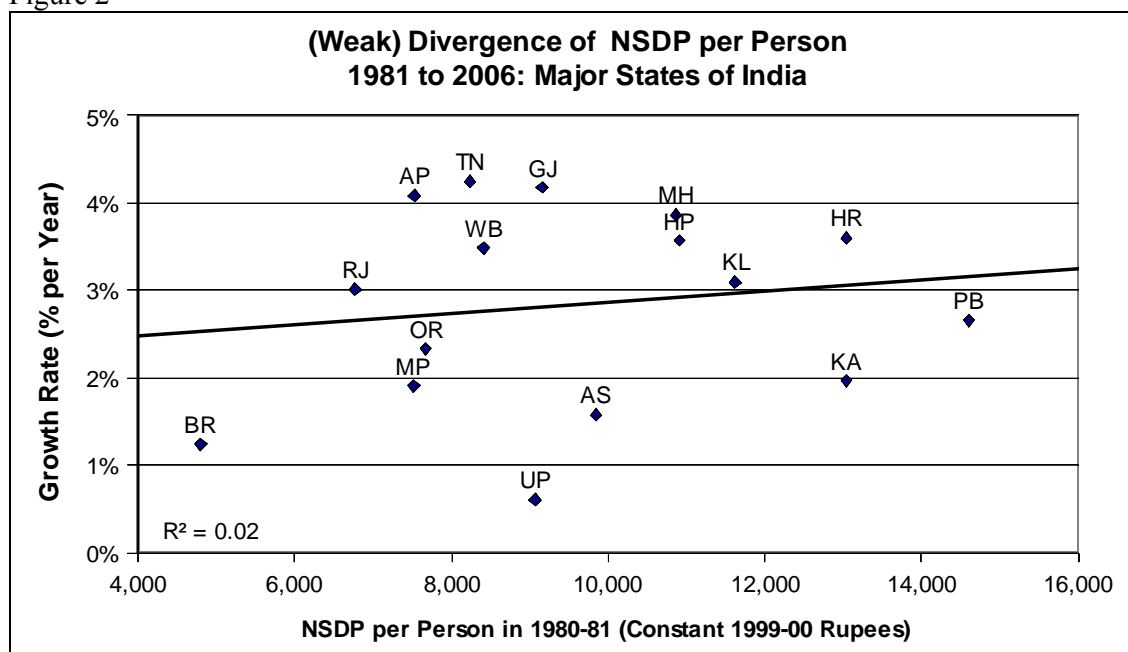
**Figure 1 Convergence of State Incomes in the USA**



<sup>3</sup> See Barro (1997) and Barro and Sala-i-Martin (1995) for other examples.

Figure 2 is a similar plot for income growth across the major Indian states in the last quarter century.<sup>4</sup> Specifically, the chart displays the average growth rate of inflation-adjusted net state domestic product (NSDP) per person against the initial level in 1980-81. The states which were richer to begin with had on average slightly higher rates of growth, but the regression slope is neither substantive in magnitude nor statistically significant ( $p=.58$ ), a result that we term “weak” divergence. The highest rates of growth – more than 4 percent per year – were achieved in three states with moderate initial incomes, Andhra Pradesh, Gujarat, and Tamil Nadu. However, the state that was initially the poorest, Bihar, had a very slow growth rate of only 1.2 percent per year, and Uttar Pradesh grew even more slowly, 0.6 percent per year. Thus, per capita incomes among Indian states show no evidence of either strong convergence or divergence.

Figure 2

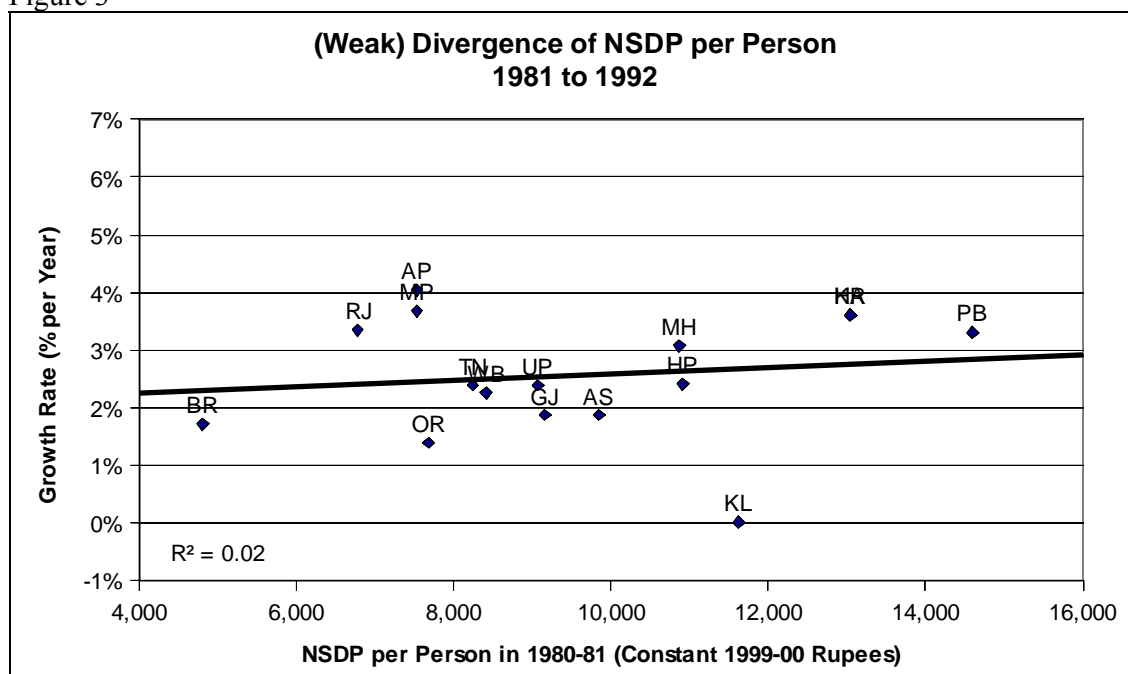


A lot of attention has been paid to the impact of the market-oriented reforms in the early 1990s. It is unclear exactly when to date the change, and the results can be sensitive to

<sup>4</sup> Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal. Data from Central Statistical Office (2009).

dating, because of the relatively short time periods involved and special events such as financial crisis or drought that may affect particular states in particular years. That said, Figure 3 displays the period 1980-81 to 1991-92, when growth in NSDP per person averaged about 2.7% per year. The chart suggests some divergence was already occurring before the reforms, but the relationship is not statistically significant. Note also the range of growth rates, from zero in Kerala to 4% in Andhra Pradesh.

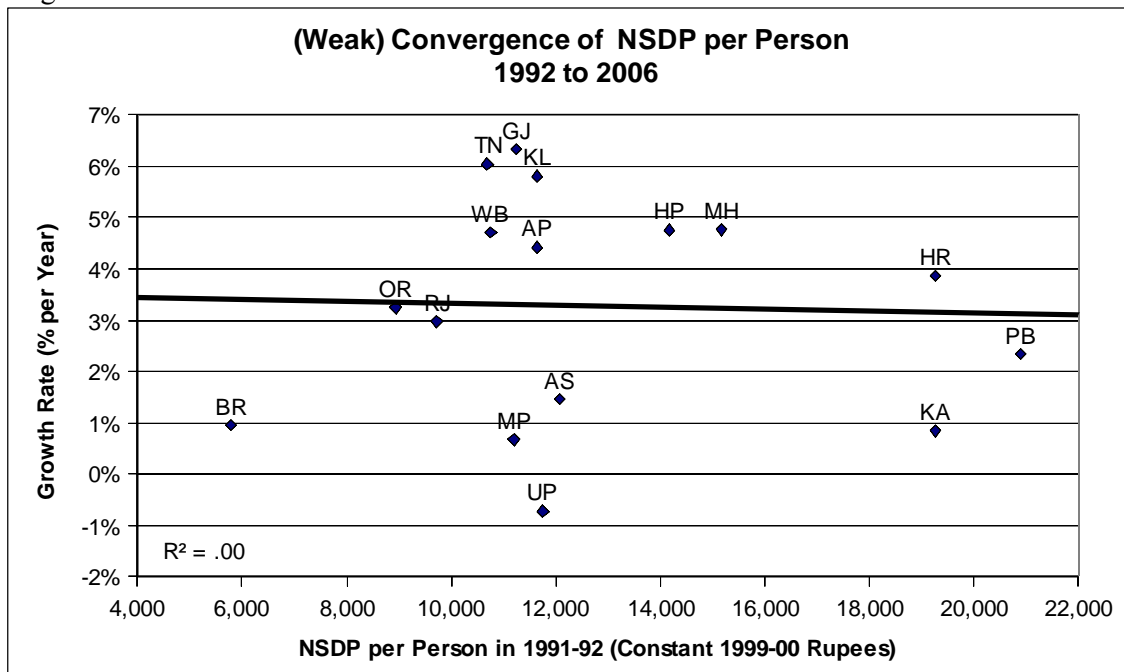
Figure 3



The period since the reforms has been characterized by slightly faster average growth of 3.4% on a population weighted basis (Figure 4). The slight downward slope to the regression line suggests that there is some tendency toward convergence, but it is again neither important in magnitude nor statistically significant. However, the variability of growth rates increased substantially, so in this sense inequality increased. Specifically, the standard deviation of growth rates doubled from 1.1% to 2.2%, and the range of growth rates widened from minus 0.7% in Uttar Pradesh to 6.3% in Gujarat. Put differently, dispersion across states in growth of income per person increased, but it was NOT the case that rich

states grew faster than poor states. Rather, growth was almost unrelated to initial income level.

Figure 4



The National Sample Survey Organization (NSSO) quinquennial surveys provide data on average consumption per capita for major states and in urban and rural areas. Figure 5 displays the urban-rural breakdown for all India in 1972-73, 1993-94 and 2004-05 adjusted for inflation.<sup>5</sup> Average consumption in urban areas is nearly twice that in rural areas, although rural consumption increased slightly faster (38 percent versus 35 percent) over the entire 32 year period. Looking at the two sub periods separately, the relative gains in rural areas occurred before 1993-94 (23 percent rural growth versus 17 percent in urban areas), while the urban-rural gap widened after 1993-94 (12 percent rural growth versus 15 percent in urban areas).

<sup>5</sup> There are some inconsistencies in the questionnaire between surveys, and the NSSO price indices for individual states are highly suspect. See Deaton and Dreze (2002), Deaton (2008) and the discussion in Section III below. In this paper the rural and urban series are deflated by the *national* Consumer Price Indices for Agricultural Labor (CPI-AL) and for Urban Non-Manual Employees (CPI-UNME), respectively (NSSO, 2006, p. 18).

Figure 5

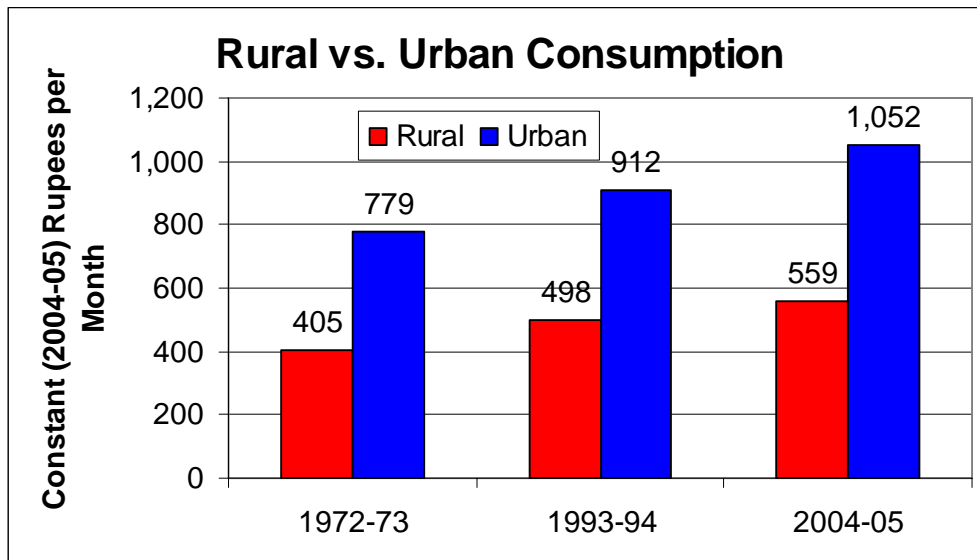


Figure 6 plots the percentage growth of inflation-adjusted consumption per capita in rural areas for the period 1993-94 to 2004-05 against the initial level in 1993-94 for major states. Kerala had the fastest rate of growth (46%), even though it was one of the better off states to begin with. On the other hand, consumption grew 33 percent in Uttar Pradesh, a relatively poor state. However, consumption actually fell three percent in Madhya Pradesh, also a poor state. Overall the data suggest a statistically significant trend toward divergence ( $p=.09$ ).

