

Human Development in India: The Nineties*

Bhaskar Dutta
University of Warwick,
Coventry, England.

2005

* Prepared for the Asian Development Bank under the contract title *Interregional Variations in Poverty and Human Development*. I am most grateful to Kaveri Kumar for excellent research assistance and to Sudipto Mundle and Bharat Ramaswami for detailed comments.

The views expressed here are those of the author and do not necessarily reflect ADB's views.

I. Introduction

The decade of the nineties has arguably been one of the most significant periods for the Indian economy. There has been a complete overhaul of the economic policy environment in the country, with the economy taking giant strides towards liberalization and integration with the global economy. At an aggregate level, the economy has performed remarkably well, recording one of the highest average growth rates amongst all countries. However, the *welfare* consequence of these policy changes has been a matter of intense controversy. The proponents of economic reforms claim that the decade has witnessed unprecedented improvements in living standards. An equally passionate group has claimed that the reforms have led to huge increases in inequality, with the rich garnering all the benefits of growth at the expense of the vast majority who have experienced a sharp deterioration in their well being.

This debate has been conducted almost entirely in terms of trends in the levels of poverty during the nineties.¹ This is in conformity with a long tradition in economics that equates goals of development almost entirely in terms of levels of *income* or *consumption*. However, it is being increasingly recognized that in any evaluation of the performance of an economy, incomes and similar expenditure-based indicators need to be supplemented with broader indicators of wellbeing which include achievements in health and education.² The main purpose of this paper is to describe how the (the major) individual Indian *states* have fared during the nineties in terms of criteria such as the percentage of the population completing different stages of education, infant and child mortality rates as well as the more traditional income-based criteria.

The description is conducted at two levels. First, the paper looks at inter-state variations and the relative ranks of different states in terms of each of the *individual* criteria in health, education, inequality, the head-count measure of poverty and per capita state domestic product at two points of time corresponding essentially to the “early” and “late” nineties. Second, the relative rankings are aggregated to arrive at some (ordinal) ranking of *human development* for the states.³

¹ See Datt(1999), Datt and Ravallion(1998, 2002), Bhalla(2003), Deaton and Dreze(2002), Sen (2000), Sen and Himangshu(2004), Sundaram and Tendulkar (2003a, 2003b, 2003c), among others.

² Amartya Sen has been particularly influential in changing perceptions about the appropriate goals of development. See, for instance, Sen (1987).

³ The actual ranking constructed here is very different from the human development rankings constructed by successive versions of the UNDP's *Human Development Report*, although the spirit of the exercise is very similar.

Even a cursory glance at the data shows that the Indian states are very *heterogeneous*, the levels of achievement according to the different criteria being vastly different in the different states. It is also difficult to classify all states as “successes” or “failures” according to all the criteria –some states have relatively low rates of mortality but are also low achievers in education while some states are relatively well educated but also have high rates of mortality.⁴ This suggests that the level of state incomes cannot determine whether states are low or high achievers. Indeed, it turns out that the correlation between per capita state domestic product and levels of achievement in the social sectors are not particularly high. The paper goes on to examine the influence of state expenditure in health and education on levels of achievement, and shows that expenditures and sectoral outcomes are correlated.

A word of caution is in order. The paper makes extensive use of data on health and education collected by the *National Family Health Survey* (NFHS). The data cover the years 1992-93 and 1998-99, and are based on questionnaires circulated to *ever-married women* (and their households) between the ages of 13-49. Of course, the use of this data source means that we have observations at only two time-points. This imposes a severe constraint on the type of analysis that is possible. Clearly, this rules out any kind of econometric analysis. Thus, although the ultimate interest in such a descriptive analysis must centre around the *causal* factors underlying achievement levels in health and education, the subsequent sections only use the rather crude method of looking at the (*Spearman rank*) *correlation* between say the ranking of states according to infant mortality and the ranking of states according to per capita state domestic product. This does not really provide an answer to the question of whether the benefits of growth spill over to achievements in health. Similarly, even a relatively high correlation between the ranking of states according to the proportion of state population completing primary education and the ranking according to state governments’ expenditure on education provides at best only a tentative conclusion about the importance of public policy in promoting higher levels of achievement in the social sectors. So, the main purpose of this section of the paper is to raise issues for further analysis rather than to provide definitive answers.

⁴ Of course, some states such as Kerala and Maharashtra perform remarkably well according to most criteria in the social sectors.

II. Inter-State Variations.

The main purpose of this section is to describe the performance of the 16 major states during the nineties in the social sectors. For completeness, the section also contains a brief discussion of how the states have performed in terms of the income-based criteria such as per capita state domestic product, inequality and poverty.⁵

The paper uses data from the two surveys of the NFHS to evaluate the states' achievements in the spheres of education and health. Data on *gross school enrollment*, published by the Ministry of Human Resource Development represent an alternative source of data. Since these are published annually, they constitute a potentially richer data set. Unfortunately, there are several problems with the enrollment data. First, several researchers have raised doubts about the reliability of the data, alleging that schools deliberately over report the data in order to show that targets have been fulfilled. Second, the enrollment ratio does not take into account drop-out ratios which are often very high in the terminal stages of primary education. Lastly, gross enrollment ratios can be misleading because children in say the age group 6-11 years may also be enrolled in the primary section.⁶

Kakwani (1993) points out that it is essential to use *non-linear* transformations of the actual variables in measuring achievements in the social sectors. This is because the values of several indicators have to satisfy some natural constraints. Mortality rates or measures of poverty or inequality are bounded below by zero, while the percentage of the population completing any given stage of education is bounded above by 100. Consider two states A and B with say infant mortality rates of 50 and 40 respectively. Then, state A will find it easier to reduce the mortality rate to 45 than B to reduce the mortality rate to 35. A linear measure of achievement does not take this phenomenon into account. For indicators where lower values are more desirable, this effect is captured by taking *strictly concave* transformations. On the other hand, for measures such as the percentage completing a given level of education, higher values are more desirable, and then *strictly convex* transformations are appropriate. In this paper, I have

⁵ Our discussion of the states' performance in terms of the distributional criteria borrows heavily from Deaton and Dreze (2002). See Ahluwalia (2000) for an excellent analysis of the "economic" performance of the major states during the nineties. It is revealing of prevailing orthodoxies that Ahluwalia essentially uses "economic" performance synonymously with levels of per capita state domestic product.

⁶ The *Sample Registration System*, supervised by the Office of the Registrar General of India, provides an alternative source of data on infant and child mortality rates. I have used the data from the NFHS so as to maintain consistency with the data on education.

used the logarithmic transformation for indicators such as mortality rates and levels of poverty. For education variables, I have used $x^{1.5}$, where x is the value of the basic variable.

II.1 Education

The NFHS surveys provide data by sex on the percentages of each state's population above 6 years who have completed different stages of education – primary, middle, and high school and beyond high school. I discuss below the main features of this data.

Tables 2-5 show that the rank correlations for the first three stages of schooling are very high. That is, states, which score well in terms of the fraction of population completing primary school, also obtain high scores for middle and high school. This suggests that the rate of attrition across the different stages of school is fairly similar for the different states. In view of the similarity across these three stages, I will restrict much of the discussion to the salient features of the data for the *primary* stage.

