# Prices and Poverty in India, 1987-2000

*Using consumption data from the 43rd, 50th and 55th rounds of the National Sample Survey, this paper computes for each of the large Indian states, by urban and rural sectors separately, a range of consumer prices indexes for 1999-2000 relative to 1993-94 and for 1993-94 relative to 1987-88. The main focus of the paper is to explain the methodology underlying the new price indexes and to incorporate them into poverty lines.*

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## I Introduction

This paper uses the consumption data from the 43rd, 50th, and 55th Rounds of the Indian National Sample Survey to compute consumer price indexes. For each of the large Indian states, by urban and rural sectors separately, I calculate a range of price indexes for 1999-2000 relative to 1993-94, and for 1993-94 relative to 1987-88. In all three years, I also calculate price indexes for each state relative to all-India, again separately for urban and rural households, as well as price indexes of urban relative to rural prices for each of the states. I use the price indexes to calculate a new set of poverty lines, by state and sector, and over time, and calculate headcount ratios based on them. Finally, I use the procedures of Deaton (2003) to adjust the 55th round poverty estimates for the fact that changes in questionnaire design make results from the 55th round incomparable with those from earlier rounds. The final tables contain estimates of headcount ratios based on a consistent set of price indexes from the 43rd to the 55th rounds as well as on consistent, or adjusted to be consistent, consumption data.

Because my calculated inflation rates are somewhat lower than those used by the Planning Commission, my rural poverty lines, which take the official rural poverty line in 1987-88 as base, are lower than the official ones in both the later periods, especially in 1999-2000. However, my adjustment to the poverty rates in the 55th round, to account for the incomparability in survey design, offsets a good deal of this effect, so that my final All-India rural headcount ratio is only slightly lower than the official one, 25.3 per cent as opposed to 27 per cent. Note however that my estimates of the reduction in the headcount ratio from 1993-94 to 1999-2000 are a good deal smaller than the official estimates because much of the decline in the new estimates took place between 1987-88 and 1993-94, not in the 1990s. Note also that my urban poverty lines are on average only 15 per cent higher than my rural poverty lines as opposed to nearly 40 per cent in the official lines, so that because I start from the same *rural* estimates for 1987-88 as the Planning Commission, I estimate urban poverty in all years to be much lower. As argued in Deaton and Tarozzi (2000), the urban to rural price differentials that are implicit in the official lines are quite implausible, so that the estimates in this paper are to be preferred to the official counts. My price indexes for the states relative to the average are also different from the official ones, so that the

**Table 1: Price Indexes for 1999-2000 Relative to 1993-94**

| | Budget 50 | Budget 55 | Laspeyres | Paasche Index | Fisher Ideal | Törnqvist | PL Deflator |
|---|---|---|---|---|---|---|---|
| **Rural** | | | | | | | |
| Andhra Pradesh | 64.1 | 60.7 | 159.6 | 155.3 | 157.4 | 157.3 | 161.3 |
| Assam | 69.6 | 64.8 | 161.4 | 156.5 | 158.9 | 159.4 | 157.5 |
| Bihar | 70.3 | 65.4 | 162.5 | 158.1 | 160.3 | 160.4 | 157.0 |
| Gujarat | 68.8 | 59.6 | 150.2 | 147.4 | 148.8 | 148.6 | 157.8 |
| Haryana | 63.4 | 57.1 | 151.8 | 147.9 | 149.9 | 149.8 | 155.2 |
| Himachal Pradesh | 64.4 | 54.4 | 164.3 | 159.7 | 161.9 | 161.9 | 157.2 |
| Jammu and Kashmir | 65.0 | 58.8 | 162.7 | 161.4 | 162 | 162.5 | .. |
| Karnataka | 62.8 | 57.0 | 165.0 | 158.1 | 161.5 | 161.7 | 165.9 |
| Kerala | 57.8 | 49.0 | 165.5 | 162.3 | 163.9 | 163.7 | 153.7 |
| Madhya Pradesh | 64.3 | 58.6 | 159.5 | 156.1 | 157.8 | 157.8 | 161.2 |
| Maharashtra | 59.1 | 52.6 | 163.6 | 155.6 | 159.5 | 159.1 | 163.5 |
| Orissa | 68.4 | 63.1 | 175.2 | 166.1 | 170.6 | 171.4 | 166.9 |
| Punjab | 62.5 | 53.5 | 153.9 | 150.6 | 152.2 | 152.3 | 155.1 |
| Rajasthan | 65.4 | 59.8 | 165.6 | 162.9 | 164.2 | 164.3 | 159.4 |
| Tamil Nadu | 63.4 | 55.9 | 160.0 | 155.6 | 157.8 | 157.8 | 156.5 |
| Uttar Pradesh | 64.4 | 58.2 | 163.4 | 158.7 | 161 | 161.1 | 158.2 |
| West Bengal | 66.5 | 62.5 | 162.7 | 159.7 | 161.2 | 161.4 | 158.6 |
| All-India | 65.5 | 59.6 | 156.4 | 152.5 | 154.5 | 154.5 | 159.1 |
| **Urban** | | | | | | | |
| Andhra Pradesh | 56.6 | 48.9 | 163.4 | 161.2 | 162.3 | 161.9 | 164.4 |
| Assam | 57.1 | 52.5 | 161.3 | 157.1 | 159.2 | 158.3 | 161.9 |
| Bihar | 63.3 | 58.4 | 156.5 | 154.2 | 155.3 | 155.2 | 159.2 |
| Gujarat | 60.9 | 50.1 | 159.2 | 137.8 | 148.1 | 155.9 | 159.6 |
| Haryana | 56.6 | 46.8 | 152.9 | 151.0 | 151.9 | 151.8 | 162.7 |
| Himachal Pradesh | 56.6 | 44.8 | 158.8 | 147.8 | 153.2 | 154.3 | 165.7 |
| Jammu and Kashmir | 56.9 | 50.4 | 163.4 | 161.5 | 162.4 | 162.1 | .. |
| Karnataka | 56.2 | 46.1 | 163.7 | 160.6 | 162.1 | 162.0 | 168.9 |
| Kerala | 52.4 | 45.5 | 165.6 | 162.9 | 164.3 | 164.4 | 170.1 |
| Madhya Pradesh | 57.1 | 50.0 | 153.4 | 151.2 | 152.3 | 151.9 | 151.9 |
| Maharashtra | 54.1 | 46.2 | 155.3 | 151.9 | 153.6 | 153.2 | 164.3 |
| Orissa | 56.4 | 54.1 | 158.1 | 156.7 | 157.4 | 157.4 | 158.6 |
| Punjab | 55.3 | 48.5 | 148.5 | 145.2 | 146.9 | 146.8 | 153.1 |
| Rajasthan | 59.0 | 51.6 | 159.0 | 153.8 | 156.4 | 158.0 | 165.9 |
| Tamil Nadu | 55.2 | 47.2 | 165.0 | 161.7 | 163.4 | 163.2 | 160.3 |
| Uttar Pradesh | 58.6 | 52.2 | 161.2 | 157.3 | 159.3 | 159.0 | 160.9 |
| West Bengal | 55.5 | 50.0 | 156.9 | 155.9 | 156.4 | 156.2 | 165.3 |
| Delhi | 53.6 | 41.9 | 165.8 | 158.1 | 161.9 | 161.9 | 163.3 |
| All-India | 57.8 | 50.3 | 162 | 155.7 | 158.8 | 157.7 | 161.4 |