Figure 6

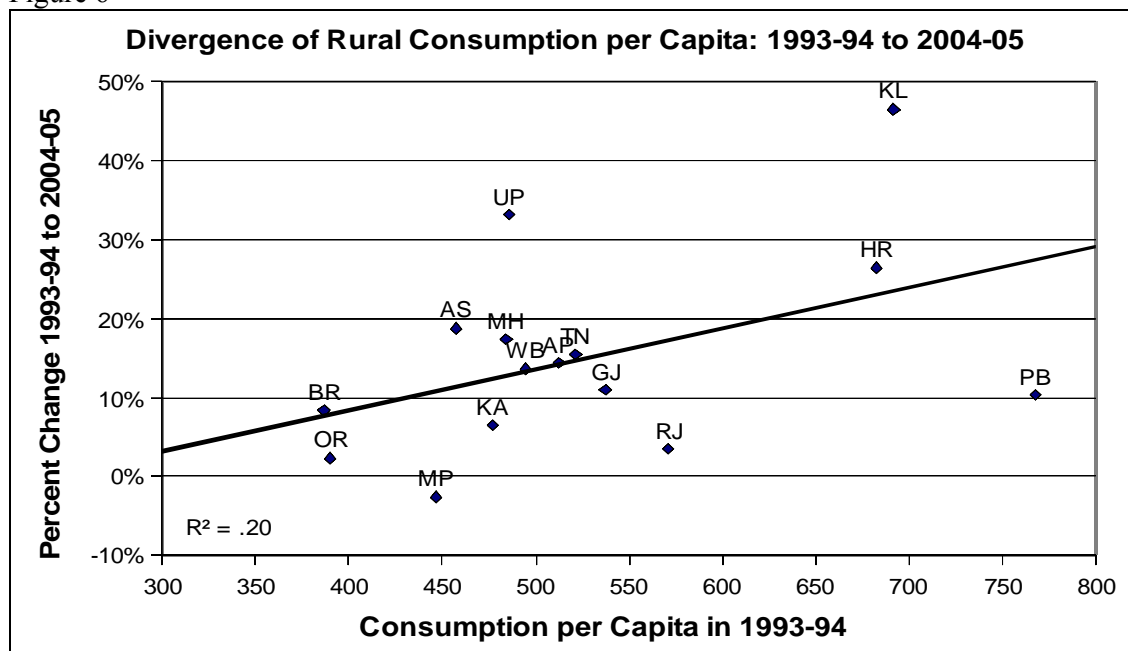


Figure 7 displays the corresponding data for the earlier period, 1972-73 to 1993-94. Kerala again had the fastest growth (78 percent) although it was initially a middle income state. At the opposite extreme, average consumption in Bihar grew only 2 percent. The two states that with the highest initial consumption, Haryana and Punjab, had relatively slow growth. The overall pattern suggests convergence, and is significant at the 11 percent level.<sup>6</sup>

<sup>6</sup> A nonlinear function would fit the data even better, but there is a severe danger of “over fitting” with only 15 observations. The linear function reported here maintains consistency with the other figures.

Figure 7

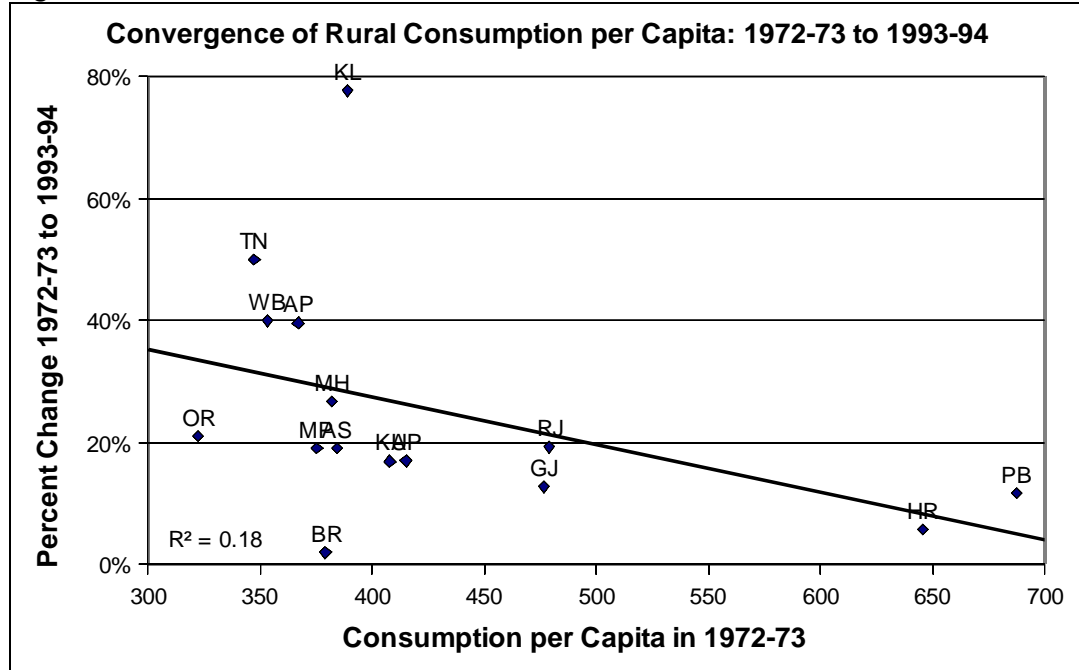


Figure 8 displays the data for the urban areas of the major states in the more recent sub period. The two states with the fastest growth rates, Kerala and Punjab, were already relatively well-off in 1993-94, and the slowest growing state, Orissa with a decline of six percent, was initially relatively poor. Thus, the overall pattern suggests divergence, but the relationship is not statistically significant ( $p = 0.41$ ).

Figure 8

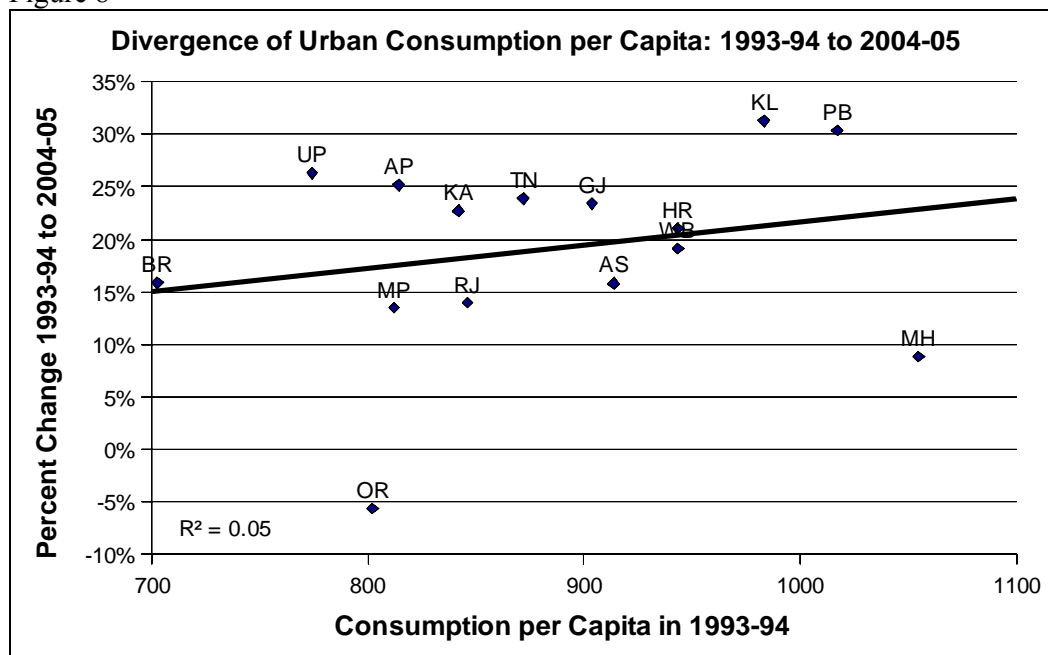
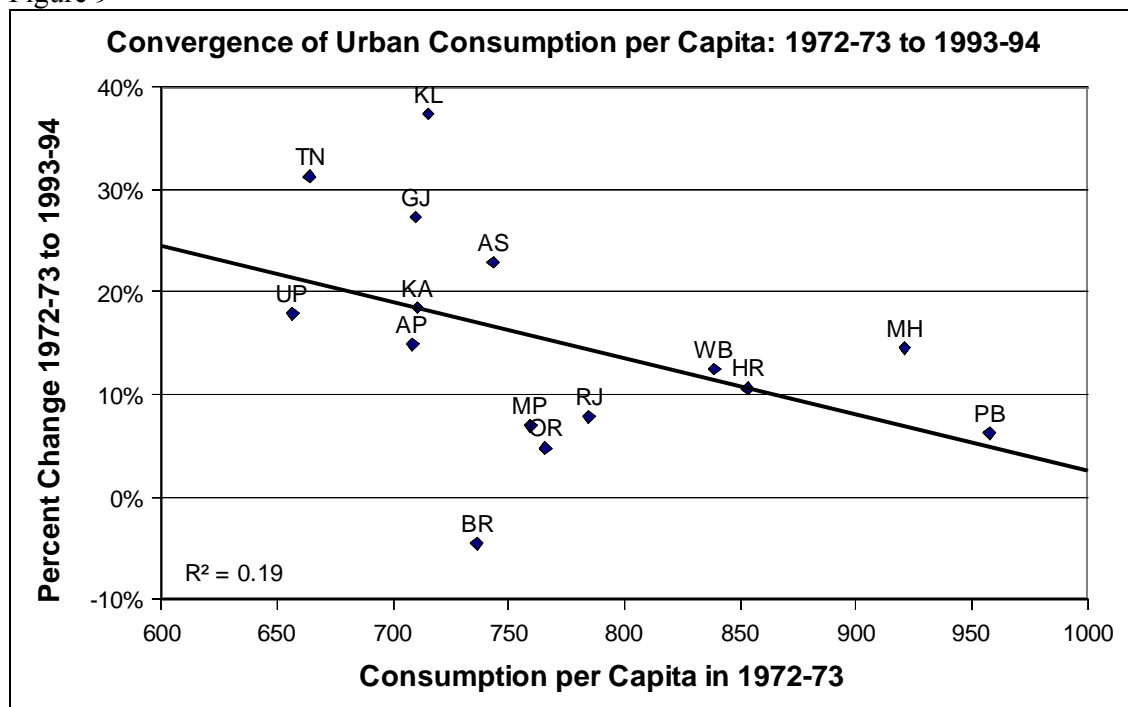


Figure 9 displays urban trends in the earlier sub period. Kerala once again had the fastest growth (37 percent), although Tamil Nadu and Gujarat were not far behind (31 percent and 27 percent). Since all of these states initially had relatively low consumption, their rapid growth contributed to convergence. Relatively slow growth in the Punjab, initially the richest state, also contributed to convergence. However, consumption fell five percent in Bihar and grew less than 10 percent in Madhya Pradesh, Orissa, and Rajasthan which were relatively poor states. The negative slope is significant at the 10 percent level.

Figure 9



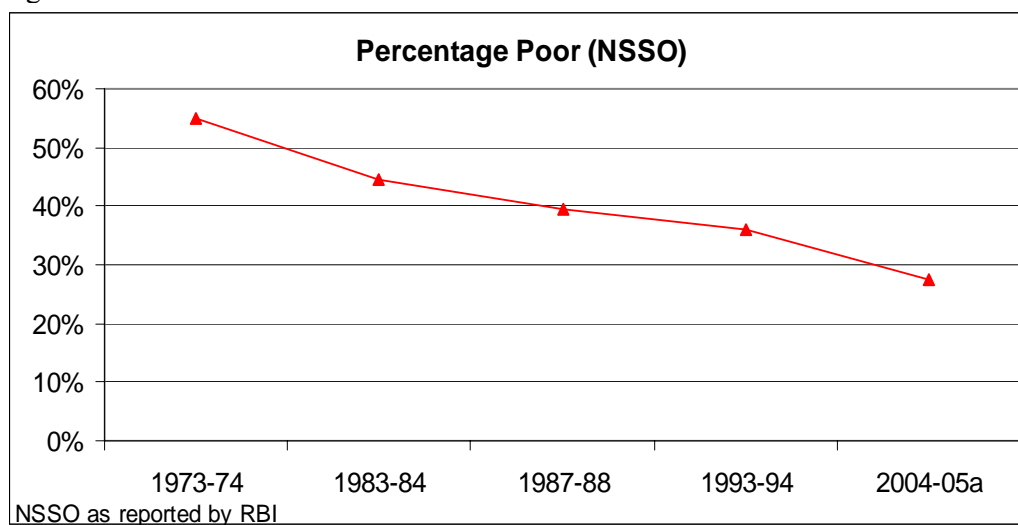
Summarizing this section, NSDP per person has shown weak divergence between states during the 1981-2006 period. There is no evidence that NSDP diverged more after the reforms in the early 1990s. Somewhat more definitively, the NSSO data show that average consumption in rural areas increased six percent faster than in urban areas during the period 1972-73 to 1993-94, but three percent slower between 1993-94 and 2004-05, thus increasing the urban-rural gap in the more recent period. Similarly, the NSSO data also suggest that average consumption was converging between states during the first sub period in both rural and urban areas, but convergence stopped after 1993-94 in urban areas and actually diverged in rural areas.<sup>7</sup>

<sup>7</sup> These results are broadly consistent with Deaton and Dreze (2002), who find strong evidence of divergence in average consumption expenditure per capita across states between 1993-94 and 1999-2000. See their Figure 2 in particular. When we include the NSSO data for 2004-05, there is no significant evidence of divergence in urban areas. Deaton and Dreze (2002) use a different set of state-specific adjustments for inflation, which may also affect the results. See the next section.

### III. Poverty

Net state domestic product per person is a measure of average income, which is affected by incomes in all parts of the distribution. Similarly, average consumption is based on all parts of the distribution, including both rich and poor. However, much of the concern about living standards in India is focused on the poor, and the poverty headcount is one measure of conditions among this group.<sup>8</sup> Figure 10 displays the percentage poor for all India based on the consumption surveys performed by the National Sample Survey Organization. The data shown are based on a uniform 30 day recall period; for that reason the NSSO results from 1999-2000 are omitted (Deaton and Kozel, 2005). The data indicate that the incidence of poverty has steadily declined. A similar result is obtained by the World Bank, who also rely on the NSSO data (Chen and Ravallion, 2008).

Figure 10



However, there are some unusual results in the NSSO data for individual states and for urban-rural breakdowns, which are the central focus of this paper (Table 1).<sup>9</sup> For example,

<sup>8</sup> Deaton and Dreze (2002) also consider the poverty gap – the total amount of income required to bring all persons up to the poverty line. Their results for the poverty gap are very similar to those for the poverty headcount.

<sup>9</sup> Deaton and Dreze (2002) and Deaton and Kozel (2005) point out similar anomalies in the 1999-2000 data.

the NSSO results for Andhra Pradesh and Karnataka in 2004-05 imply that the cost of living is 85% higher in urban areas than in rural ones. In all of India, the urban cost of living is estimated to be 51% higher than the rural one. This is a marked departure from baseline studies done in the early 1970s that indicated that the urban cost of living was about 15% higher than the rural one, and more recent studies using the NSSO data reach the same conclusion.<sup>10</sup>

The result of using these apparently distorted cost of living indices is that measured poverty rates are sometimes much lower in rural areas than in urban ones, a result that Deaton and Dreze (2002) term “implausible.” For example, the poverty rate in rural Andhra Pradesh is a strikingly low 11%, while the urban rate is 2.5 times as high. A similar though less dramatic result obtains in Karnataka, and the rural poverty rate for all India is appears to be almost as low as the urban rate.