The tables also show that this pattern is not maintained for the category “above high school” – the rank correlations between the categories primary, middle and high school on the one hand and above high school is not very high, being particularly low for boys in 1992-93. I will discuss very briefly some of the features relating to the “above high school” category.

Given Kerala's enviable record in human development, it is not surprising that the state has the highest percentage of both males and females completing primary school for both time periods. The figures for 1992-93 show that 65.5 per cent of boys and 60.6 per cent of girls completed primary school in Kerala. Kerala leaves the other states far behind. Tamil Nadu occupies the second position for both sexes. While 58.6 per cent of the male population in Tamil Nadu above 6 years completed primary school, the situation for girls is even more striking. Only 41 per cent of the female population completed primary school in Tamil Nadu. At the other end of the spectrum is Rajasthan, one of the BIMARU states, with only 41 percent of boys and as little as 15 percent of girls completing primary school. In fact, most of the BIMARU states are bunched at the lower end of the spectrum for both male and female education.

In 1998-99, almost 75 per cent of males and 68 per cent of females above 6 years completed primary school in Kerala. Bihar occupied the bottom position for both sexes, with 43.5 percent of males and only 20 per cent of females completing primary

school. A noticeable difference from 1992-93 is the relative improvement in the positions of some of the BIMARU states in male primary education. For instance, Rajasthan climbs up to the 9th position in terms of the percentage of male population completing primary school. Another striking change is the vast improvement in the achievement of Himachal Pradesh, which occupied the second position behind Kerala for both sexes. This improvement has been brought about by a sizeable increase in the percentage of population completing primary education in the state- up from 57.2 percent to 67.6 per cent for males and from 39.6 per cent to 52.7 per cent for females.

There are no clear discernible geographical patterns in the distribution of levels of achievement in education. For instance, while Kerala and Tamil Nadu are close to the top in all school categories and in both time periods, the performance of the other Southern states has not been particularly distinguished, with Andhra Pradesh languishing quite close to the bottom. Amongst the Northern states, Himachal Pradesh has been the most successful and has moved up the ladder quite rapidly, but Haryana's relative position has actually deteriorated at least in male education. Perhaps, the only noticeable pattern is that the Eastern states as a whole lag behind the rest of the country,

Since incremental changes are more difficult to achieve if a state is already a high achiever, a first impression may have been that the states with low levels of achievement in the early nineties would add to the numbers of students completing primary education at a faster rate than states like Kerala and Tamil Nadu. This would in turn mean that absolute differences in the levels for the various states should come down over time. The changes in the relative ranking of states across the two years should also have contributed to this trend, thus leading to some reduction in the extent of dispersion in levels of achievement. However, Table 1 shows a movement in the *opposite* direction - the dispersion (measured by the coefficient of variation) has actually increased in all the three categories for male education. Almost the same phenomenon has been witnessed in female education.

Table 1 also shows that the dispersion is significantly higher in Middle and High school education, this feature being particularly noticeable in the latter period. This suggests that larger fractions drop out of the school system after the primary and middle school stages in the less successful states. For instance, the 1998-99 figures show that the ratios of the percentage completing primary school to that completing middle school amongst males in Kerala and Himachal Pradesh is around 0.69. The corresponding

figure in states like Bihar and Haryana is 0.62. It is even lower at 0.58 in Madhya Pradesh.

In the absence of any “hard” evidence, one can only speculate about the underlying causes. A mixture of “economic” and social reasons comes to mind. In the poorer states such as Bihar and Madhya Pradesh, the returns to education beyond the primary stage may be perceived to be low. Impoverished parents may also be forced to send their children out to work in order to supplement family incomes. These cannot be very compelling reasons in a state like Haryana, which is one of the richest states. Here, cultural factors are more likely to be responsible for higher drop-out rates.

Social norms must certainly be responsible for the prevalence of gender bias in education. Even a cursory glance at the data reveals the wide gap between the fractions of males and females completing various stages of education. In comparing the extent of gender bias (and more importantly the change across time), I have measured gender bias in any category of education by $\ln(M/F)$, where (M/F) is the ratio of fractions of Males and Females completing any level of education. So, a positive value of the index indicates a bias against females, while a negative value shows the presence of bias against males. Of course, the choice of any specific measure of gender bias (provided each is an increasing transformation of the ratio M/F) cannot affect comparisons of *levels* of gender bias since all such measures must be ordinal transformations of M/F . However, the choice does affect comparisons of *changes* across time.

Tables 8 and 9 describe the levels of gender bias in the two time periods. The BIMARU states are at the top of the table in both years and for each category of education, while Kerala is the most liberal state with a very low level of bias against females. Interestingly, the neighbouring states of Punjab and Haryana exhibit very different characteristics in the first time period, with the bias being much higher in the latter state. Indeed, Punjab exhibits the second lowest bias against girls after Kerala.

The tables also show that the bias against girls is larger in the higher stages of education. The economic returns to boys' education are greater than that of girls' education since a smaller proportion of women work. Moreover, girls leave the family after marriage, and so parents get no direct benefits from the future earnings of girls. Girls are also more useful than boys in household work such as looking after smaller children. Hence, it is not surprising that drop-out rates are higher for girls than boys resulting in an increase in the extent of gender bias at higher stages of education.

Table 10 describes how the prevalence of gender bias has changed during the nineties. Haryana has been the most successful state in reducing the extent of bias against females in all categories. To some extent, the huge improvement in bias has been due to “negative” reasons. The NFHS data show that there has been an *absolute drop* in the percentage of males completing various stages of education in Haryana. For instance, the percentage of males completing primary education in Haryana dropped from 53.9 per cent in the first period to 47.9 in the second period. On the other hand, the fraction of females completing various stages of education has increased, thereby causing a large fall in the M/F ratio.

The BIMARU states have performed surprisingly well in reducing the extent of bias at the primary stage, although they still exhibit the greatest degree of bias. Perhaps, the reason why the BIMARU states do so well in terms of *improvement* is because the bias was so high in the initial year, and so it was relatively easy to reduce the M/F ratio. Also, except for Rajasthan, where the fraction of males completing primary education also went up significantly, the other states did well on the improvement score partly because there was very little improvement in figures for male education.

II.2 Health

The two rounds of the NFHS provide data on various mortality rates as well as on anthropometric indices such as the degree of deviation (in terms of number of standard deviations) from the median of the International Reference Population of characteristics such as weight for age, height for age, and weight for height. Unfortunately, only the “weight for age” data are available for all the states for 1992-93. So, we have used only the “weight for age” data amongst the anthropometric indices.

Table 12 shows that the ranking of states according to the anthropometric index corresponding to “weight for age” has a low correlation with rankings corresponding to the various mortality rates.⁷ This is surprising for two reasons. First, the “weight for age” criterion indicates the extent of malnourishment and since well-nourished babies are better equipped to resist various infections, there “should” be greater correlation between these rankings. Second, malnourished babies are more likely to be from poorer households, and so the “income effect” should also contribute to a higher correlation.

⁷ The table uses the percentage of children in the age group 0-47 months below 3 standard deviations away from the median of the reference population. A similar result holds for the percentage below 2 standard deviations away from the median.

Notice that the table shows that the correlation in rankings according to the various mortality rates is quite high, this being particularly in 1998-99.