*Note:* Budget 50 and Budget 55 are the total shares of the budget (in per cent) in the 50th and 55th rounds respectively of all the goods covered by the index. Data for all-India are calculated from the complete survey, including those states and territories not listed separately. The final column is the implicit deflator of the official poverty lines.

distribution of poverty across states is different from the official distribution. Again, I would argue that my estimates are more rationally based. Nevertheless, all of my calculations, like the official ones, are based on the NSS household survey data and make no attempt to correct it for any of the deficiencies (other than change of reporting period) that have sometimes been leveled against it.

The main focus of this paper is to explain the methodology underlying the new price indexes, and to incorporate them into poverty lines. A fuller discussion of the results, not only of poverty headcount ratios, but of poverty gap measures and various inequality indexes, is given in Deaton and Drèze (2002).

## II
## Price Indexes: Methodology

The procedures for calculating price indexes are described in full in Deaton and Tarozzi (2000). The NSS consumer expenditure surveys collect data on both expenditure and quantity purchased for a large number of food, beverage, tobacco (and other intoxicants) and fuel items. In the 55th round, for example, there are 173 separate items for which both quantity and expenditure data were collected. This is somewhat less than in previous rounds; a few previously separate items were combined in order to shorten the consumption questionnaire. Unlike previous large consumption surveys in India, respondents were asked to report expenditures and quantities over both 30 and 7 days for all the items used here. Here, I use only the 30-day reports; preliminary work showed that the results based on the 7-day reports would not be much different. However, in order to protect against any possible systematic differences, I did not attempt to increase the sample by combining unit values obtained at both frequencies.

For each recorded purchase of each good, a unit value was calculated by dividing the reported expenditure by the reported quantity. These unit values were inspected for outliers and for multi-modality, the presence of which would suggest that the category contained several distinct goods with very different unit values. For example, 'other milk products' (as well as several other 'other' categories) was usually deleted because it contains cheap items (like panir or yoghurt) and expensive items (like milk based sweets). For each sector within each state, the median unit value was calculated for each good. As in the earlier work, a large fraction of these often assumed the same value. For example, in the 55th round, of 1,879 recorded purchases of liquid milk in rural Kerala, 600 were at exactly Rs 12 per litre, and 669 were at exactly Rs 13 per litre.

For each household, the expenditure on each good was used to calculate a budget share by division by the household's total monthly expenditure. These household budget shares, including the zero budget shares, were then averaged by sector and state. Although these are not poverty-weighted, the use of the average of the budget shares, rather than the budget shares of the averages, imparts a 'democratic' bias to the weights and locates them well down the income distribution. The average budget shares were then combined with the median unit values to calculate Laspeyres, Paasche, Fisher Ideal, and Törnqvist price indexes according to standard formulae. The Laspeyres index is calculated according to the formula

$$P_{10}^{L} = \sum_{k=1}^{n} w_{0k} \left( \frac{P_{1k}}{P_{0k}} \right) \qquad ...(1)$$

where $w_{0k}$ is the average household budget share for good k in period 0, and $P_{1k}$ and $P_{0k}$ are its median unit value in period's 1 and 0. The Paasche index uses current, not base period weights, and can be written in the form

$$[P_{10}^{p}]^{-1} = \sum_{k=1}^{n} w_{1k} \left( \frac{P_{1k}}{P_{0k}} \right)^{-1} \qquad ...(2)$$

also involving price relatives and budget shares, this time period 1's budget shares. The Fisher Ideal index is the square root of the product of (the geometric mean) of