Deaton and Dreze (2002) have recalculated poverty rates for urban and rural areas of each state for 1987-88, 1993-94 and 1999-2000.<sup>11</sup> The adjustments don’t make much difference for the all-India rural poverty rate (Figure 11).<sup>12</sup> But recalculated urban rates are substantially lower than those reported by the NSSO (Figure 12). Because the adjustments by Deaton and Dreze appear to be both appropriate and important, we report their results for urban-rural differences and individual states in what follows.

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<sup>10</sup> *Ibid.*

<sup>11</sup> Deaton and Dreze (2002) also adjust for changes in the recall period in the 1999-2000 survey.

<sup>12</sup> The differences are very large for some individual states, however. For example, the NSSO’s rural poverty rate in Andhra Pradesh in 1999-2000 is 10.5% while Deaton and Dreze find that it is 26.2%. For this reason, the use of the individual state data from NSSO is highly questionable.

Figure 11

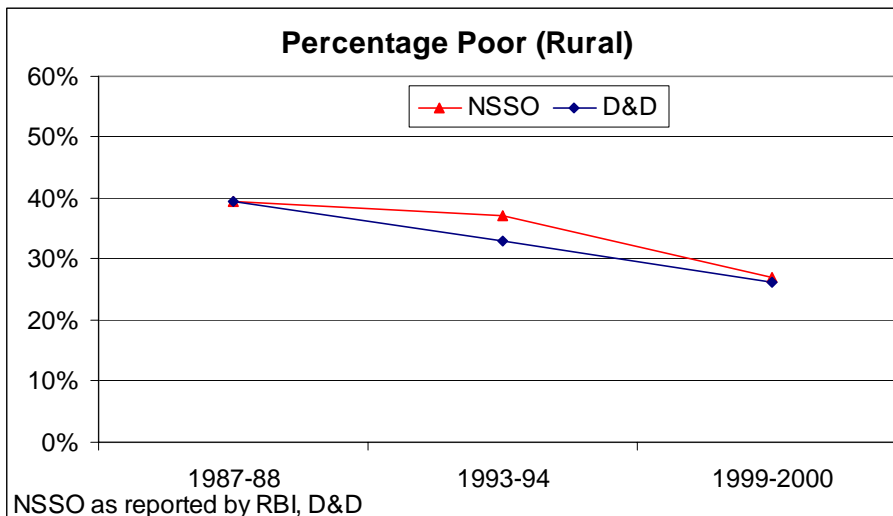
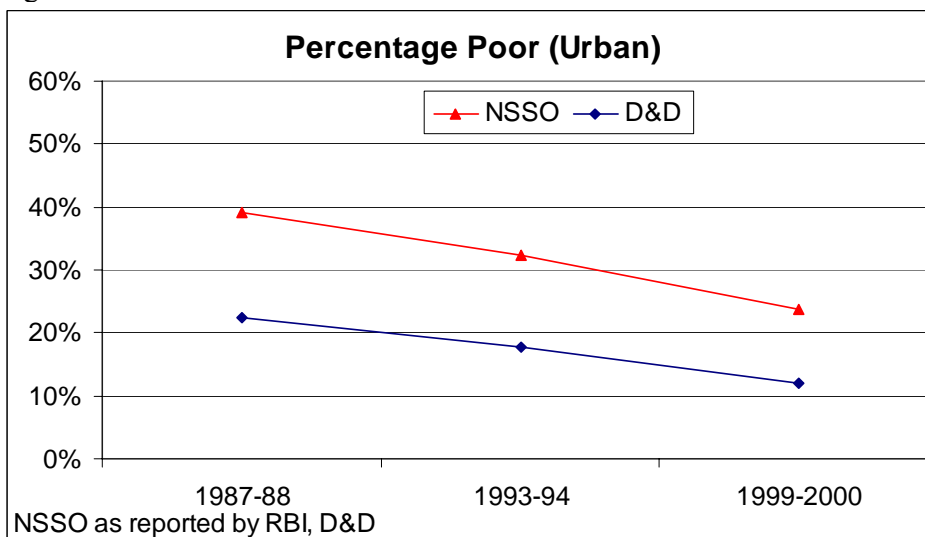
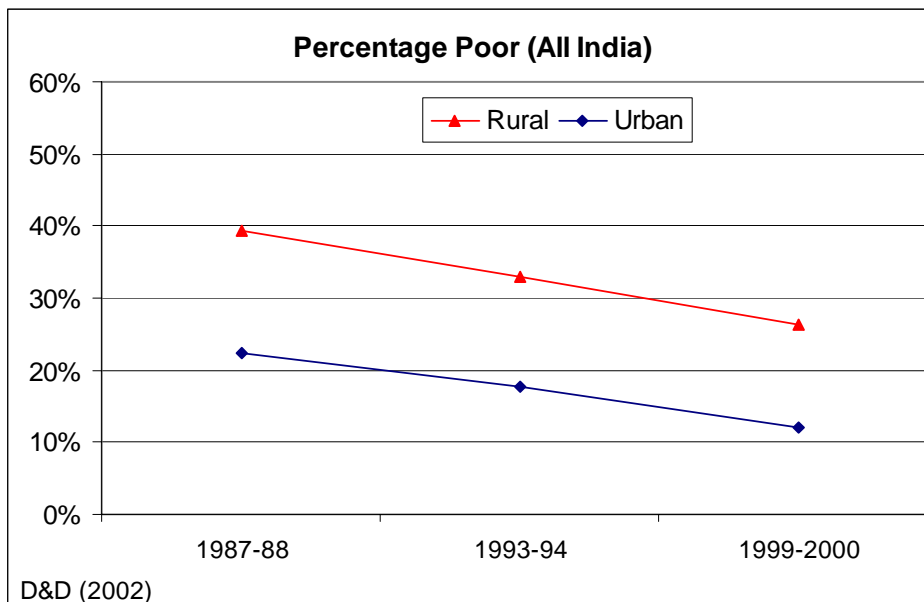


Figure 12



First consider all-India poverty rates for rural and urban areas (Figure 13). The rural poverty rate declined 13.1 percentage points in 12 years, while the urban rate declined slightly less, 10.5 percentage points. As a result the gap between urban and rural rates declined modestly, by about 2.5 percentage points.

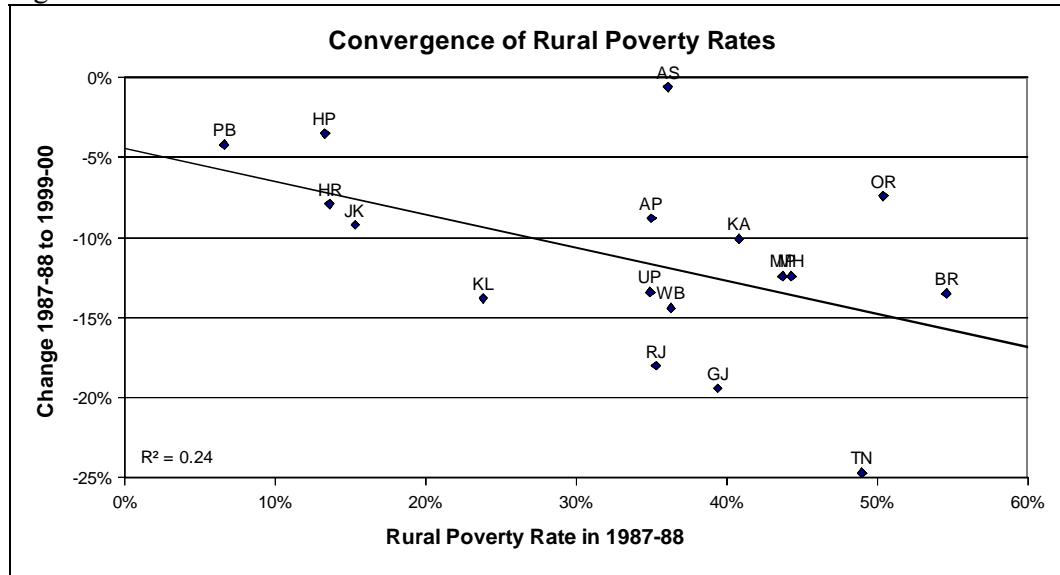
Figure 13



The Deaton and Dreze data indicate that rural poverty rates in India are converging (Figure 14). The states with the highest rural poverty rates in 1987-88 experienced the greatest reductions in poverty.<sup>13</sup> Tamil Nadu had the greatest reduction in rural poverty – about 25 percentage points. Gujarat and Rajasthan also had reductions of more than 15 percentage points, and all of these states had relatively low high poverty rates in the beginning. On the other hand, Himachal Pradesh and the Punjab, which had relatively low rates of poverty in 1987-88, had reductions of less than 5 percentage points. Assam is a bit of an outlier in the data, with a reduction in rural poverty of only 1 percentage point. But the overall relationship, including Assam, is significant at the 5 percent level.

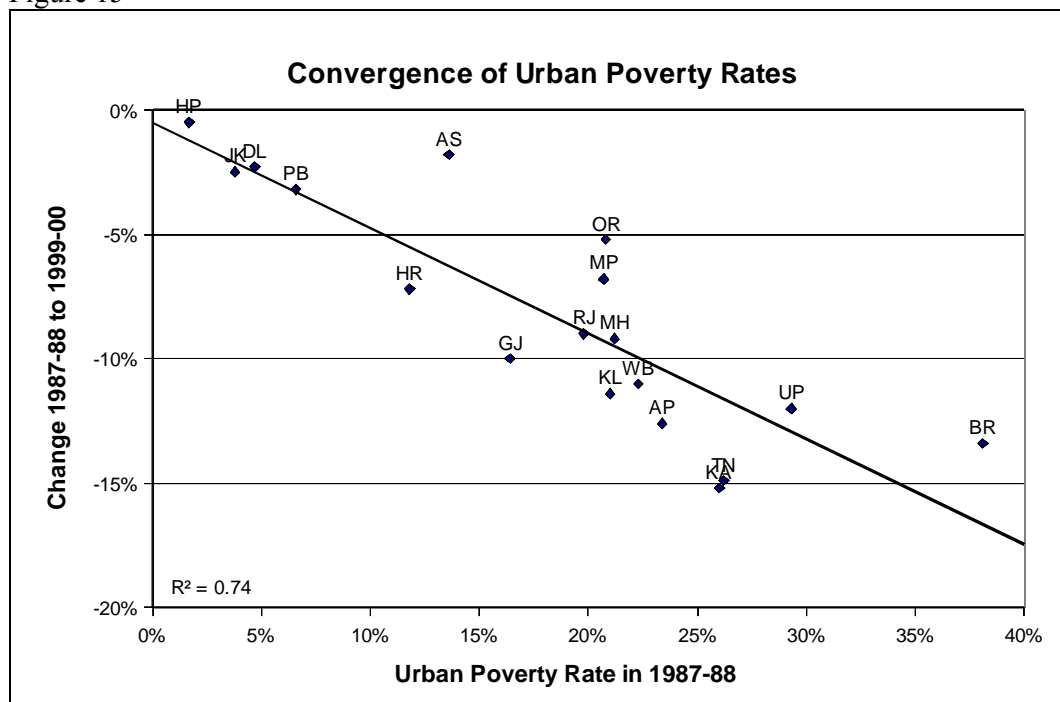
<sup>13</sup> An alternative approach is to measure *percentage* changes in the poverty rate. Since the initial value is already a percentage, this implies calculating the percentage change in a percentage, with sometimes less than intuitive results. For example, if two states of equal population reduced their poverty rates by the same number of percentage points but they had different initial poverty rates, then their percentage changes would differ even though the same number of people moved out of poverty. On the other hand, Deaton and Dreze (2002, p. 3735), argue that using simple changes “would seem to give an unfair ‘advantage’ to states that start off with high levels of poverty, and where there tends to be a large number of households close to the poverty line.” But simple changes in poverty rates most clearly illustrate the main point here: The states with the highest initial poverty rates made the most progress.

Figure 14



The results are even stronger for urban areas (Figure 15): States with higher initial poverty rates tended to have larger reductions in poverty, and the relationship is significant at the .01 level. The most rapid reductions in urban areas were 15 percentage points in Karnataka and Tamil Nadu, while the smallest were in urban areas with low initial poverty rates, including Himachal Pradesh, Punjab and Delhi.

Figure 15



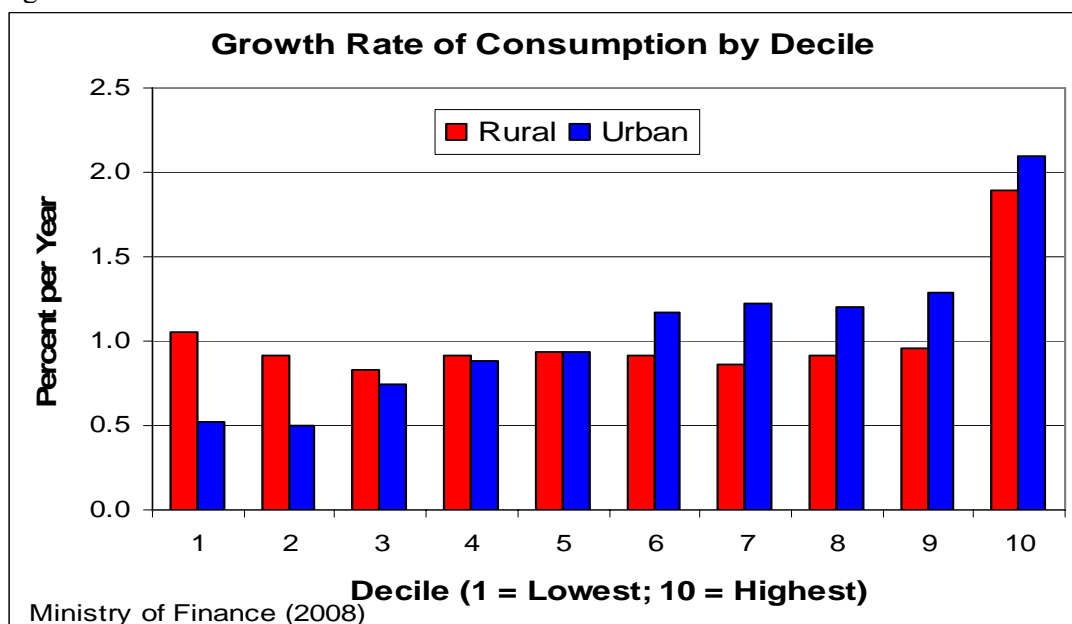
Summarizing this section, between 1987-88 and 1999-2000:

- the urban-rural gap in poverty rates has declined modestly, and
- poverty rates have been converging across states in both rural and urban areas.