Most of the discussion in this section will focus on the inter-state patterns in mortality rates. Not surprisingly, Kerala has the lowest mortality rates in all categories. Kerala's infant mortality rates in 1992-93 and 1998-99 were 23.8 and 16.3. These are almost comparable to the averages for the OECD countries and far lower than the averages for developing countries as a whole. The bottom of the ladder in 1992-93 is occupied by Orissa which had staggeringly high rates of 64.4, 112 and 21.3 for neonatal, infant and child mortality respectively. The infant mortality rate is almost the same as that of the average amongst the countries defined by the UNDP as "least developed countries". Bihar, Uttar Pradesh and Madhya Pradesh are also bunched at the bottom, but the other BIMARU state- Rajasthan- actually had the fifth lowest rank in terms of neonatal mortality. Himachal Pradesh, Maharashtra and Punjab have relatively low mortality rates, although there is a big gap between them and Kerala. As in the case of education, there is no clear geographical pattern. Indeed, it is quite remarkable that the mortality rates in the neighbouring states of Punjab and Haryana are not comparable, with the latter having significantly higher rates.

Rajasthan slid down the ladder between 1992-93 and 1998-99, and joined the other BIMARU states at the bottom according to all three indices of mortality in 1998-99. The rate of infant mortality in Uttar Pradesh, the worst state in terms of this index, was 86.70. To put this in perspective, note that the average for the UNDP's "developing countries" category was 64, whereas the average for the "least developing:" countries were 104. Hence, there has been a slight improvement in the relative position of the major states in India since the the infant mortality rate for Orissa in 1992-93 was comparable to that of the average for "least developed" countries. West Bengal was a new entrant at the top –the state was particularly successful in reducing the rate of neonatal and infant mortality rates.

As I have mentioned earlier, Table 12 shows that there is a low correlation between the rankings of states according to mortality rates and the anthropometric indices. However, it is worth mentioning that Kerala occupies the top position even in terms of both the "weight for age" indices. As far as the other states are concerned, there is actually no dramatic change in rankings, except possibly for Haryana which has high levels of achievement in the anthropometric rankings, although its mortality rates are not particularly low. The low correlation between the different rankings is due to the

fact that almost all states have some change in their relative ranks and not because of large changes in ranks of a few states.

Table 14 describes the extent of improvement in the various health indicators. Again, improvement has been measured as the difference between the logarithmic values of the mortality rates or the “weight for age” indices in 1992-93 and 1998-99. There is a noticeable difference in the performance of the states in terms of improvements in mortality rates and in the “weight for age” indices. West Bengal and Himachal Pradesh achieve significant improvements in the mortality rates, but negligible or small improvements in the “weight for age” indices. On the other hand, Punjab achieved a big improvement in both the “weight for age” indices, although its mortality rates actually increased between 1992-93 and 1998-99!

II.3 Income-based Criteria

In this section, we briefly review the performance of the states in terms of growth rates in per capita state domestic product, the Head-count measure of poverty and inequality.⁸

Per Capita State Domestic Product

Ahluwalia (2000) points out that there has been a significant increase in the average rate of growth of per capita gross state domestic product (pcsdp) between the eighties and the nineties.⁹ However, there has been a great deal of variation in the growth rates across states. For instance, Maharashtra and Gujarat have grown at annual rates of over 6 per cent during the nineties, whereas Bihar and Uttar Pradesh have limped along at just over 1 per cent year. Table 15 gives some idea of the inter-state variations in levels of pcsdp and how this has varied between the first and second halves of the nineties. Period 1 refers to the first five years of the nineties while period 2 represents the second half. The table shows the coefficient of variation in the simple average of pcsdp in each period. The dispersion has actually increased across the two periods, with the coefficient of variation increasing from 0.33 to 0.37.

⁸ For detailed discussions, see Ahluwalia(2000) on inter-state variations in state domestic product up to 1997-98, and Deaton and Dreze (2002), Sundaram and Tendulkar (2000, 2001, 2002), Sen and Himangshu (2004) for changes in the distributional indicators.

⁹ Ahluwalia does not include Assam and Himachal Pradesh in his calculations, and also considers data up to 1997-98. The inclusion of these two states and the addition of two additional years do not change this conclusion.

Table 16 gives a more disaggregated picture of the inter-state growth rates. The second column of the table shows the *percentage increase* in pcsdp across the two periods. Gujarat, Karnataka and Tamil Nadu have recorded percentage increases of over 30 per between these two periods. In fact, nine states have achieved percentage increases of over 20 per cent. Interestingly, this includes Rajasthan, one of the BIMARU states. On the other hand, Bihar has turned in a dismal performance, the average per capita state domestic product actually *falling* between the two periods. Assam and Orissa have also recorded very small percentage increases in pcsdp. However, there is no geographical pattern – the other eastern state, West Bengal, has been one of the best performers in terms of pcsdp during the nineties.

Poverty

As I have mentioned earlier, the extent of reduction in poverty during the nineties has been a matter of intense debate. The National Sample Survey (NSS) introduced a change in its sampling design for the 55th Round (1999-00) survey of household consumption expenditure. Unlike in the past, it used a questionnaire which contained both a 7-day and 30-day recall period for food, pan and tobacco.¹⁰ This raised fears that households would distort reported expenditures in an effort to achieve consistency between the different recall periods, so as to render the 55th round data non-comparable with earlier rounds.

Deaton (2001) devised an ingenious adjustment procedure, which used the fact that (a) even the 55th round questionnaire retained only the 30-day recall period for a few commodities, and (b) these commodities were highly correlated with total expenditure.¹¹ Hence, expenditure on these commodities could be used to get some idea of trends in total expenditure. Deaton and Dreze (2002) use the adjusted expenditures to derive their poverty estimates. In addition, they also argue that most poverty estimates use “defective” price indices to update poverty lines because the indices are based on fixed an outdated commodity weights. Since the NSS reports both quantity and value data for many commodities, the ratios provide an estimate of prices. Deaton and Dreze use these prices to construct price indices, which are in turn used to construct state-specific poverty lines across time. Other authors have not used these “corrections” and so the

¹⁰ The 7-day and 30-day recall questionnaires were also used in the past- but they were administered to *different* households.

¹¹ See also Deaton (2003a, 2003b, 2003c).

different poverty estimates lead to very different conclusions, not just about *levels* of poverty in the different states but also about the *rankings* of states according to the incidence of poverty. The subsequent discussion is based on the estimates of the head count measure of poverty presented in Deaton and Dreze.

Since the NSS reports consumption expenditure separately for the rural and urban sectors, the poverty estimates are also available for the two sectors. There is a substantial difference in the incidence of poverty across the two sectors, with rural poverty being much higher in all states except Punjab. In the rural sector, Bihar and Orissa have extremely high and *virtually unchanged* levels of poverty during the nineties, the head count ratio being over 40 percent. Maharashtra also witnessed a high rate of poverty in the rural sector in 1993-94, but managed to bring the level down to just over 30 per cent by 1999-00. Poverty in the urban sector was relatively low.

Since all the other indicators of well being are available for the state as a whole, I have used the ratios of the rural and urban populations in each state to derive the aggregate incidence of poverty for each state. The average across all states came down from just under 27 per cent in 1993-94 to just over 20 per cent in 1999-00. However, the reduction in poverty in the different states has been far from uniform. Table 15 shows that the coefficient of variation in the levels of poverty in the different states has actually gone up quite steeply from 0.37 to 0.54.