**Table 2: Price Indexes for 1993-94 Relative to 1987-88**

| | Budget 50 | Budget 55 | Laspeyres | Paasche Index | Fisher Ideal | Törnqvist | PL Deflator |
|---|---|---|---|---|---|---|---|
| **Rural** | | | | | | | |
| Andhra Pradesh | 69.9 | 68.5 | 177.5 | 174.1 | 175.8 | 175.9 | 177.3 |
| Assam | 81.9 | 81.6 | 174.8 | 172.5 | 173.6 | 173.7 | 182.1 |
| Bihar | 79.0 | 76.3 | 161.3 | 158.1 | 159.7 | 159.7 | 176.3 |
| Gujarat | 78.5 | 71.1 | 175.2 | 166.1 | 170.6 | 170.6 | 175.7 |
| Haryana | 68.5 | 69.3 | 175.7 | 173.0 | 174.3 | 174.2 | 190.2 |
| Himachal Pradesh | 68.4 | 69.2 | 171.6 | 162.9 | 167.1 | 167.1 | 190.2 |
| Jammu and Kashmir | 68.7 | 67.8 | 184.9 | 178.4 | 181.6 | 181.5 | .. |
| Karnataka | 73.2 | 62.1 | 175.8 | 174.5 | 175.1 | 175.1 | 178.7 |
| Kerala | 69.7 | 68.5 | 174.7 | 169.4 | 172.1 | 172.3 | 186.7 |
| Madhya Pradesh | 75.9 | 70.9 | 174.7 | 169.1 | 171.9 | 171.9 | 180.5 |
| Maharashtra | 71.8 | 61.1 | 174.1 | 171.3 | 172.7 | 172.6 | 168.6 |
| Orissa | 79.9 | 79.1 | 167.4 | 162.1 | 164.7 | 164.6 | 159.8 |
| Punjab | 66.7 | 68.2 | 192.6 | 188.6 | 190.6 | 190.7 | 190.2 |
| Rajasthan | 72.7 | 68.1 | 169.4 | 164.2 | 166.8 | 166.9 | 183.7 |
| Tamil Nadu | 73.4 | 69.0 | 169.4 | 165.9 | 167.6 | 167.7 | 166.2 |
| Uttar Pradesh | 69.8 | 68.9 | 170.3 | 165.5 | 167.9 | 167.9 | 185.9 |
| West Bengal | 79.6 | 75.5 | 167.6 | 165.4 | 166.5 | 166.5 | 170.8 |
| All-India | 74.6 | 70.7 | 171.7 | 167.9 | 169.8 | 169.8 | 178.7 |
| **Urban** | | | | | | | |
| Andhra Pradesh | 64.8 | 62.4 | 179.7 | 174.6 | 177.1 | 177.2 | 183.1 |
| Assam | 72.4 | 66.4 | 179.4 | 175.9 | 177.6 | 177.7 | 167.8 |
| Bihar | 73.1 | 71.0 | 165.9 | 164.3 | 165.1 | 165.2 | 158.7 |
| Gujarat | 70.4 | 65.3 | 169.2 | 161.7 | 165.4 | 165.4 | 171.6 |
| Haryana | 68.5 | 60.5 | 178.6 | 176.7 | 177.6 | 177.6 | 180.3 |
| Himachal Pradesh | 62.1 | 58.7 | 179.7 | 170.8 | 175.2 | 175.2 | 176.0 |
| Jammu and Kashmir | 66.8 | 59.5 | 185.8 | 171.7 | 178.6 | 178.5 | .. |
| Karnataka | 67.7 | 60.6 | 179.5 | 174.6 | 177.0 | 177.1 | 176.9 |
| Kerala | 69.0 | 63.4 | 175.5 | 171.2 | 173.3 | 173.5 | 171.8 |
| Madhya Pradesh | 72.2 | 63.9 | 173.5 | 168.2 | 170.8 | 170.9 | 177.8 |
| Maharashtra | 65.4 | 59.0 | 183.4 | 178.5 | 180.9 | 181.1 | 173.7 |
| Orissa | 70.7 | 66.6 | 169.1 | 166.5 | 167.8 | 167.8 | 180.3 |
| Punjab | 62.5 | 60.9 | 188.6 | 185.4 | 187 | 187.1 | 174.9 |
| Rajasthan | 67.1 | 64.5 | 173.7 | 169.9 | 171.8 | 171.8 | 169.8 |
| Tamil Nadu | 62.9 | 62.9 | 172.4 | 168.3 | 170.3 | 170.5 | 178.9 |
| Uttar Pradesh | 67.2 | 64.7 | 166.5 | 164.2 | 165.4 | 165.4 | 167.8 |
| West Bengal | 68.4 | 65.3 | 172.4 | 168.8 | 170.6 | 170.6 | 165.1 |
| Delhi | 55.8 | 56.9 | 180.1 | 170.5 | 175.2 | 175.7 | 174.9 |
| All-India | 67.6 | 63.4 | 175.1 | 172.3 | 173.7 | 173.8 | 173.5 |

*Note:* Budget 43 and Budget 50 are the total shares of the budget (in per cent) in the 43rd and 50th rounds respectively of all the goods covered by the index. Data for all-India are calculated from the complete survey, including those states and territories not listed separately. We do not have data for the CPIAL for Haryana nor for Jammu and Kashmir, nor the CPIIW for Jammu and Kashmir. The final column is the implicit deflator of the official poverty lines.

the Paasche and the Laspeyres. The Törnqvist index, which is perhaps the least familiar, is a weighted geometric index of prices, using the average of the budget shares from the two periods as weights. Formally,

$$\ln P_{10}^{T} = \sum_{k=1}^{n} \frac{w_{1k} + w_{0k}}{2} \ln \left( \frac{P_{1k}}{P_{0k}} \right) \quad ...(3)$$

The Fisher Ideal and Törnqvist indexes are *superlative* indexes, and so are capable of approximating some of the substitution effects that separate a cost-of-living index from a 'basket' price index such as the Paasche or Laspeyres. Compared with the Laspeyres basis of most official price indexes, these indexes will tend to grow somewhat less rapidly. They are particularly useful for calculating price indexes for urban versus rural households, or for states versus all-India, when the budget shares in the two places in the comparison are often very different. Another issue relates to choice of base period. One possibility would have been to use the 43rd round as base for all calculations. However, I chose instead to chain indexes, by using the 43rd round as base for the 50th round, and the 50th round as base for the 55th round, and then multiplying the indexes to calculate inflation rates from the 43rd to 55th. The price index literature suggests that chaining the indexes is likely to give a more accurate estimate of underlying price trends.

## III
## Price Indexes: Results

Table 1 shows price indexes for the 55th round (1999-2000) with the 50th round (1993-94) as base. The top panel shows the rural results by state, and for all-India, and the bottom panel the corresponding urban results. The first two columns show the percentage of the total budget accounted for by the totality of all the goods in the index in both rounds. These numbers are lower in the urban than in the rural sector, and lower in the 55th round than in the 50th round. Given that most of these goods are foods, such a result is to be expected from the operation of Engel's Law given that the cities are better off than the countryside (and their inhabitants do less heavy manual labour) and given that real incomes have been growing between the two surveys. The effect also has the undesirable result that the price indexes calculated here are based on an ever smaller share of the total budget. The official price indexes have more comprehensive coverage, at least in principle, although in practice it is unclear how well the prices and budget shares of the other goods are captured. Table 2 shows the comparable results for the 50th round with the 43rd round (1987-88) as base.