In other words, regional inequality as measured by poverty rates has been declining. Are these results consistent with evidence of growing inequality cited earlier? The answer is “yes;” that is, both the results of this paper and earlier studies can be reconciled. Figure 16 displays the growth rates of real consumption expenditure per person classified by consumption decile (Ministry of Finance, 2008).<sup>14</sup> The first decile is the 10 percent of people with the lowest consumption, and so forth up to the 10th decile, which is the 1 percent of people with the highest consumption. The vertical axis measures the annual growth rate of consumption expenditure between 1993-94 and 2004-05, adjusted for inflation.

Looking first at the rural population, most deciles experienced growth rates of about 0.9% per year, except the top decile where the growth rate was more than twice as large, 1.9%.

Figure 16



<sup>14</sup> Deaton (2008) finds that the official price index for rural areas, CPI-AL, understates the rise in the cost of living between 1999-00 and 2004-05, and thus the gains reported in Figure 11 are likely to be overstated. His corrections do not address the other problems discussed in connection with Table 1, so it is not clear whether net gains are over or understated during 1993-94 to 2004-05.

Thus, rural inequality among individuals rose during this period, as consumption increased the fastest for those who already had the highest consumption. But consumption was increasing for all deciles, so poor individuals were making progress, and indeed many of them moved from below the poverty line to above it.

The pattern is even more pronounced in urban areas. The lowest deciles experienced consumption gains of only about 0.5% per year, while the top decile's consumption grew 2.1% per year. Averaged over all deciles, consumption grew slightly faster in urban areas than rural ones: 1.35% per year versus 1.16%. Thus, inequality among individuals was increasing even more rapidly in urban areas than in rural ones, and the urban-rural gap in average incomes was increasing. But just as in the rural sector, people in the lower deciles were making economic progress, and some of them were moving from below the poverty line to above it. In addition, the rate of increase in the lower deciles in the rural areas was actually higher than in the urban areas: about 0.9% per year v. 0.5%.<sup>15</sup> Thus, the poorest people were making faster progress in the rural areas than in the urban ones, helping to reduce the poverty gaps between the two areas.

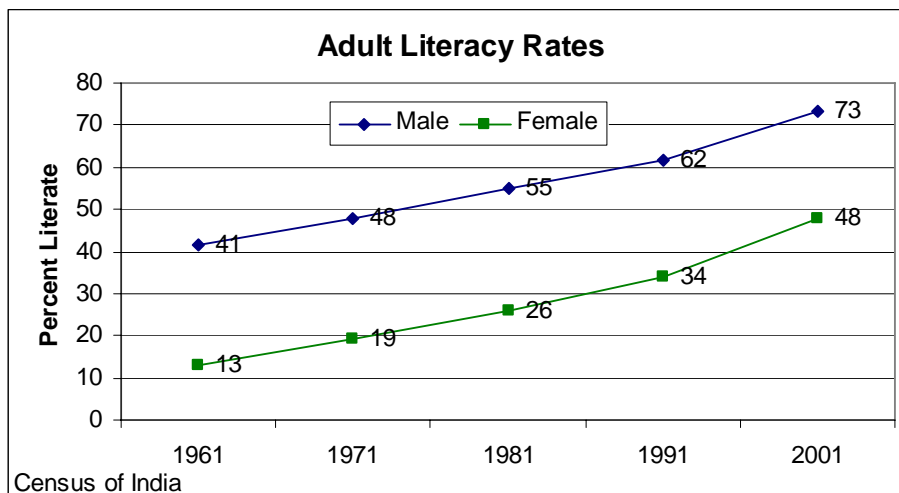
### **III. Literacy and School Enrolment**

This section describes trends in two other indicators of development, literacy and school enrolment. Literacy in India indicates little more than the ability to read and write one's name. But changes in literacy over time are probably correlated with increases in higher levels of education as well. The Census of India data indicate substantial increases in literacy since 1961 for both men and women aged 15+ (Figure 17). The gender gap, however, has declined only slightly: Female literacy rates among adults are still about 26 percentage points below those of adult males.

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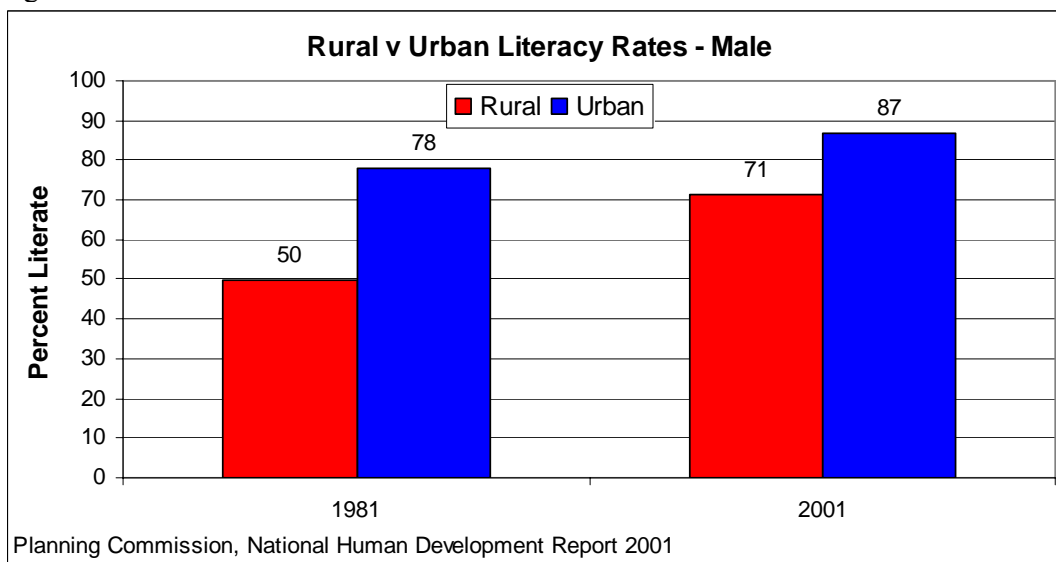
<sup>15</sup> This result may be affected by migration from the countryside to the cities. That is, the people who are in the lowest deciles in the city may be recent migrants.

Figure 17



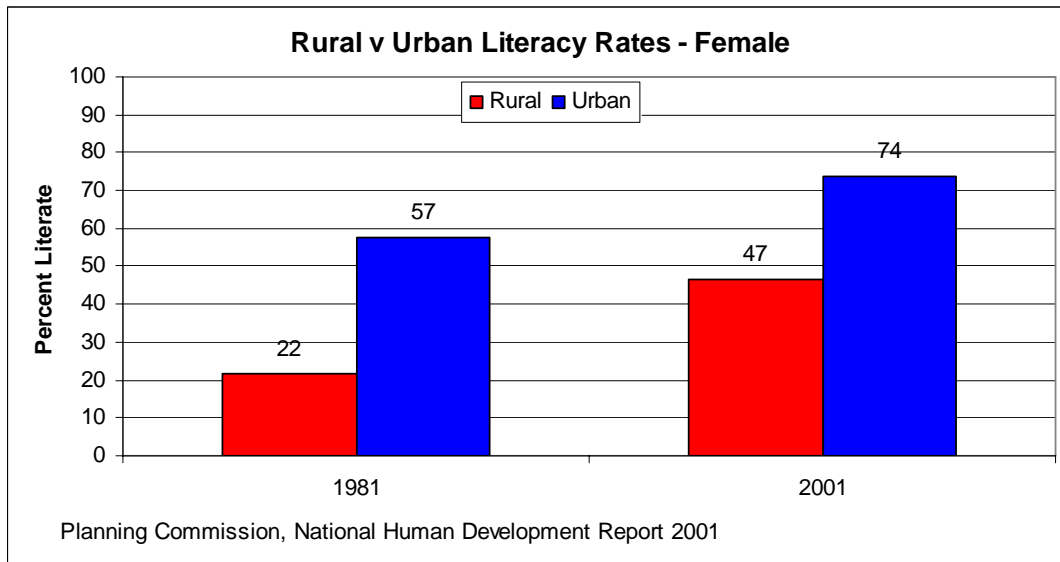
There are also gaps in literacy between urban and rural areas (Figure 18). In 1981, literacy rates among males (aged 7+) were 28 percentage points higher in urban than rural areas. By 2001, the gap declined to 16 percentage points.

Figure 18



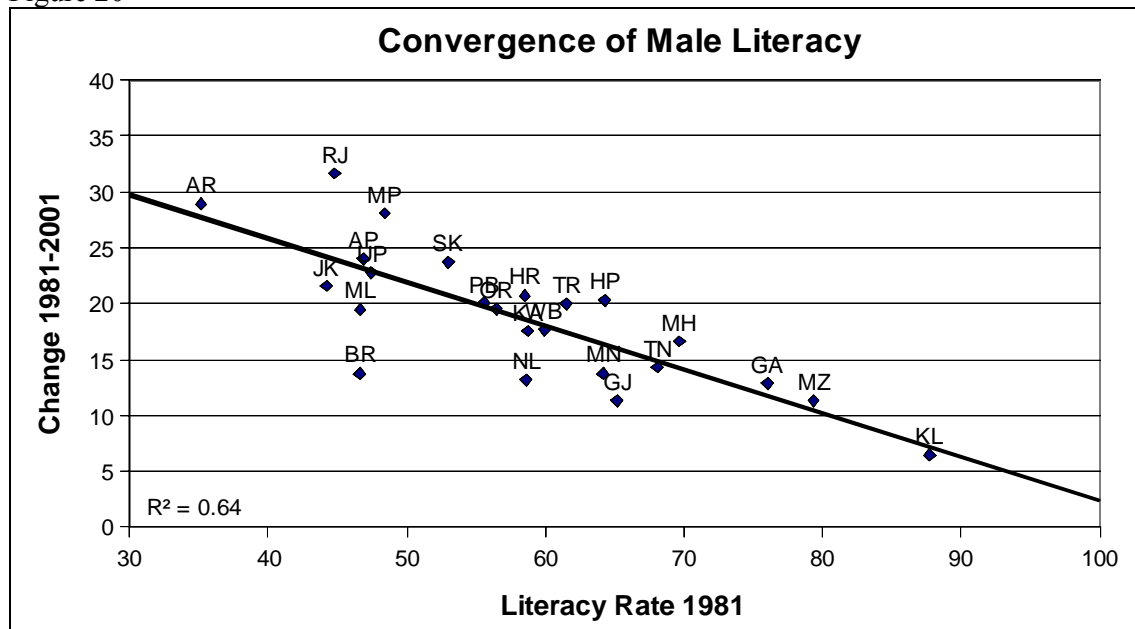
Literacy rates are especially low among rural females (Figure 19). In 1981, for example, only 22% of rural females were literate. The urban-rural gap was 35 percentage points. The evidence for urban-rural convergence is weaker for females than males, but the gap did decline to 27 points by 2001.

Figure 19



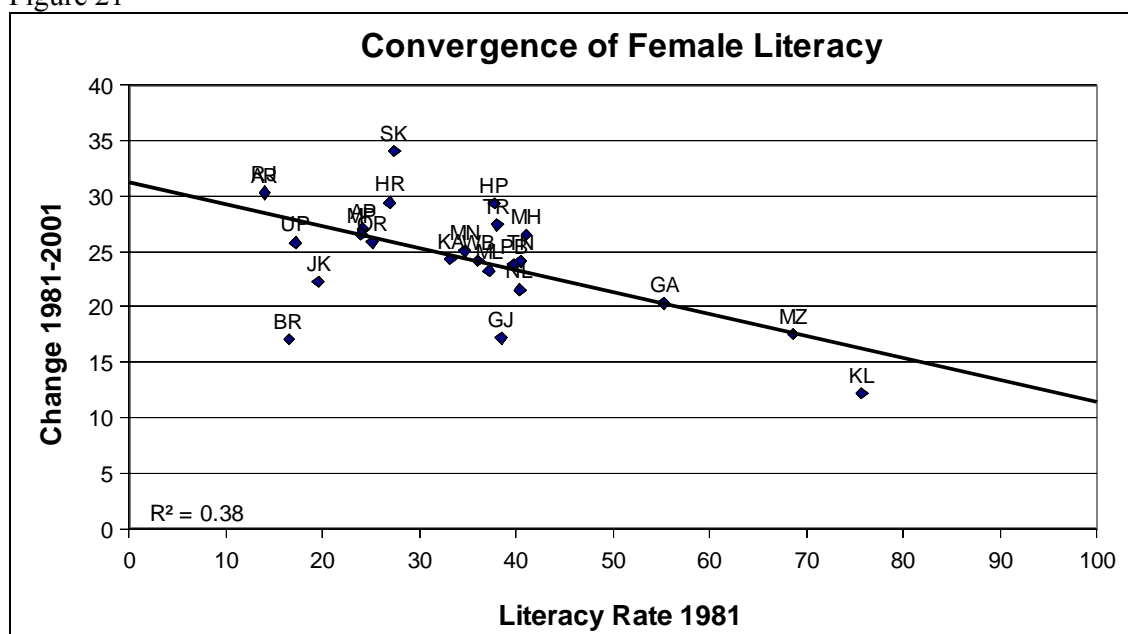
Are literacy rates converging or diverging between states? The data show a strong tendency toward convergence of male literacy rates, which is significant at the 1% level (Figure 20). Some states made tremendous gains during this time period, with Arunchal Pradesh, Madhya Pradesh and Rajasthan increasing literacy by close to 30 percentage points. Half a dozen other states with low initial literacy also made gains of 20 percentage points or more.