A more disaggregated picture of the changes in poverty is presented in Table 16. The third column of the table shows the degree of improvement achieved by each state in poverty reduction. Here, improvement in poverty is measured by the difference between the logarithmic values of poverty (aggregated across the two sectors) in 1993-94 and 1999-00. Despite having relatively low initial values of poverty, Punjab and Haryana leads the states in terms of improvement in poverty reduction. Gujarat, Himachal Pradesh, Kerala and Tamil Nadu have also been able to record sizeable reductions in the levels of poverty. On the other hand, states such as Bihar, Assam, Orissa are right at the bottom of the rankings in terms of the index of improvement. Since these are the states with high initial levels of poverty, the dispersion in the incidence of poverty in 1999-00 is obviously significantly higher.

Inequality

Deaton and Dreze also present sectoral estimates of inequality for the various states for 1993-94 and 1999-00. The discussion in this section and the figures in Tables 15 and 16 are based on inequality measured by the variance of logarithms, and with the state inequality as a weighted average of the sectoral inequalities, the weights being the sectoral populations.

Table 15 shows that there has been hardly any change in change in the extent of dispersion in inter-state inequality across the two time periods. This is actually true even at the level of the two sectors. There has also been a slight increase in the average level of inequality for the 16 states. Table 16 shows that as many as 9 of the 16 states actually experienced an increase in aggregate poverty, although in most cases the increase was quite small. There is no obvious pattern in the set of states which experienced a decline in the level of inequality. This includes both Punjab and Haryana, two of the richest states in terms of per capita state domestic product, as well as Orissa and Madhya Pradesh which are amongst the poorer states.

It is natural to “decompose” the change in the incidence of poverty into a “growth” component and a “distributional” component. After all, if growth is “distribution-neutral”, then there must be a shift in the distribution of incomes to the right, resulting in a lower incidence of poverty. If the distribution improves, poverty must go down so long as mean income does not decrease. And there are obvious trade-offs between changes in mean income and distribution. These trade-offs have obvious policy relevance. If the goal is reduction of poverty, should we follow growth-enhancing policies even at the cost of some deterioration in the distribution of income? Or should we adopt policies that improve the distribution of income even if these policies stifle growth? The answer must depend on the quantitative magnitude of these trade-offs.

Deaton and Dreze actually carry out a decomposition exercise where the growth component is represented by the increase in average per capita expenditure (APCE). However, APCE is an *endogenous* variable. It is determined by the consumption decisions of individual households in the economy, and these in turn depend on household incomes. If richer households have a lower propensity to spend than poorer households – an eminently plausible assumption- then APCE *depends* on the distribution of incomes. In this case, the decomposition exercise is not so meaningful

unless we also know the functional relationship between growth and the distribution of incomes.

There is an obvious sense in which per capita state domestic product is more “distant” than APCE from the distribution of household expenditures. Hence, pcsdp is a more appropriate variable than APCE as a proxy for the growth component. If “state-specific” factors were absent, then Table 16 would help towards a crude decomposition exercise since the table contains data on the percentage in pcsdp, inequality and the degree of reduction in poverty in the different states. Unfortunately, Table 16 does not yield any obvious clues. Consider, for instance, the performance of Haryana and Punjab which top the list in terms of improvement in poverty reduction. Inequality increased slightly in both states, while there was only a moderate increase in per capita state domestic product. On the other hand, except for Uttar Pradesh, all the states that recorded some improvement in distribution also experienced higher rates of growth in pcsdp *and* lower degree of improvement in poverty reduction compared to Punjab and Haryana. This suggests that growth rates in per capita state domestic product and inequality in household consumption expenditure are not very good predictors of the incidence of poverty in any given state. Clearly, state-specific factors – perhaps the types of interventions practiced by the state governments - *are* important. I will return to this issue in the last section.

III Human Development

The last section looks at the inter-state variations in achievement according to different economic and social indicators. But, it does not give an overall picture or provide answers to the following questions? Are there “rogue” states which perform badly according to all criteria? Conversely, are there states that are at the top in all spheres?

Tables 17 and 18 describe the rankings of the different states according to various indicators and for the two time periods. The indicators for education and health are for 1992-93 and 1998-99, while the rankings in terms of the incidence of poverty are for 1993-94 and 1999-00. Finally, the rankings for per capita SDP are for the averages of 1992-93 and 1993-94, and for 1998-99 and 1999-00.

Somewhat arbitrarily, I define a rogue state as one that occupies a rank of 12 or lower according to *all* the indicators in the two tables. Conversely, I will call a state a

“good” state if it occupies a rank of 5 or higher according to all these indicators. In the first period, Punjab qualifies as a good state, but there are no rogue states. Maharashtra and Kerala almost qualify as good states, failing the test in only one indicator, poverty for Maharashtra and per capita SDP for Kerala.¹² Several states – Bihar, Madhya Pradesh and Orissa – narrowly escape classification as rogue states, all of them occupying a rank higher than 12 in just one indicator.

There are no good states in the second time period, but several states – Madhya Pradesh, Bihar and Orissa- slide down the rankings and qualify as rogue states. There are also quite a few states – Punjab, Himachal Pradesh, Maharashtra and Kerala that just miss the “good” label.

This approach has the advantage that it does not require any assumption about the trade-offs involved between the different indicators. Hence, the approach yields a robust though rather crude idea of the relative performance of the states in terms of these broad indicators of development. An alternative approach is to aggregate the information on achievements according to the individual indicators into a single level of achievement of “human development” – the approach adopted by the UNDP.

The human development index (HDI) constructed by the UNDP is a summary measure of wellbeing or human development which combines countries’ achievements in health, education and income. The UNDP uses life expectancy at birth as the proxy for health, a combination of adult literacy and school enrollment ratios as the education variable, and GDP per capita in purchasing power parity dollars as the income variable.

The first step in the construction of the HDI is to construct indices in each of the three individual dimensions. In order to calculate the index in any dimension, maximum (M) and minimum (m) values (so-called “goalposts”) are specified for each dimension. The index in education or wealth¹³ is

$$\text{Dimension Index} = (\text{actual value} - m)/(M-m) \quad (1)$$

So, the value of each index is a number between 0 and 1. The HDI is simply the average of the three dimension indices. So, the HDI also takes on a value between 0 and 1. This value is often referred to as the human development score of any given country, and generates the human development ranking of countries.

This method involves a very specific weighting pattern between the various dimensions. For instance, a one PPP dollar increase in income increases the income

¹² Maharashtra’s poor rank according to the level of poverty is largely due to the very high incidence of *rural* poverty.

¹³ For income, *concave* transformations are taken of the actual income as well as of M and m because

index, which itself has a weight of one-third in the HDI, by $g'(x)/(M-m)$, where $g(\cdot)$ is the concave transformation of income used in the computation of the income index, and $g'(x)$ is the derivative of the function g evaluated at current income x . On the other hand, a one percent increase in life expectancy increases the health index by $1/(M-m)$, and so on. Of course, the choices of the function g as well as the specifications of the goal posts M and m , are completely arbitrary. So, it does not seem appropriate that these arbitrary specifications should have such a big influence in determining the rankings.