In both Tables, for 1993-94 compared with 1987-88, and for 1999-2000 compared with 1993-94, the rural Laspeyres index calculated from the unit values shows somewhat less inflation than the price index implicit in the poverty lines. In the earlier period (Table 2) the rural Laspeyres calculated here is 171.7 compared with 178.7 in the official poverty lines. In the second period, the comparison is 156.4 to 159.1. The superlative indexes make the discrepancy somewhat larger, 169.8 versus 178.7 and 154.5 versus 159.1. For urban households by contrast, the Laspeyres index from the unit values is close to (or even a little larger than) the implicit price deflator for the poverty lines, though the superlative indexes, which make some allowance for

**Table 3: Price Indexes for Urban Relative to Rural 43rd, 50th and 55th Rounds**

| | Budget Urban | Budget Rural | Laspeyres Index | Paasche Index | Fisher Ideal Index | Törnqvist Visit Index | PL Deflator |
|---|---|---|---|---|---|---|---|
| **43rd Round** | | | | | | | |
| Andhra Pradesh | 68.8 | 74.7 | 111.8 | 109.5 | 110.6 | 110.7 | 165.2 |
| Assam | 75.0 | 83.5 | 109.1 | 107.0 | 108.1 | 108.0 | 99.3 |
| Bihar | 75.5 | 80.4 | 108.5 | 107.7 | 108.1 | 108.1 | 124.8 |
| Gujarat | 72.7 | 80.0 | 106.3 | 104.5 | 105.4 | 105.4 | 150.6 |
| Haryana | 71.5 | 69.4 | 114.1 | 110.3 | 112.2 | 112.1 | 116.5 |
| Himachal Pradesh | 66.5 | 67.8 | 111.6 | 96.1 | 103.6 | 104.8 | 117.2 |
| Jammu and Kashmir | 72.5 | 72.5 | 104.6 | 102.8 | 103.7 | 103.8 | 119.3 |
| Karnataka | 71.4 | 77.2 | 110.4 | 108.9 | 109.6 | 110.0 | 163.9 |
| Kerala | 73.0 | 74.4 | 103.7 | 103.4 | 103.5 | 103.5 | 125.0 |
| Madhya Pradesh | 74.2 | 76.6 | 116.9 | 109.4 | 113.1 | 113.0 | 166.7 |
| Maharashtra | 69.1 | 73.8 | 114.9 | 113.1 | 114.0 | 114.1 | 163.6 |
| Orissa | 73.5 | 81.2 | 112.9 | 107.6 | 110.2 | 110.2 | 136.2 |
| Punjab | 64.7 | 68.6 | 115.6 | 110.8 | 113.2 | 113.2 | 118.0 |
| Rajasthan | 70.2 | 74.3 | 108.2 | 105.3 | 106.7 | 106.7 | 140.7 |
| Tamil Nadu | 68.8 | 79.3 | 109.7 | 108.4 | 109.0 | 109.0 | 140.3 |
| Uttar Pradesh | 69.7 | 71.8 | 120.0 | 116.1 | 118.1 | 118.1 | 134.6 |
| West Bengal | 71.9 | 81.8 | 112.9 | 112.4 | 112.6 | 112.7 | 116.1 |
| All-India | 70.9 | 77.1 | 113.1 | 109.8 | 111.4 | 111.4 | 140.8 |
| **50th Round** | | | | | | | |
| Andhra Pradesh | 63.4 | 69.6 | 111.8 | 109.3 | 110.5 | 110.5 | 170.6 |
| Assam | 68.3 | 80.9 | 113.6 | 109.1 | 111.3 | 111.6 | 91.5 |
| Bihar | 71.7 | 77.0 | 112.6 | 112.3 | 112.5 | 112.5 | 112.4 |
| Gujarat | 67.6 | 74.6 | 106.9 | 103.4 | 105.1 | 105.2 | 147.1 |
| Haryana | 62.3 | 69.1 | 119.2 | 112.0 | 115.5 | 115.6 | 110.5 |
| Himachal Pradesh | 61.4 | 66.8 | 110.9 | 104.5 | 107.7 | 108.1 | 108.5 |
| Jammu and Kashmir | 58.2 | 67.1 | 109.2 | 104.9 | 107.0 | 107.0 | na |
| Karnataka | 64.3 | 69.1 | 111.3 | 109.9 | 110.6 | 110.6 | 115.1 |
| Kerala | 64.0 | 68.6 | 104.7 | 103.7 | 104.2 | 104.2 | 164.2 |
| Madhya Pradesh | 65.1 | 73.3 | 118.7 | 113.1 | 115.8 | 115.8 | 168.5 |
| Maharashtra | 61.7 | 67.4 | 121.2 | 115.4 | 118.3 | 118.2 | 153.7 |
| Orissa | 66.4 | 77.9 | 111.9 | 108.9 | 110.4 | 110.5 | 108.5 |
| Punjab | 62.8 | 68.5 | 116.3 | 112.0 | 114.1 | 114.2 | 130.1 |
| Rajasthan | 64.9 | 72.6 | 113.2 | 109.1 | 111.1 | 111.3 | 150.9 |
| Tamil Nadu | 63.3 | 70.1 | 111.0 | 108.5 | 109.8 | 109.7 | 121.4 |
| Uttar Pradesh | 66.2 | 69.2 | 118.3 | 114.5 | 116.4 | 116.5 | 112.1 |
| West Bengal | 65.3 | 75.4 | 119.6 | 115 | 117.3 | 117.5 | 112.1 |
| All-India | 65.8 | 73.7 | 117.5 | 113.7 | 115.6 | 115.6 | 136.7 |
| **55th Round** | | | | | | | |
| Andhra Pradesh | 52.6 | 62.8 | 111.9 | 110.7 | 111.3 | 111.3 | 174.0 |
| Assam | 60.2 | 69.6 | 112.4 | 110.7 | 111.5 | 111.5 | 94.1 |
| Bihar | 61.4 | 66.3 | 108.9 | 107.7 | 108.3 | 108.3 | 114.0 |
| Gujarat | 52.0 | 56.1 | 110.5 | 108.9 | 109.7 | 109.5 | 148.7 |
| Haryana | 47.7 | 57.4 | 117.8 | 112.5 | 115.2 | 115.3 | 115.8 |
| Himachal Pradesh | 48.1 | 54.5 | 109.2 | 91.7 | 100.1 | 104.5 | 114.4 |
| Jammu and Kashmir | 56.4 | 62.5 | 106.2 | 102.7 | 104.5 | 104.7 | na |
| Karnataka | 49.3 | 58.3 | 115.8 | 112.4 | 114.1 | 113.8 | 165.2 |
| Kerala | 53.5 | 56.7 | 103.5 | 103.1 | 103.3 | 103.3 | 127.3 |
| Madhya Pradesh | 53.0 | 59.5 | 112.6 | 109.6 | 111.1 | 111.2 | 154.7 |
| Maharashtra | 50.3 | 54.4 | 121.8 | 119.3 | 120.5 | 120.5 | 169.4 |
| Orissa | 59.4 | 65.4 | 104.2 | 103.8 | 104.0 | 104.0 | 146.1 |
| Punjab | 49.7 | 53.9 | 111.8 | 109.7 | 110.7 | 110.8 | 107.0 |
| Rajasthan | 53.8 | 55.9 | 110.2 | 107.6 | 108.9 | 109.0 | 135.4 |
| Tamil Nadu | 52.5 | 60.5 | 109.3 | 108.4 | 108.8 | 108.8 | 154.6 |
| Uttar Pradesh | 55.1 | 59.8 | 115.2 | 113.1 | 114.1 | 114.2 | 123.6 |
| West Bengal | 56.7 | 68.8 | 113.2 | 110.5 | 111.8 | 112.0 | 116.9 |
| All-India | 53.2 | 61.1 | 115.9 | 114..0 | 115.0 | 115.1 | 138.6 |