Figure 20



The results for females are similar and also significant at the 1% level (Figure 21). As we have already seen, literacy rates for females are substantially lower than for males. However, average gains in literacy were about five percentage points higher among females than males, so the gap was modestly reduced. And as the chart indicates, the gains were largest in the states with the lowest initial literacy rates.

Figure 21



Summarizing these results,

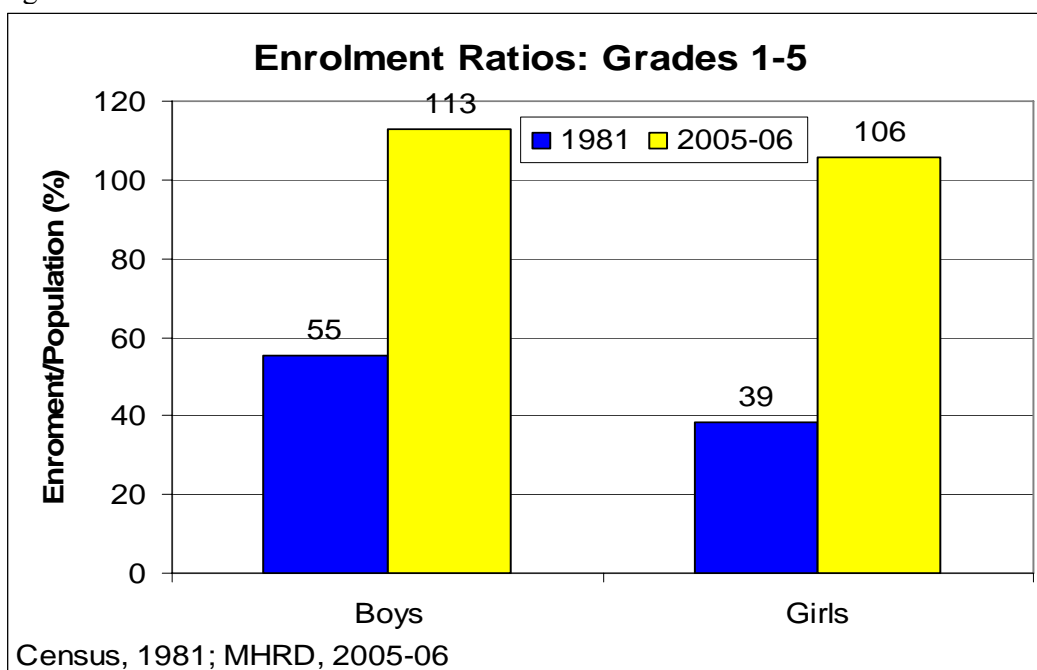
- Literacy rates in India have doubled since the early 1960s
- The urban-rural gap is declining
- Interstate differences are declining in both urban and rural areas
- The gender gap has declined only modestly

Literacy of youth is a product of school enrolment, especially in the primary grades, as well as parental attitudes and education. Gross enrolment ratios measure enrolment divided by the population in the corresponding age group, which is 6-11 for grades 1-5. Enrolment is typically measured in the beginning of the academic year and may overstate

average attendance during the year. Enrolment figures may also be skewed to the extent that school funds are distributed based on reported figures.

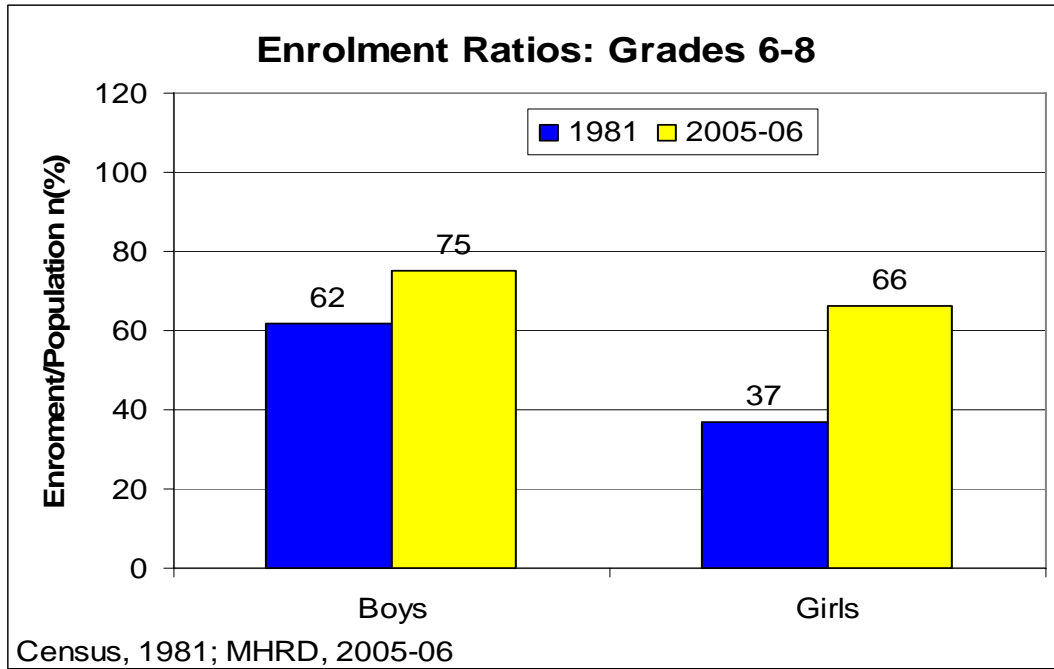
Keeping these caveats in mind, enrolment in the primary grades has increased dramatically since the early 1980s, doubling for both boys and girls (Figure 22). Gross enrolment ratios in excess of 100% are common in developing countries, particularly at the primary level. They may result from older children – who did not attend school earlier –now attending along with the normal age group.

Figure 22



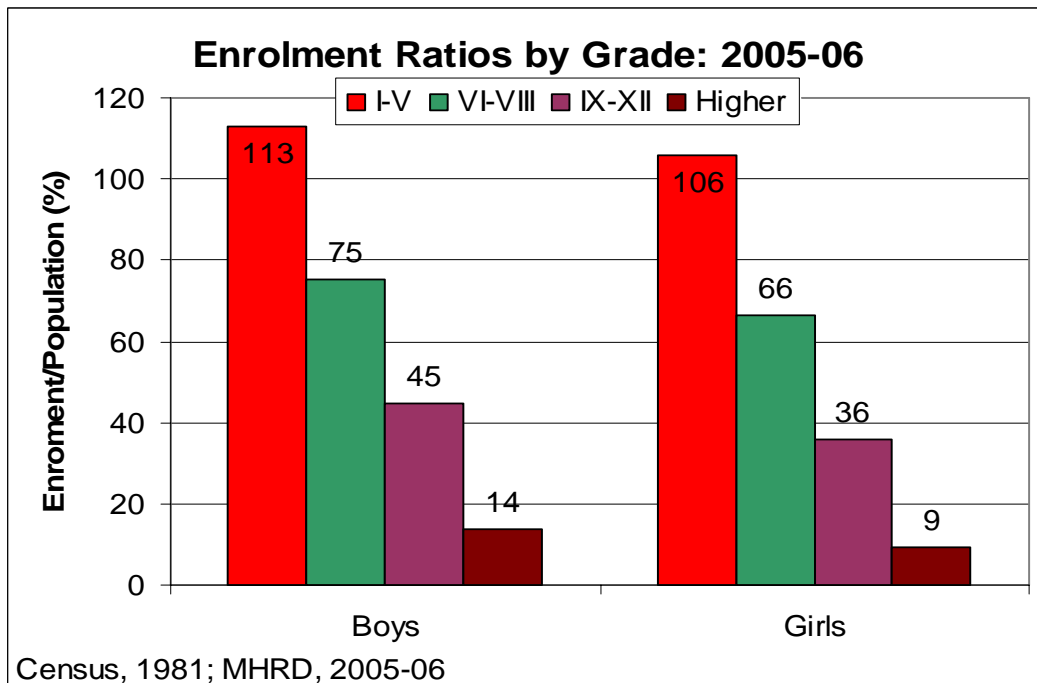
Enrolment ratios are lower in grades 6-8, but have increased over time (Figure 23). The increase for girls is particularly large, and has eliminated most of the gender gap between boys and girls.

Figure 23



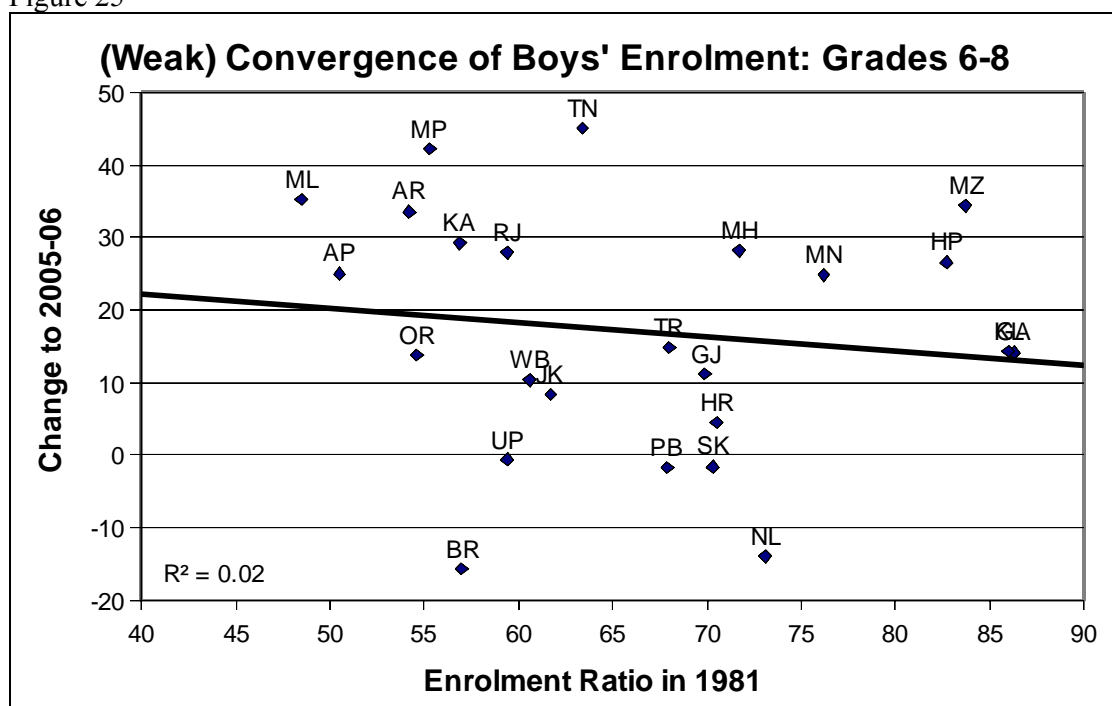
Enrolment ratios drop off rapidly at higher grade levels, with about 45% of boys and 36% of girls attending grades 9-12 (Figure 24). Enrolment in institutions of higher education is lower yet.

Figure 24



The evidence for convergence of enrolment ratios is much weaker than for poverty and literacy rates (Figure 25). This chart plots the change in enrollment ratio for boys in grades 6-8 against the enrolment ratio in 1981. The data points are widely scattered around the regression line, and enrolment ratios appear to have declined in several states. These include declines of 16 percentage points in Bihar and 14 points in Nagaland. Enrolment ratios also declined in the Punjab, Sikkim and Uttar Pradesh. Although the estimated relationship has a negative slope, it is significant at only the 53% level.

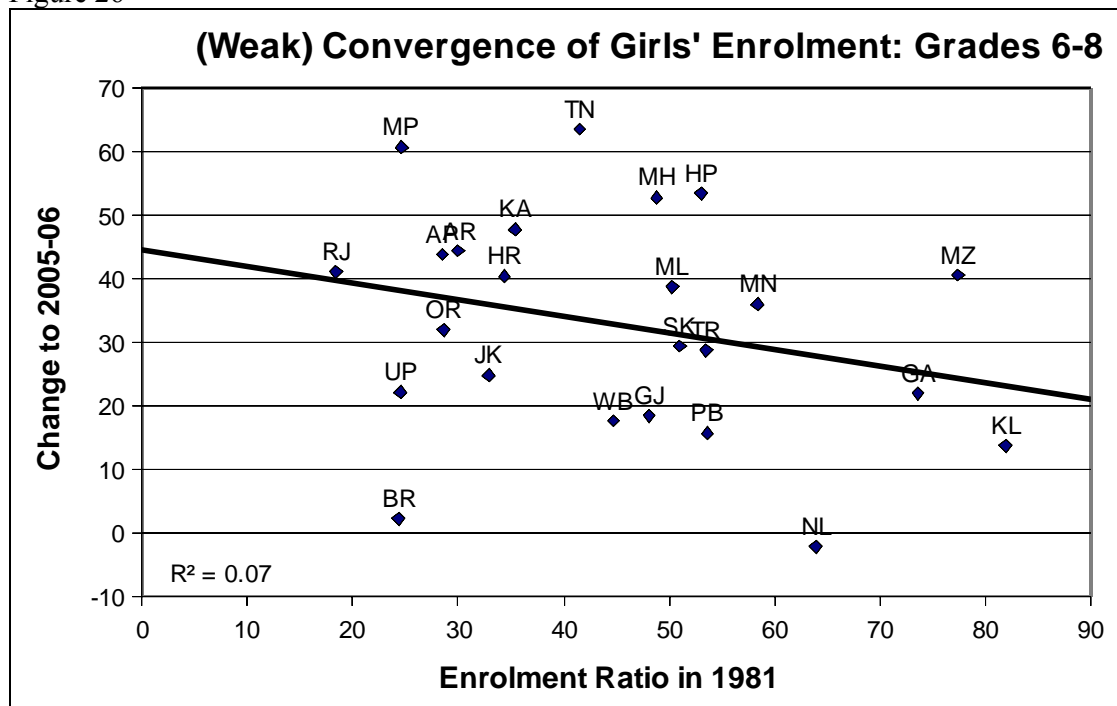
Figure 25



The results are somewhat stronger but still weak for girls (Figure 26). The only state with a declining enrolment ratio was Nagaland, although Bihar's ratio only increased two percentage points and remains among the lowest in India. Other states with low enrolment ratios in 1981 showed larger increases, including Rajasthan, Madhya Pradesh, and Uttar Pradesh. The largest increase was 64 percentage points in Tamil Nadu, where the enrolment

ratio now exceeds 100 percent. The estimated regression line is again negative but insignificant ( $p = .20$ ).