Is there any obvious alternative? This really depends on the interpretation to be given to the human development scores, and there is some ambiguity about this. Sometimes, the Human Development Reports (HDR) seems to suggest that an increase in the value of the HDI for any country between two points of time represents a measure of the *improvement*. If the *difference* in the human development score is to have any significance, then some *cardinal* significance is being attributed to the HDI. In this case, the aggregation procedure has to associate a *real number* for each country, and then precise weighting patterns seem unavoidable.

On the other hand, HDR(1993) quotes Anand and Sen (1992):

“But, the human development index in the 1990 (and subsequent) Reports was constructed expressly as a measure of relative performance across countries at a point in time. No special significance is attached to the *absolute value* of the index, the entire exercise being conducted in terms of the *ranking* of countries relative to one another.” (italics ours)

Suppose the purpose of the aggregation exercise is to derive a human development index which is to have only *ordinal* significance. That is it is to be used only to rank countries in terms of the level of human development. Then a considerably simpler procedure, which is more robust to weighting patterns, is available. The procedure is to rank all groups (states in the present case, countries in the international context) in each dimension, use the rank of each state in each dimension as its “score”, and then define the composite score to be the sum of the scores in each dimension. The composite scores then define a human development ranking. Notice that a lower composite score implies a higher rank.

For instance, Kerala's ranks in education, health, income are 1,1, and 8 respectively, while that of Punjab is 3,3, 1. Then, the composite scores of Kerala and Punjab are 10 and 7, and hence Punjab will be ranked above Kerala. Of course, this procedure too involves an implicit weighting pattern between the various indicators. But,

typically small changes in the absolute value of some dimension will not result in any change in rank in that dimension. Hence, the human development ranking constructed via this approach will be more robust than the UNDP's procedure.

Table 19 exhibits the human development ranking of different states under this approach. The following procedure has been used to derive the rankings. The achievement level in the education sector has been defined to be the *average* of the percentage of population completing primary, middle and high school stages. So, the ranking in education is simply the ranking of these achievement levels. Similarly, the ranking for health is based on the average of the neonatal, infant and child mortality rates. I have used two alternatives for the income ranking. In one option, the income variable is simply the per capita SDP in each state. The overall ranking based on the unadjusted state domestic product has been labeled HDI1 in Table 19. The other option adjusts the per capita SDP by the incidence of poverty. Adjusted "income" is defined to be equal to $pcsdp(1 - HCR)$, where HCR is the head count ratio of poverty. Thus, a state that has a relatively high incidence of poverty is penalized in this approach. The overall ranking obtained after this adjustment is labeled HDI2 in Table 19.

It turns out that the adjustment for high incidence of poverty has very little effect on the human development ranking, the individual ranks changing only slightly if at all. The biggest change is in 1998-99 when Maharashtra is ranked the best state in terms of human development with the unadjusted SDP, but only fourth from the top when per capita SDP is adjusted for high incidence of poverty. The table also confirms the preeminent position of Kerala in the field of human development – it is almost at the top of the rankings although its per capita SDP is not very high. Punjab also does very well overall, and not just in the income dimension. The bottom of the table is occupied by the problem states – Bihar, Madhya Pradesh and Orissa. The other feature which is striking is the virtually unchanged ranking of states across time. Madhya Pradesh has dropped four places, while Orissa has climbed up three places. The relative position of other states is almost unchanged.

IV Policy Implications

The large and increasing variation in levels of achievement in the social sectors despite a relatively high rate of growth for the country as a whole calls into question the development strategies followed so far. In the past, the efficacy of the trickle-down

process for eradication of poverty has been questioned, and there is increasing awareness that governments have to implement active pro-poor policies. There is less public debate on the need for public intervention in the social sectors, although perhaps even that is changing.¹⁴

Perhaps the reluctance to follow more interventionist policies in the social sectors is due to the supposed high correlation between income growth and progress in the social sectors in cross-country regressions. Of course, a high correlation does not necessarily imply causation. For instance, Anand and Ravallion (1993) point out that one explanation for the observed correlation could be the fact that high income levels allow richer countries to provide better social services which are instrumental in improved social outcomes.¹⁵

In this section, I briefly revisit the “growth versus public intervention” debate in the context of the data on inter-state variations in levels of achievement in the social sectors during the nineties. Given the nature the data, it is pertinent to repeat the caveat that the analysis is extremely rudimentary, and I useful only in so far as it raises issues for further scrutiny.

I ask the following questions

- Do richer states, that is those with high per capita GDP, achieve better outcomes in the social sectors?
- Do states with higher incidence of poverty achieve worse outcomes in the social sectors?
- Do states which have higher rates of growth succeed in achieving greater degree of improvement in social outcomes?

Table 21 has some bearing on the answer to the first question. The table shows the correlations between the ranking of states according to per capita state domestic product and levels of achievement in the social sectors and incidence of poverty. Even at this level of aggregation, the evidence is mixed. The correlation is particularly low in the health sector in 1998-9. Table 22 contains the corresponding evidence for the second question. Notice that the correlations are even lower.

Table 23 provides some evidence related to the last question. As earlier, improvement in health, and education indicators as well in poverty reduction is

¹⁴ Even the World Bank has increasingly advocated the importance of progress in the social sectors, and there has been a substantial increase in its lending to social sector programmes.

¹⁵ There is also a debate on the effectiveness of Sri Lanka's welfare programmes. On this, see for instance, Dreze and Sen (1989), Bhalla (1988), Bhalla and Glewwe(1986), Sen (1988), Kakwani (1993).

measured as the difference in the logarithmic transformations of the levels of achievement in the two periods. Improvement in per capita SDP is measured by the percentage change in the two periods. The table shows that the correlations in rankings according to improvements are quite low.

It is also important to look at the relationship between expenditure in the social sectors, infrastructure and outcomes. First, consider the relation between expenditure and outcomes. It is possible to argue that expenditures in the immediate *past* also have an influence on current outcomes, at least partly because capital expenditure is useful in building infrastructure but has some gestation lag. In order to allow for this possibility, the expenditure variable is defined to be the average of state expenditures (both revenue and capital) for the previous 3 years and the current year. That is, the variable for 1992-93 is the average for the years 1989-90 to 1992-93, and so on.¹⁶ Achievement in education is defined to be the average of the percentages completing primary, middle and high schools, while achievement in health is the average of the neonatal, infant and child mortality rates. The correlations in rankings between expenditure and social sector outcomes are shown below.

	1992-93	1998-99
Education	0.80	0.84
Health	0.89	0.63

Except for “health” in 1998-99, all the other correlation coefficients are actually higher than the correlations between rankings according to social sector outcomes and per capita SDP. Of course, this does not establish that public expenditure is more important than state incomes. But, it certainly provides food for thought.

Even a casual glance at the data suggests that there is no obvious relationship between educational achievements and education infrastructure. For instance, Kerala has a relatively low teacher-pupil ratio, as well as number of schools per thousand of population, whereas Orissa scores quite well in these categories. Perhaps, one reason why there is no relationship between infrastructure in education and outcomes is that the

¹⁶ Expenditure on education also includes expenditure on sports, arts and culture, while expenditure on health is the expenditure on the category medical, public health and family welfare.

numbers of schools and teachers can be misleading. School buildings can be dilapidated, and teacher absenteeism can vary across states.¹⁷

Consider now the influence of infrastructure in the health sector. The NFHS reports data on maternal care indicators by state. The data describes as a percentage of live births (i) the percentage of mothers receiving antenatal care as well as (ii) the percentage of births assisted by health professionals. Construct a health infrastructure indicator which is a simple average of (i) and (ii), and focus on infant mortality, which is more likely to be affected by (i) and (ii). Then, the correlation between the rankings of states according to infant mortality and health infrastructure is 0.79 in 1992-93 and 0.75 in 1998-99.