substitution, are very close to the official indexes, somewhat less in the second period, and somewhat more in the first period.

As always, there is dispersion across the states. For example, it is not always true that the price indexes are always less than the indexes implicit in the poverty lines. Occasionally, the calculated index is considerably less than the official deflator; for example, for the later period the Törnqvist index for rural Gujarat is 148.6 compared with the official index of 157.8. In spite of these differences, the cross-state correlation between the official and calculated (Törnqvist) index in Table 1 is 0.43 for rural households and 0.62 for urban households.

Table 3 shows, for all three rounds, the urban relative to rural price indexes for each state and for all-India. Here there is a good deal of consistency over time. In particular, the all-India ratio is 115.1 in 1999-2000, compared with 115.6 in 1993-94, and 111.5 in 1987-88. It is worth noting that the 15 per cent price difference between urban and rural is exactly the amount that was for many years incorporated into the poverty lines, until the 1993 Expert Group Report recommended separate rates for each state. As in previous rounds, the urban to rural price differentials are quite different from those that are implicit in the official poverty lines. In 1999-2000, the interstate correlation coefficient between the two sets of prices is only 0.24. In some cases, such as Andhra Pradesh, Karnataka and Maharashtra, the deflators implicit in the official poverty lines defy belief. Note that these implicit differentials were not explicitly set by the Expert Group who calculated separate urban and rural poverty lines (based on studies of interstate price differentials) and did not explicitly consider the urban to rural differentials that were embodied in them. Whatever their intent, the effect of the adoption of the Expert Group lines was to raise measured poverty in urban relative to rural areas. In 1999-2000, the urban to rural differential implicit in the official lines is 38.6 per cent, compared with 15.1 per cent in the unit values, and 15 per cent in the official lines prior to the adoption of the Expert Group lines. As I shall discuss in Section III, it is the treatment of the urban-rural price difference that makes the biggest difference between the official poverty estimates and those presented in this paper.

The urban to rural price differences vary from one state to another, although the interstate patterns show some persistence over time. Using the Törnqvist price index, the 55th round differentials have an interstate correlation coefficient with the 50th round differentials of 0.75, falling to 0.70 with the 43rd round differentials. This is what we might expect. The ratios do not change rapidly, but nor are they fixed in stone, so that the further apart are the comparisons, the lower the correlations.

Tables 4A, 4B, and 4C present the price indexes comparing the prices in each state to those for the country as a whole. These are the most difficult of the price indexes to estimate because consumption patterns vary greatly across the subcontinent, and when different people consume very different goods, there is little basis for a price index that compares between them. In the calculations, this shows up in relatively large differences between the Paasche and Laspeyres indexes, and in rather smaller differences between the two superlative indexes. Although there is a great deal of spatial variation in prices across India, when all prices are combined into an index, the spatial differences are relatively modest. In the 55th round, rural Maharashtra has the highest prices relative to the country as a whole, 123.2, and rural Uttar Pradesh, at 92.4, has the lowest. As might be expected, the interstate variations are somewhat lower in urban areas, ranging from highs of 114.7 in Delhi and 109.6 in Maharashtra to a low of 88.6 in Orissa. Once again, the interstate patterns are persistent over time; the correlations of the 55th round with the 50th and 43rd rounds are 0.82 and 0.65 for the rural sector, and 0.84 and 0.59 in the urban sector. Once again, it is reasonable for these patterns to remain constant over short periods of time, but not over long periods. Indeed, these results serve as a warning against the official lines which, on the Expert Group recommendation, embody fixed interstate price differentials based on long outdated studies. Even so, there is still some correlation across the states between the official deflators and those shown in the