Figure 26



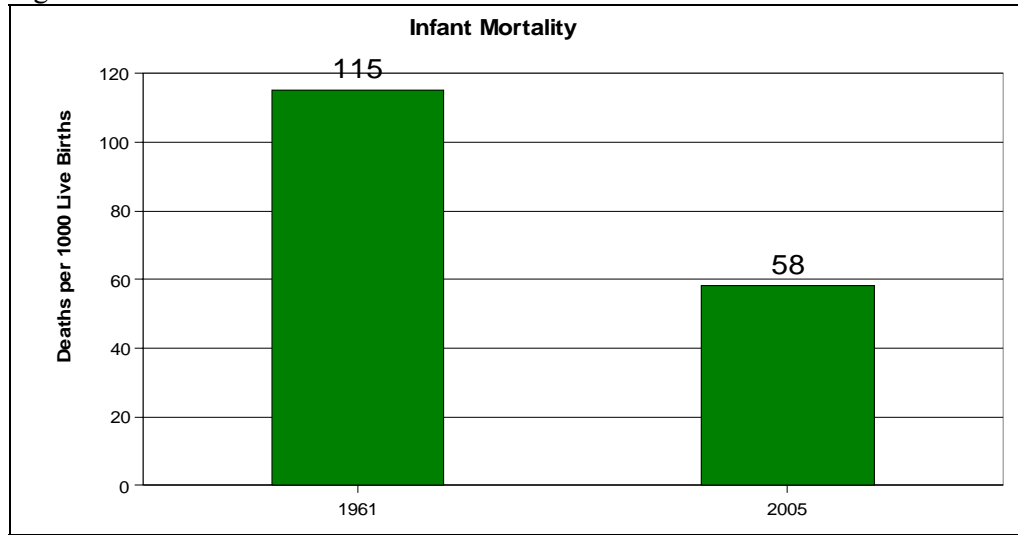
Summarizing these results for school enrolment:

- In Grades 1-5, enrollment ratios doubled and in many cases exceed 100%.
- In Grades 6-8, enrolment ratios increased and the gender gap declined.
- There is only weak evidence of convergence, because some low enrolment states saw little or no increase.

#### IV. Infant Mortality and Access to Clean Water

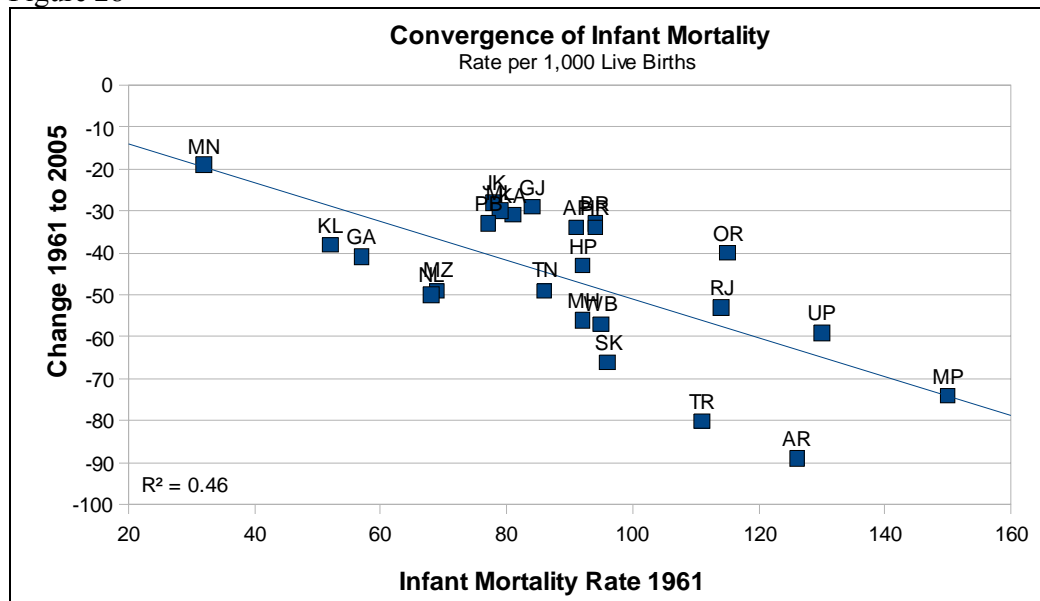
Infant mortality is another key indicator of development, especially for those least well off in Indian society. Infant mortality is measured as the number of babies who do not survive to their first birthday, expressed as a rate per 1,000 babies born alive. India's infant mortality rate decreased from 115 to 58 between 1961 and 2005, a decline of 50 percent (Figure 27).

Figure 27



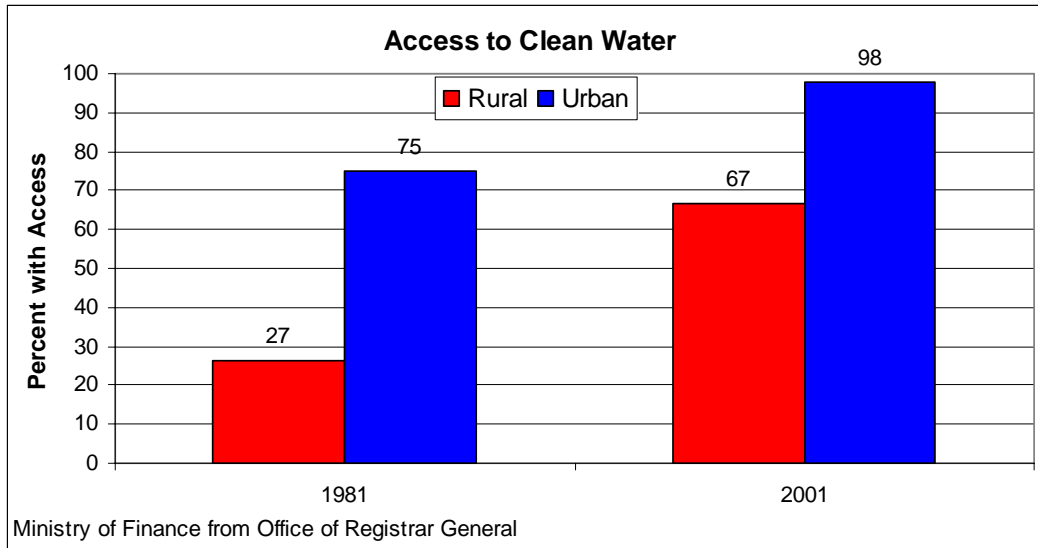
In 1961, infant mortality ranged from 150 per 1,000 in Madhya Pradesh to 32 per 1,000 in Manipur (Figure 28). As the chart indicates, infant mortality decreased the most in the states that had initially had relatively high rates. The relationship is significant at the 1 percent level.

Figure 28



One of the important determinants of health in general and infant survival in particular is access to clean water. In India water is considered safe if it comes from a tap, hand pump or tube well. The urban-rural gap in access to clean water was almost 50 percentage points in 1981, but it decreased to about 30 points by 2001 (Figure 29).

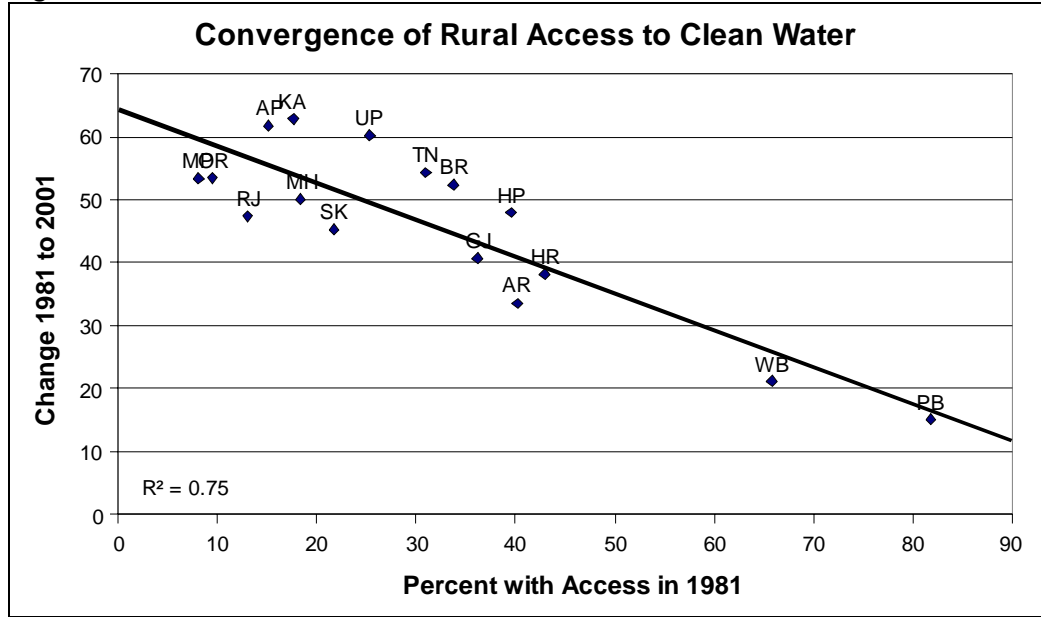
Figure 29



Access to clean water in rural areas has increased the fastest in the states with the least access in 1981 (Figure 30).<sup>16</sup> The overall relationship is highly significant ( $p < .001$ ).

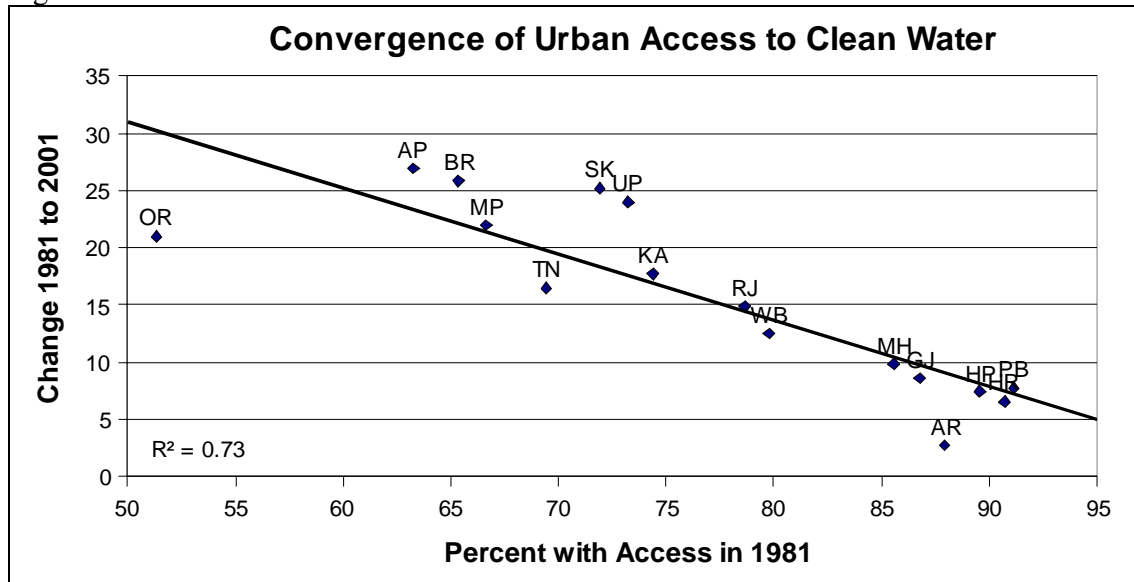
<sup>16</sup> Kerala is a major outlier in the data from the Office of the Registrar General, with exceptionally low access in 1981 and very little progress since that time. The National Human Development Report 2001 indicates that 80% of rural Keralans obtain their water from “pucca” (good) wells, but these wells are not considered to be access to clean water in the Office of Registrar’s data. Thus, Kerala is excluded from the data shown in the figure.

Figure 30



A similar result holds in the urban areas of the major states, with the largest gains generally being in the states with the lowest initial access (Figure 31). The relationship is again highly significant ( $p < .001$ ).

Figure 31



Summarizing the results on infant mortality and access to clean water,

- Infant mortality declined by one-half since 1961.
- There is strong evidence of convergence between states.
- Access to clean water increased, doubling in rural areas.
- There is strong evidence of convergence between states in both urban and rural areas.

## V. Consumption, Literacy, Urbanization and Growth

How is economic well being related to literacy and urbanization across the states of India? Are literacy and urbanization related to the growth as well as the level of consumption? This section uses the NSSO data on average monthly per capita consumption expenditure by state in urban and rural areas to examine the relationships between consumption, literacy and urbanization. Specifically, a two equation model is estimated for consumption in rural (R) and urban (U) areas, respectively.

$$y_{it}^R = \beta_0^R + \beta_1^R LIT_{it}^R + \beta_2^R URB_{it} + \beta_3^R YEAR_t + \varepsilon_{it}^R$$

$$y_{it}^U = \beta_0^U + \beta_1^U LIT_{it}^U + \beta_2^U URB_{it} + \beta_3^U YEAR_t + \varepsilon_{it}^U$$

where  $i=1, 2, \dots, 15$  denotes the major states, and

$t$  denotes the seven quinquennial rounds of the NSSO surveys between 1972-73 and 2004-05.

The dependent variables,  $y_{it} = \ln(\text{MPCE}_{it})$ , are equal to the natural logarithm of monthly per capita consumption expenditure in state  $i$  in survey  $t$  for rural and urban areas separately. The data are adjusted for inflation using national price indices as described in section II. Mean and median consumption across state-years in rural areas are substantially less than in urban areas, and the standard deviation is smaller as well (Table 2).<sup>17</sup> However, the standard deviation is higher relative to the mean in rural areas (0.257) than in urban areas

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<sup>17</sup> The urban-rural gap in mean consumption is highly significant ( $p < .001$ ).