The evidence presented in this section suggests the importance of public provision of educational and health services in order to improve achievements in the social sectors.

V. Concluding Remarks

The main purpose of this paper has been to analyse the pattern of inter-state variations in levels of achievement in the social sectors and to see whether these are correlated with levels of per capita state domestic product. The paper is mainly based on data on health and education collected by the National Family Health Survey for the years 1992-93 and 1998-99.

1. Even at a high level of aggregation, it is obvious that Indian states are very heterogeneous. With a few exceptions, states cannot be classified as “successes” or “failures” because some states do relatively well in education but have high rates of mortality, while other states have low rates of mortality but are poor achievers in education.
2. If attention is restricted to the first three stages of education, then states which do well at one stage of education also perform at other stages suggesting that most states have a similar rate of attrition across the different stages of education.
3. Not surprisingly, Kerala has the highest percentage of both males and females completing primary education. The BIMARU states languish at the bottom in 1992-93.
4. However, some of the BIMARU states record significant improvement in their relative positions, particularly in male education.

¹⁷ See Dreze and Gazdar (1996) for an account of educational infrastructure in Uttar Pradesh.

5. Another striking change is the vast improvement in the achievement of Himachal Pradesh.
6. There is no clear discernible geographical pattern in the distribution of levels of achievement in education.
7. The BIMARU states also exhibit the highest level of gender bias in education in both periods.
8. In the health sector, Kerala again tops the list, achieving the lowest levels of mortality.
9. The BIMARU states, with the exception of Rajasthan, are bunched at the bottom with relatively high rates of mortality.
10. As in education, there is no discernible geographical pattern in the levels of achievement in the health sector.
11. There is no evidence to conclude that the richer states, that is those with higher per capita state domestic product, necessarily have higher levels of achievement in the social sectors. This is particularly true of achievements in the health sector.
12. Neither is it true that states with low incidence of poverty have better levels of achievement in the social sectors.
13. The data also shows that states which have higher rates of growth in per capita state domestic product do not necessarily record greater improvements in achievements in the social sectors.
14. Finally, the data shows that public expenditure on health and education is an important instrumental variable in improving achievements in the social sectors.

REFERENCES

- Anand, Sudhir and Martin Ravallion (1993): 'Human Development in poor countries: On the role of private incomes and public services', *Journal of Economic Perspectives*, 7.
- Anand, Sudhir and Amartya Sen (1992): 'Humand Development Index: Methodology and Measurement', background paper for *Human Development Report*, 1993, UNDP.
- Ahluwalia, Montek S (2000): 'Economic Performance of States in Post-Reforms Period', *Economic and Political Weekly*, May 6-11.
- Bhalla, Surjit S (1988): 'Is Sri Lanka an exception? A comparative study of living standards', in P.K.Bardhan and T.N. Srinivasan (eds) *Rural Poverty in South Asia*, Columbia University Press.
- Bhalla, Surjit S (2003): 'Recounting the Poor: Poverty in India, 1983-99', *Economic and Political Weekly*, January 25-31.
- Bhalla, Surjit S and Paul Glewwe (1986): 'Growth and equity in developing countries: A reinterpretation of Sri Lanka's experience', *The World Bank Economic Review*, 1.
- Datt, Gaurav (1999): "Has Poverty Declined since Economic Reforms?", *Economic and Political Weekly*, December 11-17.
- Datt, Gaurav and Martin Ravallion (1998): 'Why Have Some Indian States Done Better than Others at Reducing Rural Poverty?' *Economica* 65: 17-38.
- Datt, Gaurav and Martin Ravallion (2002): 'Is India's Economic Growth Leaving the Poor Behind?' *Journal of Economic Perspectives*, summer, vol. 16 No. 3
- Deaton, Angus (2001): 'Survey Design and Poverty Monitoring in India, Research Program in Development Studies, Princeton University. Available at <http://www.wws.princeton.edu/~rpds>
- Deaton, Angus (2003a): 'Adjusted Indian Poverty Estimates for 1999-2000', *Economic and Political Weekly*, January25-31
- Deaton, Angus (2003b): 'Prices and Poverty in India, 1987-2000', *Economic and Political Weekly*, January25-31
- Deaton, Angus (2003c): 'Regional poverty estimates for India, 1999-2000' Research Program in Development Studies, Princeton University (mimeo).
- Deaton, Angus and Jean Dreze (2002): 'Poverty and Inequality in India: A Re-examination', *Economic and Political Weekly*, September 7.
- Dreze, Jean and Amartya Sen (1989), '*Hunger and Public Action*', Oxford University Press.

Dreze, Jean and Amartya Sen (1996), '*Indian Development: Selected Regional Perspectives*', Oxford University Press.

Dreze, Jean and Haris Gazdar (1996), '*Uttar Pradesh: The Burden of inertia*', in Dreze and Sen (1996).

Kakwani, Nanak (1993): 'Performance in living standards: An international comparison', *Journal of Development Economics*, **41**.

Sen, Abhijit (2000): 'Estimates of Consumer Expenditure and its Distribution: Statistical Priorities after NSS 55th round', *Economic and Political Weekly*, December 16-22.

Sen, Abhijit and Himangshu (2004): 'Poverty and inequality: Getting closer to the truth', mimeo.

Sen, Amartya (1987): '*The Standard of Living*', The Tanner Lectures, Cambridge University Press.

Sundaram, K and Suresh D Tendulkar (2003a): 'Poverty Has Declined in the 1990s: A Resolution of Comparability Problems in NSS Consumer Expenditure Data', *Economic and Political Weekly*, January 25-31

Sundaram, K and Suresh D Tendulkar (2003b): 'Poverty in India in the 1990s: An Analysis of Changes in 15 Major States', *Economic and Political Weekly*, April 5-11

Sundaram, K and Suresh D Tendulkar (2003c): 'Poverty in India in the 1990s: Revised Results for All-India and 15 Major States for 1993-94', *Economic and Political Weekly*, November 15-22.

TABLE 1

Coefficient of Variation in Levels of Achievement in Education:
1992-93 and 1998-99 by Sex

Educationa l Stage	1992-93		1998-99	
	Male	Female	Male	Female
Prim	0.145	0.364	0.161	0.337
Middle	0.145	0.408	0.198	0.430
High	0.160	0.387	0.254	0.524
Above High	0.196	0.321	0.164	0.599

Note: Computed from NFHS 1 and NFHS 2. Data refer to average for the preceding 5-year average.

TABLE 2

Correlation between Education Indicators for Males – 1992-93

	Primary	Middle	High	High+
Primary	1.00	0.89	0.71	0.29
Middle	0.89	1.00	0.77	0.22
High	0.71	0.77	1.00	0.36
Above High	0.29	0.22	0.36	1.00

Note: Computed from NFHS 1. Data refer to average for the preceding 5-year average.**TABLE 3**

Correlation between Education Indicators for Males – 1998-99

	Primary	Middle	High	High+
Primary	1.00	0.87	0.81	0.69
Middle	0.87	1.00	0.81	0.72
High	0.81	0.81	1.00	0.84
Above High	0.69	0.72	0.84	1.00

Note: Computed from NFHS 1. Data refer to average for the preceding 5-year average.