**Table 4A: Price Indexes for States Relative to All-India, 55th Round, 1999-2000**

| | Share of Budget | Laspeyres Index | Paasche Index | Fisher Ideal Index | Törnqvist Index | Poverty Lines Implicit |
|---|---|---|---|---|---|---|
| **Rural** | | | | | | |
| Andhra Pradesh | 64.1 | 106.8 | 98.5 | 102.6 | 102.0 | 80.3 |
| Assam | 71.1 | 116.3 | 107.7 | 111.9 | 112.0 | 111.6 |
| Bihar | 67.6 | 99.5 | 96.5 | 98.0 | 97.8 | 101.7 |
| Gujarat | 63.4 | 113.2 | 109.1 | 111.1 | 111.1 | 97.4 |
| Haryana | 58.5 | 107.7 | 98.2 | 102.8 | 102.4 | 110.8 |
| Himachal Pradesh | 59.9 | 121.4 | 116.0 | 118.7 | 119.0 | 112.2 |
| Jammu and Kashmir | 65.0 | 117.3 | 111.1 | 114.2 | 114.7 | na |
| Karnataka | 62.1 | 108.7 | 104.0 | 106.4 | 106.3 | 94.5 |
| Kerala | 57.2 | 130.6 | 113.0 | 121.5 | 123.2 | 114.4 |
| Madhya Pradesh | 62.1 | 96.5 | 94.0 | 95.2 | 95.2 | 95.0 |
| Maharashtra | 57.7 | 107.9 | 102.8 | 105.3 | 105.4 | 97.3 |
| Orissa | 66.9 | 101.5 | 97.0 | 99.2 | 99.0 | 98.9 |
| Punjab | 55.3 | 111.6 | 98.6 | 104.9 | 104.3 | 110.7 |
| Rajasthan | 62.6 | 116.9 | 99.7 | 108.0 | 106.7 | 105.0 |
| Tamil Nadu | 61.6 | 117.4 | 106.1 | 111.6 | 110.9 | 93.9 |
| Uttar Pradesh | 60.8 | 94.9 | 90.6 | 92.7 | 92.4 | 102.8 |
| West Bengal | 69.0 | 103.9 | 99.0 | 101.4 | 101.1 | 106.9 |
| All-India | 59.8* | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Urban** | | | | | | |
| Andhra Pradesh | 53.2 | 101.6 | 94.7 | 98.1 | 97.7 | 100.7 |
| Assam | 60.5 | 110.8 | 105.0 | 107.9 | 107.9 | 75.8 |
| Bihar | 62.1 | 93.1 | 89.6 | 91.3 | 91.4 | 83.6 |
| Gujarat | 53.9 | 109.7 | 104.8 | 107.2 | 107.4 | 104.5 |
| Haryana | 49.3 | 100.7 | 100.1 | 100.4 | 100.5 | 92.5 |
| Himachal Pradesh | 50.1 | 109.7 | 95.2 | 102.2 | 104.3 | 92.5 |
| Jammu and Kashmir | 58.2 | 106.8 | 105.8 | 106.3 | 107.0 | na |
| Karnataka | 50.7 | 105.6 | 101.4 | 103.5 | 103.5 | 112.6 |
| Kerala | 54.2 | 113.6 | 102.6 | 107.9 | 108.5 | 105.1 |
| Madhya Pradesh | 54.1 | 94.1 | 91.4 | 92.8 | 92.7 | 106.1 |
| Maharashtra | 51.4 | 111.1 | 108.2 | 109.7 | 109.6 | 118.9 |
| Orissa | 60.5 | 91.2 | 86.2 | 88.6 | 88.6 | 104.2 |
| Punjab | 51.0 | 98.5 | 96.1 | 97.3 | 97.3 | 85.5 |
| Rajasthan | 55.3 | 102.6 | 96.5 | 99.5 | 99.1 | 102.6 |
| Tamil Nadu | 52.7 | 110.3 | 100.5 | 105.3 | 104.6 | 104.7 |
| Uttar Pradesh | 55.9 | 97.2 | 91.9 | 94.5 | 94.3 | 91.7 |
| West Bengal | 57.5 | 101.1 | 95.9 | 98.5 | 98.4 | 90.1 |
| Delhi | 47.1 | 117.7 | 111.7 | 114.6 | 114.7 | 111.3 |
| All-India | 52.0* | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Note:* * Indicates the average over all the states.

table, 0.45 for the rural sector and 0.33 for the urban sector.

## IV
## Poverty Estimates: Methods and Results

Tables 5 and 6 present my recalculations of headcount ratios using the price indexes of Tables 1 through 4. The results update those presented in Table 10 of Deaton and Tarozzi (2000), and were obtained using the same procedures, as follows. The starting point is the official rural all-India poverty line for the 43rd round, 1987-88. This is Rs 115.70 per head for 30 days. Rural poverty lines for each state are obtained by multiplying this base poverty line by the rural price indexes for each state relative to all-India. Finally, the urban poverty lines, for each state as well as for all-India, are calculated from the rural poverty lines by scaling up by the respective urban relative to rural price indexes. In all cases, I use the relevant Törnqvist price indexes. The case of Delhi is handled differently. Because there are few sample households in rural Delhi, it is not advisable to use the price index for rural Delhi as part of the calculations. The poverty line for urban Delhi is calculated from the all-India urban poverty line by multiplying it by the price index for urban Delhi relative to urban all-India.

To move to the 50th round, the all-India rural line of Rs 115.70 is scaled up by the Törnqvist index for all-India rural for the 50th round relative to the 43rd round, 1.698 (Table 2, column 6), to give an all-India rural poverty line for the 50th round. This number is then used to generate an all-India urban poverty line, and state urban and rural poverty lines, following exactly the same procedure as for the 43rd round. Finally, poverty lines for the 55th round are calculated in the same way from an all-India rural line, which is the 50th round all-India rural line scaled up by the inflation rate between the two surveys, 1.545, see Table 1 column 6.

Table 5 shows some of the results. Columns 1 through 4 show the official calculations; the 55th round official poverty lines are followed by the official headcount ratios for the 43rd, 50th, and 55th rounds. (These have been recalculated for this paper from the unit-record data and differ somewhat from the headcount ratios published by the Planning Commission, which come from extrapolation from published tables.) Column 5 shows the 55th round poverty lines calculated as detailed in the previous paragraph. Because my deflators show less inflation than the official ones, the rural lines are lower than the official ones, at least on average, if not for every state. The urban lines, of course, are much lower than the official ones, because they incorporate the much lower (and much more reasonable) urban to rural price differentials.

My rural headcount ratio for the 43rd round is, by construction, essentially the same as the official rural headcount ratio; this is because my calculations are based on the official all-India rural poverty line for the 43rd round. In subsequent rounds, my all-India rural poverty lines diverge from the official ones to the extent of the cumulative divergence of my price indexes relative to the official ones. In consequence, the associated headcount ratios show a more rapid decline in poverty rates, by 1 percentage point a year from 1987-88 to 1993-94, and by 1.9 percentage points a year from 1993-94 to 1999-2000. Because the all-India urban price indexes grow at much the same rate as the official implicit deflators of the all-India urban poverty lines, the two sets of urban nominal poverty lines grow in parallel. The difference in their levels, and thus in the two sets of all-India urban poverty rates in the last row of Table 5, is driven by the fact that the price indexes from the unit values show only a 15 per cent difference between urban and rural prices, compared with the much larger differential in the official lines. By 1999-2000, the all-India urban headcount ratio in Table 5 is only 9.5 per cent. The headcount ratio fell by 0.8 percentage points a year from 1987-88 to 1993-94, and by 1.4 percentage points a year from 1993-2000.