(0.185), indicating that the variation in rural consumption is higher on a proportional basis.<sup>18</sup>

This is confirmed by the statistics on log consumption: The variance of log consumption is 78 percent higher across state-years in rural areas than in urban areas.

The variable  $LIT_{it}$  is the literacy rate in state  $i$  and year  $t$ , which is available separately for rural and urban areas. Literacy is a basic determinant of labor productivity and, as we have seen, it has varied a great deal over time, across states and between urban and rural areas. States and years with higher literacy are likely to have higher levels of primary and secondary education as well, so the literacy rate serves as a proxy for all levels of education – not just literacy *per se*. The coefficient on literacy is expected to be positive, indicating that higher literacy is associated with higher consumption. An interesting question is whether the returns to literacy are the same in both urban and rural areas, i.e. are the coefficients of literacy equal in both the rural and urban equations.

The variable  $URB_{it}$  is the percentage of population in state  $i$  in year  $t$  living in urban areas. Although the variable takes on the same value for both urban and rural areas of a state, the coefficients may differ across equations. As is well known, job opportunities and the pay they provide are greater in urban than in rural areas, which leads to rural-urban migration. States with larger values of  $URB$  have relatively more opportunities in urban areas and less costly migration than in states with less developed urban areas. States with higher values of  $URB$  may therefore draw more migrants and raise incomes in rural areas as labor supply declines there, which would be indicated by a positive coefficient on  $URB$  in the rural equation. More urbanization may be associated with higher incomes in urban areas as well, if higher urbanization reflects productivity advantages, e.g. those stemming from higher capital-labor ratios and/or economies of agglomeration.<sup>19</sup>

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<sup>18</sup> Equivalently, the coefficient of variation is higher across state-years in rural areas than across urban areas.

<sup>19</sup> This is the pattern in the USA (Glaeser and Mare, 2001).

The variable  $YEAR_{it}$  takes on the values 0, 5, 10, 15, 21, 27, 32 corresponding to the NSSO survey years (with 1973=0). As specified above, the equations assume constant geometric growth rates which may differ between urban and rural areas. However, some alternative specifications are estimated below, breaking the whole sample into sub periods or including time specific fixed effects. These alternatives are sometimes of interest themselves, e.g. pre and post reform sub periods, and also serve as a check on the robustness of the estimates of the other coefficients.

The variable  $\varepsilon_{it}$  is a random disturbance assumed to have zero mean and constant variance over time, but which may differ between rural and urban areas. The disturbances may be correlated across equations because unobserved characteristics of a state in a particular year may affect consumption in both rural and urban areas. That is,

$$E \begin{bmatrix} \varepsilon_{it}^R \\ \varepsilon_{it}^U \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \text{ and}$$

$$E \begin{bmatrix} \varepsilon_{it}^R \\ \varepsilon_{it}^U \end{bmatrix} \begin{bmatrix} \varepsilon_{it}^R & \varepsilon_{it}^U \end{bmatrix} = \begin{bmatrix} \sigma_{RR} & \sigma_{RU} \\ \sigma_{RU} & \sigma_{UU} \end{bmatrix}$$

Estimation uses the seemingly unrelated regressions method, which takes account of cross-equation correlation and facilitates hypothesis tests involving coefficients from both equations.<sup>20</sup>

Table 3 displays estimates of the coefficients. Columns (1) and (2) are based on the basic model specified above. The constant term in the urban equation exceeds that in the rural equation by 0.246, a difference that is significant at the .01 level. Since the dependent variables are in logarithms, this implies that average consumption in urban areas would be about 28 percent higher than in rural areas in 1973 even if other factors (i.e. literacy and urbanization) were equal.

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<sup>20</sup> The model is estimated using EViews 3.1 from Quantitative Micro Software. An alternative specification would include state-specific fixed effects, but there are only seven observations for each state.

The literacy coefficients are highly significant and indicate that a one percent increase in the literacy rate is associated with an increase in average consumption of 0.59 percent in rural areas and 0.76 percent in urban areas, suggesting that the returns to education are higher in urban areas. While a Wald test indicates that the difference is only significant at the 0.29 level, the magnitude is substantively important. For example, an increase in literacy of 50 percentage points – approximately the increase for all India since 1951 – would be associated with an increase in average consumption of 34 percent in rural areas and 46 percent in urban areas.

The coefficients of urbanization are also both positive and highly significant. A one percentage point increase in the proportion of a state's population living in urban areas is associated with an increase in rural consumption of 0.59 percent and urban consumption of 0.62 percent. The difference between rural and urban coefficients is not statistically significant ( $p = 0.86$ ). Thus, in states with higher levels of urbanization, average consumption is higher in both rural and urban areas, and by about the same percentage.

The time (Year) coefficients indicate that average consumption in rural areas increased about 0.34 percent per year while in urban areas the growth rate was 0.54 percent per year, holding literacy and urbanization constant.<sup>21</sup> The trend in rural areas is only significantly different from zero in a statistical sense at the 13 percent level, while it is highly significant in urban areas. The difference in point estimates of 0.20 percent per year is not statistically significant ( $p = 0.28$ ); it amounts to a difference in favor of urban areas of about six percent over the 32 years of the sample.<sup>22</sup>

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<sup>21</sup> A model which excludes literacy and urbanization, i.e. including only constants and time trends, indicates that consumption increased about 1.0 percent per year in rural areas and 1.1 percent per year in urban areas. Thus, literacy and urbanization account for about 2/3 of the growth in rural areas and 1/2 of the growth in urban areas.

<sup>22</sup> Although none of the tests of individual pairs of coefficients rejects the hypothesis that urban and rural coefficients are equal (except the constant terms), a joint test of equality across equations for literacy, urbanization, and time is rejected at the 0.09 significance level.

The adjusted  $R^2$  statistics indicate that the model explains twice as large a proportion of the variation across state-years in urban consumption than rural consumption. This is not surprising, because as noted earlier the variance of log rural consumption is 79 percent larger than that of log urban consumption. Variation in weather and land quality across states and time may increase the variation in rural consumption.

The third and fourth columns (“Reform”) display the estimates when the time trends are allowed to vary between the pre- and post-reform periods. Specifically, a dummy variable taking the value of one for the 1999-2000 and 2004-05 surveys is interacted with the year variable.<sup>23</sup> There is little change in the estimated trend in rural areas, the change in trend associated with reform is not significant ( $p = 0.55$ ), and the  $R^2$  adjusted for degrees of freedom goes down. However, the trend in urban areas is markedly different in the two sub periods, almost tripling from 0.19 percent per year in the pre-reform period to 0.54 percent per year in the post-reform period.<sup>24</sup> In short, the economic reforms of the early 1990s have been followed by an acceleration in growth in urban areas but not in rural areas.

The final two columns of Table 3 display the results when year-specific constant terms are included, except for 1973 which is the base year. This is a much less restrictive specification since the time path of consumption is not required to evolve over a smooth path of constant exponential growth. Year-specific effects may be particularly appropriate for the rural sector, because incomes are affected by year-specific weather events in agriculture. Indeed the estimates in column (5) indicate that rural consumption was exceptionally high in 1987-88, and then resumed a slowly increasing trend that left consumption in 2004-05 only

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<sup>23</sup> Some of the reforms occurred as early as the 1980s but others occurred later, and it is unlikely that the early reforms had much impact on consumption in 1993-94.

<sup>24</sup> Similar results are obtained if a dummy variable for the 1999-2000 survey is included in each equation. The changes in trends, which are now estimated based only on the 2004-05 data relative to the 1972-73 to 1993-94 trend, are again negative, small and insignificant for agriculture, and positive, relatively large, and statistically significant in urban areas. The point estimates of the 1999-2000 dummies suggest that measured consumption was 1.1 percent above trend in rural areas and 2.9 percent above trend in urban areas. See also the estimates in columns (5) and (6). These results are consistent with other evidence that changes in the survey questionnaire resulted in higher measured consumption in the 1999-2000 survey.

9.7 percent higher than in 1973, holding constant literacy and urbanization. In fact, the 9.7 percent figure is not significantly different from zero ( $p = 0.24$ ). The estimates for urban areas display a quite different pattern (column 6). Consumption initially *declined* in 1977-78 a statistically significant 9.8 percent below 1972-73, controlling for literacy and urbanization. This decline may reflect the effects of the Emergency. Urban consumption increased fairly steadily after that, ending the period a statistically significant 9.9 percent above the 1972-73 level. Overall, the data suggest some importance for year-specific effects, but the adjusted  $R^2$  declines in the rural sector and rises only 0.01 in the urban sector.

The estimated coefficients on literacy and urbanization are quite stable across the various specifications for time trends. For example, the rural literacy coefficient ranges only between 0.0059 and 0.0070 across columns (1,3,5), while the urban literacy coefficient ranges only between 0.0063 and 0.0079 across columns (2,4,6). The ranges of the urbanization coefficients are even smaller: from 0.0054 to 0.0059 in rural areas and 0.0062 to 0.0063 in urban areas. Since literacy and urbanization both have strong time trends themselves, it is reassuring that the various specifications for year effects do not affect the estimates of literacy and urbanization. These findings reinforce the conclusions above: Higher rates of literacy and urbanization are significantly associated with higher consumption in both urban and rural areas.

A similar model can be estimated to examine the relationship between literacy and urbanization on the one hand, and consumption growth – as opposed to consumption levels – on the other hand. Endogenous growth theories suggest that education increases not just the *level* of productivity, but also its *rate of growth* and thus incomes and consumption (Jones, 2001). Glaeser and coauthors (1992, 1995) make related arguments and provide empirical evidence for a similar role for cities (urbanization) in economic growth. These hypotheses

can be examined using the Indian data already described. The model also provides a more formal method for examining convergence.

Following Barro and coauthors (1992, 1995, 1997), the annual growth rate of real monthly per capita consumption expenditure (“consumption”) in state  $i$  in years leading up to year  $t$ ,  $g_{it}$ , depends on the initial level of consumption, literacy, urbanization and a random disturbance term.

$$g_{it}^R = \beta_0^R + \beta_1^R \ln(MPCE_{it-2}^R) + \beta_2^R LIT_{it-2}^R + \beta_3^R URB_{it-2}^R + \eta_{it}^R$$

$$g_{it}^U = \beta_0^U + \beta_1^U \ln(MPCE_{it-2}^U) + \beta_2^U LIT_{it-2}^U + \beta_3^U URB_{it-2}^U + \eta_{it}^U$$

where  $i=1, 2, \dots, 15$  denotes the major states, and

$t$  denotes the seven quinquennial rounds of the NSSO surveys between 1972-73 and 2004-05. We use the 1972-73, 1983, 1993-94, and 2004-05 surveys. While one could in principle estimate the model using all of the surveys, shorter time periods between surveys may be highly influenced by temporary phenomena. For example, the analysis in the previous section suggested that both 1987-88 and 1999-00 are outliers, and they are effectively eliminated in the growth analysis.

The dependent variables  $g_{it}$  are defined as:

$$g_{it}^R = \ln(MPCE_{it}^R / MPCE_{it-2}^R) / (Year_t - Year_{t-2}) * 100, \text{ and}$$

$$g_{it}^U = \ln(MPCE_{it}^U / MPCE_{it-2}^U) / (Year_t - Year_{t-2}) * 100.$$

The first term,  $\ln(\cdot)$ , is the proportional growth between survey  $t-2$  and survey  $t$ . Dividing by the number of years between surveys yields the annual proportional rate of growth.<sup>25</sup>

Multiplying by one hundred expresses the annual rate of growth in percentage terms. The resulting data set consist of growth rates between the first and third, third and fifth, and fifth

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<sup>25</sup> The number of years between surveys varies slightly. We use 10.5 years for the time from the 1972-73 survey to the 1983 survey and for the time from the 1983 survey to the 1993-94 survey. There are 11 years between the 1993-94 and 2004-05 surveys.

and seventh surveys for each of the 15 major states, or a total of 45 observations on rural areas and 45 more on urban areas.

Averaged across states and survey periods, the mean annual growth rate in rural areas was 1.09 percent per year, and in urban areas it was 0.96 percent per year (Table 4).<sup>26</sup> The highest rural growth rate (3.96 percent per year) occurred in Kerala between 1972-73 and 1983, while the lowest rural growth rate (-0.44 percent per year) occurred in Haryana in the same period. The highest urban growth rate (2.48 percent per year) also occurred in Kerala between 1993-94 and 2004-05, while the lowest urban growth rate (-1.04 percent per year) occurred in Bihar between 1972-73 and 1983.

The term  $\ln(\text{MPCE}_{it-2})$  is the natural logarithm of the initial level of consumption at the beginning of the growth period. A negative coefficient on this term indicates that states with higher initial consumption tend to grow more slowly, i.e. consumption tends to converge. A positive coefficient indicates divergence, i.e. that states which are initially richer also tend to grow faster. The magnitude of the coefficient can be interpreted as the percentage rate of convergence or divergence. For example, coefficient of -3.00 indicates that about three percent of the gap between states is eliminated each year, *ceteris paribus*.

When no other explanatory variables are included, convergence (or divergence) is termed unconditional. When other explanatory variables are included, convergence (or divergence) is termed conditional, because it is conditional on (controls for) the influence of the other variables in the model, namely literacy and urbanization. The coefficients of these variables are expected to be positive if literacy and urbanization increase not just levels of consumption but also growth rates. As with the initial consumption level, literacy and urbanization are measured at the beginning of the growth period.

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<sup>26</sup> Recall that the estimated Year coefficients in Table 3 are smaller because they are net of the estimated effects of changes in literacy and urbanization.