TABLE 4

Correlation between Education Indicators for Females – 1992-93

	Primary	Middle	High	Above High
Primary	1.00	0.94	0.93	0.76
Middle	0.87	1.00	0.91	0.74
High	0.93	0.91	1.00	0.87
Above High	0.76	0.74	0.87	1.00

Note: Computed from NFHS 1. Data refer to average for the preceding 5-year average.

TABLE 5

Correlation between Education Indicators for Females – 1998-99

	Primary	Middle	High	Above High
Primary	1.00	0.90	0.87	0.89
Middle	0.90	1.00	0.91	0.90
High	0.87	0.91	1.00	0.90
Above High	0.89	0.91	0.90	1.00

Note: Computed from NFHS 2. Data refer to average for the preceding 5-year average.

TABLE 6

Correlation Between Education Indicators (All)– 1992-93

	Primary	Middle	High	High+
Primary	1.00	0.96	0.88	0.47
Middle	0.96	1.00	0.91	0.50
High	0.88	0.91	1.00	0.63
High+	0.47	0.50	0.63	1.00

Note: Computed from NFHS 1. Data refer to average for the preceding 5-year average.

TABLE 7

Correlation between Education Indicators (All) – 1998-99

	Primary	Middle	High	Above High
Primary	1.00	0.90	0.87	0.89
Middle	0.90	1.00	0.91	0.90
High	0.87	0.91	1.00	0.90
Above High	0.89	0.91	0.90	1.00

Note: Computed from NFHS 2. Data refer to average for the preceding 5-year average.

Table 8**Gender Bias in Education –1992-93**

	Prim	Middle	High	Above High
Rajasthan	0.99	1.16	1.15	1.05
Bihar	0.90	1.06	1.14	1.31
Uttar Pradesh	0.79	0.94	0.98	0.88
Madhya Pradesh	0.76	0.94	1.01	0.92
Orissa	0.60	0.80	0.93	1.14
Haryana	0.56	0.77	0.84	0.82
Andhra Pradesh	0.53	0.63	0.79	0.98
West Bengal	0.48	0.63	0.87	1.00
Gujarat	0.45	0.56	0.59	0.74
Karnataka	0.43	0.58	0.68	0.97
Maharashtra	0.42	0.60	0.64	0.69
Assam	0.37	0.45	0.69	0.89
Himachal Pradesh	0.37	0.61	0.73	0.95
Tamil Nadu	0.35	0.46	0.55	0.83
Punjab	0.24	0.36	0.38	0.34
Kerala	0.08	0.09	0.10	0.19

Note: States are arranged according to increasing order of gender bias in primary education.

Table 9**Gender Bias in Education –1998-99**

	Prim	Middle	High	Above High
Rajasthan	0.85	1.01	1.09	1.02
Bihar	0.77	0.99	1.17	0.81
Uttar Pradesh	0.63	0.82	0.84	1.13
Madhya Pradesh	0.62	0.75	0.78	1.38
Orissa	0.50	0.70	0.85	0.74
Andhra Pradesh	0.46	0.69	0.79	0.56
West Bengal	0.42	0.57	0.72	0.91
Gujarat	0.38	0.48	0.49	0.57
Tamil Nadu	0.35	0.43	0.55	0.42
Maharashtra	0.34	0.50	0.57	0.52
Karnataka	0.34	0.44	0.50	0.41
Assam	0.30	0.34	0.60	0.60
Himachal Pradesh	0.25	0.41	0.52	0.03
Haryana	0.18	0.25	0.13	0.03
Punjab	0.18	0.26	0.24	-0.08
Kerala	0.09	0.09	0.09	-0.40

Note: States are arranged according decreasing order of gender bias in Primary education.

Table 10**Improvement in Gender Bias**

	Prim	Middle	High	Above High
Haryana	0.38	0.52	0.71	0.80
Uttar Pradesh	0.15	0.12	0.14	-0.26
Rajasthan	0.14	0.15	0.06	0.03
Madhya Pradesh	0.14	0.19	0.24	-0.46
Bihar	0.13	0.07	-0.03	0.51
Himachal Pradesh	0.12	0.20	0.21	0.92
Orissa	0.10	0.11	0.08	0.40
Karnataka	0.09	0.13	0.18	0.56
Maharashtra	0.08	0.10	0.07	0.17
Gujarat	0.08	0.08	0.10	0.17
Andhra Pradesh	0.07	-0.06	-0.01	0.42
Assam	0.06	0.11	0.10	0.30
West Bengal	0.06	0.06	0.15	0.09
Punjab	0.06	0.10	0.14	0.41
Tamil Nadu	0.01	0.04	0.00	0.41
Kerala	-0.01	0.01	0.01	0.59

Note: States are arranged in decreasing order of improvement in bias in primary education.

Table 11**Coefficient of Variation in Levels of Achievement in Health**

	1992-93	1998-99
Neonatal Mortality	0.28	0.27
Infant Mortality	0.29	0.33
Child Mortality	0.48	0.55
Weight for age*	0.17	0.21
Weight for age **	0.34	0.38

Notes: (i) Computed from NFHS 1 and NFHS 2.

(ii) * refers to the percentage below 2 standard deviations away from the median of the International reference population.

(iii) ** refers to the percentage below 2 standard deviations away from the median of the International reference population.

TABLE 12**Correlation between Health Indicators – 1992-93**

	Weight for age	Neonatal Mortality	Infant Mortality	Child Mortality
Weight for age	1.00	0.73	0.35	0.62
Neonatal Mort	0.73	1.00	0.91	0.62
Infant Mort	0.35	0.91	1.00	0.71
Child Mort	0.62	0.62	0.71	1.00

Note: Computed from NFHS 1. Weight for age refers to percentage below 3 standard deviations away from the reference population.

TABLE 13

Correlation between Health Indicators – 1998-99

	Weight for age	Neonatal Mortality	Infant Mortality	Child Mortality
Weight for age	1.00	0.71	0.64	0.73
Neonatal Mortality	0.71	1.00	0.96	0.94
Infant Mortality	0.64	0.96	1.00	0.94
Child Mortality	0.73	0.94	0.94	1.00

Table 14
Improvement Indices in Health

	Neonatal mortality	Infant mortality	Child mortality	Weight for age*	Weight for age**
West Bengal	0.48	0.44	0.27	0.12	0.15
Himachal Pradesh	0.44	0.48	0.53	0.06	0.08
Orissa	0.29	0.32	-0.18	0.09	-0.02
Tamil Nadu	0.28	0.34	0.23	0.23	0.27
Karnataka	0.20	0.24	0.20	0.16	0.21
Bihar	0.16	0.20	0.19	0.20	0.14
Assam	0.13	0.24	1.01	0.34	0.34
Maharashtra	0.13	0.14	0.33	0.19	0.09
Kerala	0.12	0.38	1.17	0.26	0.06
Uttar Pradesh	0.11	0.14	0.16	0.12	0.13
Haryana	0.10	0.26	0.26	-0.12	0.09
Gujarat	0.07	0.09	0.46	0.08	0.11
Andhra Pradesh	0.03	0.07	0.06	0.42	0.26
Madhya Pradesh	-0.03	-0.01	-0.13	-0.09	0.04
Punjab	-0.09	-0.06	-0.06	0.48	0.47
Rajasthan	-0.29	-0.10	-0.15	-0.08	-0.20

Table 15

Coefficient of Variation in Income Indicators

	Period 1	Period 2
Per capita SDP	0.33	0.37
Poverty	0.37	0.54
Inequality	0.22	0.21

Note: The figures for inequality and poverty relate to 1993-94 and 1999-00, and have been computed from estimates in Deaton and Dreze(2002). The figures for State Domestic Product refer to 1990-91 to 1994-95 (period 1) and 1995-96 to 1999-00(period 2).