The headcount ratios in Table 5, like the official ones, take no account of the fact that the 55th round survey was carried out in a way that was not comparable with the surveys for the 43rd and 50th rounds. In particular, respondents in the 55th round were asked to report their expenditures on food, beverages, and intoxicants over *both* the last 30 days and the last 7 days, while

**Table 4B: Price Indexes for States Relative to All-India, 50th Round, 1994-94**

| | Share of Budget | Laspeyres Index | Paasche Index | Fisher Ideal Index | Törnqvist Index | Poverty Lines Implicit |
|---|---|---|---|---|---|---|
| **Rural** | | | | | | |
| Andhra Pradesh | 71.1 | 104.8 | 93.5 | 99.0 | 97.9 | 79.2 |
| Assam | 81.9 | 114.4 | 104.6 | 109.4 | 109.3 | 112.7 |
| Bihar | 77.4 | 98.9 | 96.9 | 97.9 | 98.1 | 103.1 |
| Gujarat | 75.4 | 118.7 | 114.5 | 116.6 | 116.5 | 98.2 |
| Haryana | 69.7 | 107.2 | 99.8 | 103.4 | 103.3 | 113.6 |
| Himachal Pradesh | 74.2 | 107.4 | 101.6 | 104.5 | 104.5 | 113.6 |
| Jammu and Kashmir | 71.1 | 105.9 | 102.2 | 104.0 | 104.1 | .. |
| Karnataka | 72.8 | 105.7 | 101.7 | 103.7 | 103.5 | 90.7 |
| Kerala | 68.7 | 119.5 | 105.7 | 112.4 | 112.7 | 118.5 |
| Madhya Pradesh | 74.2 | 95.6 | 93.0 | 94.3 | 94.2 | 93.8 |
| Maharashtra | 69.5 | 110.0 | 100.7 | 105.2 | 105.7 | 94.7 |
| Orissa | 80.0 | 99.0 | 87.4 | 93.0 | 92.8 | 94.3 |
| Punjab | 68.9 | 109.9 | 101.1 | 105.4 | 105.0 | 113.6 |
| Rajasthan | 73.3 | 112.2 | 100.7 | 106.3 | 105.5 | 104.9 |
| Tamil Nadu | 70.8 | 114.1 | 102.0 | 107.9 | 107.0 | 95.5 |
| Uttar Pradesh | 70.0 | 94.8 | 89.4 | 92.1 | 91.8 | 103.5 |
| West Bengal | 75.6 | 99.7 | 94.2 | 96.9 | 96.6 | 107.2 |
| All-India | 66.9* | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Urban** | | | | | | |
| Andhra Pradesh | 63.6 | 98.0 | 90.9 | 94.4 | 94.0 | 98.9 |
| Assam | 68.6 | 109.1 | 102.4 | 105.7 | 105.9 | 75.5 |
| Bihar | 72.0 | 98.1 | 93.4 | 95.8 | 95.7 | 84.8 |
| Gujarat | 68.2 | 105.8 | 104.6 | 105.2 | 105.2 | 105.6 |
| Haryana | 63.0 | 101.6 | 100.1 | 100.9 | 100.9 | 91.8 |
| Himachal Pradesh | 61.7 | 101.4 | 97.3 | 99.4 | 99.3 | 90.1 |
| Jammu and Kashmir | 62.3 | 97.3 | 94.3 | 95.8 | 95.7 | .. |
| Karnataka | 64.4 | 101.4 | 98.0 | 99.7 | 99.4 | 107.7 |
| Kerala | 64.1 | 106.8 | 94.9 | 100.7 | 100.5 | 99.7 |
| Madhya Pradesh | 65.6 | 95.6 | 94.0 | 94.8 | 94.8 | 112.7 |
| Maharashtra | 62.2 | 112.2 | 108.9 | 110.6 | 110.6 | 116.8 |
| Orissa | 67.7 | 93.8 | 87.1 | 90.4 | 90.6 | 106.0 |
| Punjab | 63.2 | 103.2 | 100.4 | 101.8 | 101.7 | 90.1 |
| Rajasthan | 65.6 | 104.9 | 95.8 | 100.2 | 99.7 | 99.8 |
| Tamil Nadu | 63.5 | 105.1 | 97.1 | 101.0 | 100.4 | 105.4 |
| Uttar Pradesh | 66.3 | 96.8 | 91.9 | 94.3 | 94.1 | 91.9 |
| West Bengal | 65.6 | 103.2 | 97.5 | 100.3 | 100.0 | 88.0 |
| Delhi | 58.6 | 109.3 | 103.4 | 106.3 | 106.3 | 110.0 |
| All-India | 60.5* | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Note:* * Indicates the average over all the states.

for low frequency items, including durables and clothing, the response period was changed from 30 days in the earlier surveys to 365 days in the 55th round. Experimental surveys in the 51st through 54th rounds showed that changes in the reporting period can have substantial effects on the amounts reported, and very large effects on the headcount ratios. In particular, the 7-day reporting period for the high frequency items generates larger reported expenditures than does the 30-day period, at least when households are randomly allocated to one or the other. Because respondents were given both questionnaires in the 55th round, we have no direct prior experience to tell us how responses were affected. Even so, a reasonable supposition is that, by being asked to report for both reporting periods side by side, respondents were unlikely to report wildly inconsistent patterns. If so, the presence of the 7-day questions, which tend to lead to higher reports, might have caused respondents to shade upwards their 30-day reports, thus overstating their total expenditures compared with what they would have reported given the questionnaires used in the 43rd and 50th rounds. The move to 365 days for the low frequency items, although lowering the average amount reported, caused a much larger number of households to report something. These additional reports caused the bottom tail of the expenditure distribution to be pulled up compared with earlier rounds, [Sundaram and Tendulkar 2003]. It is therefore likely that both changes to the questionnaire had the effect of increasing reported expenditures among the poor, so that the official headcount ratios, which use the 30-day reporting period for all but the low frequency items, which are reported at 365 days, are too low compared with earlier rounds. The existence and extent of this bias have been the subject of a good deal of debate.