Consumption at the beginning of the period is likely to be correlated with the disturbance term for several reasons. First, it is directly involved in the definition of the dependent variable. Thus any measurement errors in  $\ln(\text{MPCE}_{it-2})$  will create a spurious negative correlation with the dependent variable. Second, growth may depend on unobserved factors that affect both the level and growth of incomes. For example, a favorable governmental regime may positively affect both income levels and growth, and thus bias the coefficient upward. Consequently, the growth model is estimated by three stage least squares, which takes account of both the potential endogeneity of initial consumption and correlation of disturbances between the rural and urban equations. Instrumental variables include the rural and urban literacy rates, urbanization, and year- and state-specific fixed effects.<sup>27</sup>

Table 5 displays estimates of the unconditional growth model, i.e. with no explanatory variables except for initial consumption. The basic model (columns 1 and 2) has almost no explanatory value – in fact the adjusted  $R^2$  is negative for both the rural and urban equations. In columns (3) and (4) a dummy variable for the reform period (growth from 1993-94 to 2004-05) is included and interacted with the initial consumption level, allowing both the intercept and slope coefficients to differ in the reform period. The estimates suggest that consumption in both rural and urban sectors was converging in the pre reform period, at a rate of 2 or 3 percent per year. The reform variables suggest a substantial shift toward divergence in the latter period. However, the adjusted  $R^2$  remains negative in the rural equation, and the reform coefficients are estimated based on only 15 observations, so they should be regarded with caution.<sup>28</sup>

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<sup>27</sup> The first stage regressions for initial rural and urban consumption yield adjusted  $R^2$ 's of .914 and .874, respectively.

<sup>28</sup> Interestingly, the rural equation in the reform specification has four highly significant individual coefficients despite the fact that the adjusted  $R^2$  is negative. In contrast, none of the coefficients of the urban equation are significant at even the 10 percent level, but the adjusted  $R^2$  is positive. These results appear to result from the high degree of collinearity among the right hand side variables. In particular the interaction of lagged consumption and the reform dummy in both urban and rural areas each have a correlation of .999 with the reform dummy itself.

Table 6 displays estimates of the conditional convergence model. Estimates of the basic model (columns 1 and 2) suggest a slow rate of convergence of consumption over the entire sample period, conditional on literacy and urbanization. However, convergence is not statistically significant in the urban equation. Growth is positively and significantly related to literacy in both rural and urban areas: A 10 percentage point increase in literacy is associated with higher growth of 0.42 to 0.67 percent per year. Urbanization is positively and significantly related to growth in urban areas, where a 10 percentage point increase in urbanization is associated with higher growth of 0.32 percent per year. The overall performance of the conditional growth equations is considerably better than the unconditional equations as indicated by the sharply higher adjusted  $R^2$ 's.

The last two columns of Table 6 display the results when a dummy for reform and its interaction with initial consumption are included. The coefficients on initial consumption are statistically significant and indicate that convergence was occurring in the pre reform period at a rate of 3-4 percent per year. The coefficients for the reform period imply a shift away from convergence toward divergence. The point estimates continue to imply convergence in rural areas, and the result is significantly different from zero. In the urban equation, the point estimates imply divergence, although the result is not significantly different from zero.<sup>29</sup> The estimated coefficients on literacy continue to imply a positive relationship with growth in both rural and urban sectors. Urbanization also continues to be positively related to growth in urban areas.

Summarizing this section, the quinquennial NSSO surveys provide strong evidence that monthly per capita consumption expenditure in both rural and urban areas is positively related to literacy and urbanization. The magnitudes of the estimated coefficients are similar

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<sup>29</sup> These results are similar to those for the unconditional equation: The individual coefficients are highly significant in the rural equation, even though the increase in  $R^2$  is modest, while the reform coefficients are not individually significant but the increase in  $R^2$  is more substantial.

across sectors, suggesting that the impacts of basic education and urbanization on average consumption are just as important in rural areas as in urban ones. Average growth rates accelerated in urban areas during the reform period, but not in rural areas. The unconditional growth model has little explanatory value in pre reform years, indicating no trend toward either divergence or convergence. A stronger tendency toward divergence emerges in urban areas in reform years. Literacy is positively associated with growth in both rural and urban areas, and more highly urbanized states have faster rates of growth in urban areas.

## **VI. Conclusions/Discussion**

India has made substantial progress over the last half century in reducing poverty, increasing literacy and school attendance, and decreasing infant mortality, in part by increasing access to clean water. Regional disparities – that is, urban-rural gaps and differences among states - have generally declined for these indicators. In some cases, the changes have been substantial. For example, inter-state differences in poverty rates in both urban and rural areas have shown marked decline, and the same is true for literacy and access to clean water. However, in some other areas, notably school enrolment, results have been very uneven across states, and some of the states with the lowest enrolment have shown very little or no increases. In addition, the urban-rural gap in consumption and the gender gap in literacy remain substantial.

The overall picture, however, is one of reductions in the measures of regional inequality that are most relevant to the poor. This stands in sharp contrast to trends in the distribution of income and consumption among individuals, particularly in recent years. Growth in incomes at the top of the distribution has increased inequality among individuals, and also increased the urban-rural gap in average incomes and consumption. Nevertheless, progress among the poor, who are arguably the central focus of concern, has continued.

It may be argued that it is “easier” for states with initially low levels of development to make improvements than it is for states that are already relatively highly developed, and that therefore the measures of convergence presented here are flawed. No doubt there is truth to the first part of the statement. One reason is that states with relatively high poverty rates typically have more persons close to the poverty line, so a modest increase in incomes will have a larger impact on poverty rates (Deaton and Dreze, 2002). It is also true that increasing marginal cost occurs in a variety of human activities, including increasing literacy, reducing infant mortality, and others. Increasing marginal cost explains, in part, why infant mortality rates in the OECD, for example, are not zero. But whether it is easier or harder to reduce poverty when there is a lot of it does not change the facts presented here: The greatest improvements in key development indicators for the poor – poverty rates, literacy, and infant mortality – have occurred in the states that initially had the worst conditions. The remaining differences across states may reflect, in part, differences in the effectiveness of state and local governments in implementing programs to increase literacy and reduce infant mortality.

Some of the attention paid to “increasing inequality” in India appears to be misplaced. As we have seen, increased inequality has primarily resulted from increased incomes among the top decile. But the condition of the rich is of only secondary relevance for the poor. Although the poor may covet the houses and cars of the rich, this is surely less important than their own circumstances of food, clothing and shelter, and the education and mortality of their children. Viewed from the perspective of these indicators, the poor have continued to make progress and regional inequality is in most cases diminishing.

Some authors have calculated what would have happened to the poor if inequality had not increased in recent years, but growth rates of average incomes or consumption had accelerated as they actually did. This is not a fruitful exercise. The incomes of the rich increased because of a variety of changes in the economy that were associated with higher

growth rates, including the reforms of the early 1990s. If the reforms had not occurred, the distribution of income probably would not have shifted so markedly in favor of the rich, but also at least some of the acceleration in growth in all likelihood would not have occurred either.

Some authors have compared the increase in Indian inequality to that in China. For example, “China’s experience of sharp and sustained increase in economic inequality over a period of more than 20 years ... is, in fact, an important pointer to the possibility of further accentuation of economic disparities in India in the near future” (Deaton and Dreze, 2002, p. 3741). Such comparisons again seem to miss the essential point: Inequality in China has increased because some people are enjoying rapid and substantial increases in their standard of living. While not everyone is benefiting equally at the same time, the most important thing is that hundreds of millions of people have been lifted out of truly abject poverty. In short, not all Chinese are equally miserable any more.

In any case there is wide agreement that as an empirical matter, “...poverty reduction is overwhelmingly driven by the growth rate of APCE [average per capita consumption], rather than by changes in distribution...”<sup>30</sup> Thus, policies aimed at spurring growth are likely to have beneficial effects for the poor. As the last section of this paper has demonstrated, both the level and growth of average consumption are positively related to education and urbanization in both rural and urban areas.

India has made great progress in addressing provision of basic services such as education and clean water. One would always wish that these accomplishments could have been sooner and better, but that does not negate the progress that has been made. Debate over the impact of liberalization in the 1990s continues, but in basic form appears to be here to stay. Additional challenges exist in infrastructure provision, quality of public services,

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<sup>30</sup> Deaton and Dreze (2002) p. 3735. See also Jha (2004) pp. 18, 22-3, 26 on the “weak” links between inequality and poverty, and Bhanumurthy and Mitra (2004).

corruption and possibly labor market reform. The effectiveness of some relief programs is questionable. These are momentous tasks, and focusing on them – rather than measures of inequality – is most likely to move the economy forward.

Table 1. “Implausible” Results

	<b>Poverty Line</b>		<b>Poverty Rate</b>	
	<b>(Rupees per Month)</b>		<b>(Percent)</b>	
	<b>Rural</b>	<b>Urban</b>	<b>Rural</b>	<b>Urban</b>
Andhra Pradesh	293	543	11	28
Karnataka	324	600	21	33
All India	356	539	28	26

Source: NSSO for 2004-05

Table 2. Descriptive Statistics for the Consumption Model

	<b>Mean</b>	<b>Median</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Std. Dev.</b>
Consumption Rural	517.43	484.00	1,013.00	322.00	133.06
Consumption Urban	861.36	829.00	1,326.00	633.00	158.98
Ln(ConsRural)	6.22	6.18	6.92	5.77	0.24
Ln(ConsUrban)	6.74	6.72	7.19	6.45	0.18
Literacy Rural	39.64	37.00	80.00	15.00	14.75
Literacy Urban	62.10	62.00	83.00	44.00	9.19
Urbanization	24.33	25.00	47.00	9.00	8.69
Year	15.71	15.00	32.00	0.00	10.84

Sources: See text. Data is by state-year; total observations = 105. Consumption (MPCE) is in constant 2004-05 Rupees per person per month. Literacy and Urbanization are percentages of population. Year refers to NSSO survey year (1973 = 0).

Table 3. Estimates of the Consumption Model  
(Absolute values of t-ratios in parentheses)

Model	Basic		Reform		Year Effects	
	Rural (1)	Urban (2)	Rural (3)	Urban (4)	Rural (5)	Urban (6)
Constant	5.7896 (91.7)	6.0356 (75.8)	5.7720 (87.4)	6.0693 (75.6)	5.7386 (79.2)	6.0924 (82.7)
Literacy	0.0059 (3.49)	0.0076 (4.96)	0.0063 (3.77)	0.0074 (5.07)	0.0070 (4.27)	0.0079 (5.83)
Urban	0.0059 (2.48)	0.0062 (4.91)	0.0056 (2.39)	0.0063 (5.10)	0.0054 (2.29)	0.0063 (5.44)
Year	0.0034 (1.50)	0.0054 (4.18)	0.0045 (1.40)	0.0019 (1.10)		
Year*Reform			-0.0014 (0.60)	0.0035 (2.83)		
D78					0.0501 (0.73)	-0.0913 (2.67)
D83					0.0652 (0.94)	-0.0601 (1.72)
D88					0.1309 (1.86)	-0.0284 (0.80)
D94					0.0709 (0.97)	0.0106 (0.29)
D00					0.0981 (1.26)	0.1045 (2.63)
D05					0.0972 (1.17)	0.0987 (2.30)
Adjusted R <sup>2</sup>	0.336	0.662	0.330	0.673	0.310	0.690

Notes: Dependent Variables are the natural logarithms of per capita consumption expenditure (MPCE) in constant 2004-05 Rupees for rural and urban areas. Sample period is the seven NSSO surveys between 1972-73 and 2004-05 across 15 major states; N=105 for both rural and urban areas.

Table 4. Descriptive Statistics for the Growth Model

	<b>Mean</b>	<b>Median</b>	<b>Maximum</b>	<b>Minimum</b>	<b>Std. Dev.</b>
Growth Rate Rural	1.09	0.97	3.96	-0.44	0.94
Growth Rate Urban	0.96	1.15	2.48	-1.04	0.94
ln(Cons Rural <sub>t-2</sub> )	6.15	6.13	6.64	5.78	0.21
ln(Cons Urban <sub>t-2</sub> )	6.69	6.68	6.96	6.47	0.12
Literacy Rural <sub>t-2</sub>	34.67	33.00	78.00	15.00	13.18
Literacy Urban <sub>t-2</sub>	58.80	58.00	81.00	44.00	8.29
Urbanization <sub>t-2</sub>	23.04	24.00	40.00	9.00	8.14

Sources: See text. Growth rates are for the 15 major states during the periods 1972-73 to 1983, 1983 to 1993-94, and 1993-94 to 2004-05; total observations = 45 in both urban and rural areas. Growth rates are average annual percentage changes. Consumption (MPCE) is in constant 2004-05 Rupees per person per month. Literacy and Urbanization are percentages of population.

Table 5. Estimates of the Unconditional Growth Model  
(Absolute values of t-ratios in parentheses)

<b>Model</b>	<b>Basic</b>		<b>Reform</b>	
	<b>Rural (1)</b>	<b>Urban (2)</b>	<b>Rural (3)</b>	<b>Urban (4)</b>
Constant	2.697 (0.64)	-12.879 (1.60)	19.333 (3.17)	14.530 (1.10)
Initial Cons	-0.261 (0.38)	2.069 (1.72)	-3.001 (3.00)	-2.089 (1.05)
Reform			-48.895 (3.48)	-42.146 (1.54)
Init Cons*Reform			7.926 (3.50)	6.394 (1.58)
Adjusted R <sup>2</sup>	-0.016	-0.008	-0.002	0.156

Notes: Dependent variables are the average annual growth rates of consumption for the 15 major states during the periods 1972-73 to 1983, 1983 to 1993-94, and 1993-94 to 2004-05; total observations = 45 in both urban and rural areas. Initial Cons is the logarithm of consumption at the beginning of the period. Estimation is by 3SLS.

Table 6. Estimates of the Conditional Growth Model  
(Absolute values of t-ratios in parentheses)

<b>Model</b>	<b>Basic</b>		<b>Reform</b>	
	<b>Rural (1)</b>	<b>Urban (2)</b>	<b>Rural (3)</b>	<b>Urban (4)</b>
Constant	8.422 (2.14)	8.523 (1.06)	17.792 (3.44)	23.995 (2.22)
Initial Cons	-1.433 (2.13)	-1.835 (1.41)	-2.919 (3.42)	-4.077 (2.46)
Literacy	0.042 (4.06)	0.067 (4.06)	0.037 (3.53)	0.053 (3.40)
Urbanization	0.001 (0.09)	0.032 (2.02)	-0.004 (0.28)	0.036 (2.40)
Reform			-36.890 (3.04)	-19.454 (0.89)
Init Cons*Reform			5.933 (3.03)	2.997 (0.82)
Adjusted R <sup>2</sup>	0.260	0.367	0.293	0.459

See notes to Table 5. Literacy and Urbanization are percentages of population.

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