Table 16

Improvement in Income Indicators

	Per Capita SDP	Poverty	Inequality
Andhra Pradesh	22	0.17	0.03
Assam	4	0.01	-0.10
Bihar	-5	0.15	-0.00
Gujarat	32	0.57	-0.06
Haryana	19	1.05	-0.11
Himachal Pradesh	27	0.58	-0.09
Karnataka	34	0.31	-0.08
Kerala	24	0.60	-0.08
Madhya Pradesh	16	0.20	-0.05
Maharashtra	25	0.35	-0.03
Orissa	10	0.02	-0.13
Punjab	16	0.89	-0.09
Rajasthan	25	0.33	0.06
Tamil Nadu	30	0.56	0.08
Uttar Pradesh	11	0.28	0.04
West Bengal	29	0.17	0.05

Table 17

Ranking of States According to Various Indicators –1992-93

	Prim	Middle	High	Per cap. SDP	Poverty	Neonatal Mortality	Infant Mortality	Child Mortality
Haryana	7	6	5	3	2	6	10	10
Himachal Pradesh	3	5	8	6	3	3	4	2
Punjab	4	2	2	1	1	2	3	3
Rajasthan	16	16	16	9	5	5	9	11
Madhya Pradesh	13	14	13	12	10	13	12	15
Uttar Pradesh	12	11	11	14	9	15	15	14
Bihar	15	13	10	16	16	14	14	13
Orissa	14	15	14	15	15	16	16	6
West Bengal	9	9	12	11	6	12	11	9
Assam	11	12	15	13	13	11	13	16
Gujarat	6	7	4	4	8	7	7	12
Maharashtra	5	4	3	2	14	4	2	5
Andhra Pradesh	10	8	9	10	7	8	8	7
Karnataka	8	10	7	7	12	9	5	8
Kerala	1	1	1	8	4	1	1	1
Tamil Nadu	2	3	6	5	11	10	6	4

Note: Poverty figures relate to 1993-94. The per capita SDP rankings are based on the average for 1992-93 and 1993-94.

Table 18

Ranking of States According to Various Indicators –1998-99

	Prim	Middle	High	Per cap. SDP	Poverty	Neonatal Mortality	Infant Mort	Child Mortality
Haryana	8	9	8	4	2	7	7	9
Himachal Pradesh	2	2	3	7	3	2	2	2
Punjab	3	3	2	1	1	5	8	4.5
Rajasthan	15	14	13	10	6	14	13	14
Madhya Pradesh	14	15	16	12	13	16	15	16
Uttar Pradesh	13	10	9	14	9	15	16	15
Bihar	16	16	12	16	16	12	12	13
Orissa	10	12	15	15	15	13	14	12
West Bengal	12	11	11	11	8	3	5	7
Assam	9	8	14	13	14	11	11	10
Gujarat	6	6	6	2	5	9	9	11
Maharashtra	5	4	5	3	11	4	3	3
Andhra Pradesh	11	13	10	9	10	10	10	8
Karnataka	7	7	4	6	12	8	6	6
Kerala	1	1	1	8	4	1	1	1
Tamil Nadu	4	5	7	5	7	6	4	4.5

Note: Poverty figures relate to 1999-00. The per capita SDP rankings are based on the average for 1998-99 and 1999-00.

Table 19

Ranking of States According to Human Development

	1992-93		1999-00	
	HDI1	HDI2	HDI1	HDI2
Andhra Pradesh	9	9	10	10
Assam	13	14	13	14
Bihar	14	14	15	15
Gujarat	7	7	6	6
Haryana	6	6	8	8
Himachal Pradesh	4	4	3	2
Karnataka	8	8	7	7
Kerala	2	2	2	1
Madhya Pradesh	12	12	16	16
Maharashtra	3	3	1	4
Orissa	16	16	13	13
Punjab	1	1	3	2
Rajasthan	11	11	11	11
Tamil Nadu	4	5	5	5
Uttar Pradesh	14	13	12	12
West Bengal	10	10	9	9

Note: HDI1 refers to the ranking which uses per capita SDP as the proxy for income. HDI2 refers to the ranking which uses *adjusted* per capita SDP as the proxy for income, where $adjusted\ pcspd = pcspd(1-HCR)$, HCR being the head count measure of poverty.

Table 20

Ranking of States According to Improvement Indices

State	Education	Health	Poverty	Per capita SDP
Kerala	1	4	3	7
Himachal Pradesh	2	1	4	6
Punjab	3	15	2	12
Maharashtra	4	10	7	8
Tamil Nadu	5	5	6	2
Gujarat	6	11	5	4
Karnataka	7	7	9	1
Haryana	8	8	1	11
Assam	9	3	16	15
Uttar Pradesh	10	12	10	14
West Bengal	11	2	12	3
Andhra Pradesh	12	13	13	5
Orissa	13	6	15	13
Rajasthan	14	16	8	9
Madhya Pradesh	15	14	11	10
Bihar	16	9	14	16

TABLE 21

Correlation between Per Capita SDP, and Poverty, Health, Education Indicators

Indicator/Year	1992-93	1998-99
Poverty	0.49	0.64
Neonatal Mortality	0.78	0.57
Infant Mortality	0.80	0.59
Child Mortality	0.50	0.58
Primary School	0.73	0.70
Middle School	0.74	0.67
High School	0.75	0.72
Above High School	0.31	0.72

Note: Poverty figures are for 1993-93 and 1999-00. If Maharashtra is excluded, then the correlation figures are 0.65 and 0.75 respectively.

TABLE 22**Correlation between Poverty and Other Social Indicators**

Indicator/Year	1992-93	1998-99
Neonatal Mortality	0.64	0.54
Infant Mortality	0.40	0.47
Child Mortality	0.32	0.42
Primary School	0.39	0.55
Middle School	0.44	0.57
High School	0.70	0.64
Above High School	-0.15	0.60

Note: Poverty figures for 1993-94 and 1999-00 correlated with social indicators for 1992-93 and 1998-99 respectively.

TABLE 23

Correlation between Improvements in Socio-economic Indicators
and percentage changes in pcsdp, 1992-93 to 1998-99

Neonatal Mortality	0.20
Infant Mortality	0.19
Child Mortality	0.35
Primary Education	-0.06
Middle School	0.03
High School	0.13
Above High School	0.02
Poverty	0.52

TABLE 24

Correlation between Improvements in Social Indicators
and changes in Poverty, 1992-93 to 1998-99.

Neonatal Mortality	-0.30
Infant Mortality	-0.01
Child Mortality	0.25
Primary Education	0.00
Middle School	0.17
High School	0.32
Above High School	0.37