In Deaton (2003), I show how it is possible to adjust the 55th round figures to make them comparable with the earlier rounds. The method relies on the fact that, in all rounds, there is an important group of goods, including fuel and light and a long list of miscellaneous goods and services, the questionnaire for which is the same in all rounds. Expenditure on these items is highly correlated with total expenditures, and so can be used to develop an estimate of the headcount ratio that is, in principle, comparable with those from the earlier rounds. Assumptions are required to make this possible, and while they are

**Table 4C: Price Indexes for States Relative to All-India, 43rd Round, 1987-88**

| | Share of Budget | Laspeyres Index | Paasche Index | Fisher Ideal Index | Törnqvist Index | Poverty Lines Implicit |
|---|---|---|---|---|---|---|
| **Rural** | | | | | | |
| Andhra Pradesh | 75.5 | 98.3 | 90.9 | 94.6 | 94.0 | 79.8 |
| Assam | 84.3 | 108.1 | 104.2 | 106.1 | 106.7 | 110.6 |
| Bihar | 81.2 | 104.4 | 104.5 | 104.5 | 104.6 | 104.5 |
| Gujarat | 80.4 | 111.3 | 110.0 | 110.5 | 110.5 | 99.8 |
| Haryana | 70.4 | 104.0 | 94.7 | 99.3 | 98.9 | 106.7 |
| Himachal Pradesh | 70.8 | 103.9 | 100.0 | 101.9 | 101.6 | 106.7 |
| Jammu and Kashmir | 73.7 | 97.9 | 92.9 | 95.4 | 95.1 | 107.9 |
| Karnataka | 77.6 | 102.6 | 97.1 | 99.8 | 99.3 | 90.7 |
| Kerala | 74.7 | 111.5 | 99.2 | 105.2 | 104.9 | 113.4 |
| Madhya Pradesh | 77.8 | 96.6 | 92.9 | 94.8 | 94.2 | 92.9 |
| Maharashtra | 74.5 | 105.2 | 102.7 | 103.9 | 103.8 | 100.4 |
| Orissa | 82.4 | 99.1 | 94.3 | 96.7 | 96.6 | 105.4 |
| Punjab | 68.8 | 100.2 | 88.8 | 94.3 | 94.2 | 106.7 |
| Rajasthan | 75.3 | 112.2 | 97.7 | 104.7 | 103.9 | 102.0 |
| Tamil Nadu | 79.6 | 109.4 | 102.9 | 106.1 | 105.5 | 102.6 |
| Uttar Pradesh | 72.0 | 94.6 | 88.2 | 91.3 | 91.4 | 99.5 |
| West Bengal | 82.1 | 100.2 | 98.3 | 99.2 | 99.2 | 112.2 |
| All-India | 71.0* | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| **Urban** | | | | | | |
| Andhra Pradesh | 69.0 | 96.8 | 91.4 | 94.1 | 94.0 | 93.6 |
| Assam | 75.0 | 104.4 | 101.0 | 102.7 | 103.0 | 78.1 |
| Bihar | 75.7 | 102.6 | 98.7 | 100.6 | 100.5 | 92.7 |
| Gujarat | 73.3 | 112.0 | 107.9 | 110.0 | 109.5 | 106.8 |
| Haryana | 71.7 | 102.8 | 100.3 | 101.6 | 101.5 | 88.3 |
| Himachal Pradesh | 66.7 | 101.0 | 94.9 | 97.9 | 98.2 | 88.8 |
| Jammu and Kashmir | 72.6 | 94.9 | 90.3 | 92.6 | 92.2 | 91.5 |
| Karnataka | 71.6 | 99.6 | 96.8 | 98.2 | 98.2 | 105.6 |
| Kerala | 73.1 | 103.0 | 92.4 | 97.5 | 97.6 | 100.7 |
| Madhya Pradesh | 75.6 | 100.4 | 96.6 | 98.5 | 98.2 | 110.0 |
| Maharashtra | 69.4 | 109.1 | 106.6 | 107.9 | 107.8 | 116.7 |
| Orissa | 74.0 | 96.3 | 91.5 | 93.8 | 94.0 | 102.0 |
| Punjab | 64.9 | 99.3 | 94.7 | 97.0 | 96.6 | 89.4 |
| Rajasthan | 70.5 | 106.8 | 97.5 | 102.1 | 101.5 | 102.0 |
| Tamil Nadu | 68.9 | 102.0 | 99.8 | 100.9 | 100.8 | 102.2 |
| Uttar Pradesh | 69.8 | 102.0 | 96.3 | 99.1 | 98.8 | 95.1 |
| West Bengal | 72.2 | 102.8 | 98.4 | 100.6 | 100.1 | 92.5 |
| Delhi | 60.2 | 105.1 | 102.2 | 103.7 | 102.8 | 109.1 |
| All-India | 66.5* | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

*Notes:* * Indicates the average over all the states. The implicit Expert Group price index is obtained from Table 4.1 of the Expert Group report by dividing the state poverty lines by the all-India poverty lines.

**Table 5: Poverty Lines for the 55th Round and Headcount Ratios, 43rd through 55th Rounds**

| | Official: Planning Commission | | | | Recalculated Using New Prices | | | |
|---|---|---|---|---|---|---|---|---|
| | $PL_{55}$ | $HCR_{43}$ | $HCR_{50}$ | $HCR_{55}$ | $PL_{55}$ | $HCR_{43}$ | $HCR_{50}$ | $HCR_{55}$ |
| **Rural** | | | | | | | | |
| Andhra Pradesh | 262.94 | 21.0 | 15.9 | 10.5 | 309.62 | 35.0 | 29.2 | 22.3 |
| Assam | 365.43 | 39.4 | 45.2 | 40.3 | 339.94 | 36.1 | 35.4 | 31.8 |
| Bihar | 333.07 | 53.9 | 58.0 | 44.0 | 296.87 | 54.6 | 48.6 | 30.4 |
| Gujarat | 318.94 | 28.6 | 22.2 | 12.4 | 337.32 | 39.4 | 32.5 | 16.0 |
| Haryana | 362.81 | 15.3 | 28.3 | 7.4 | 310.77 | 13.6 | 17.0 | 3.4 |
| Himachal Pradesh | 367.45 | 16.7 | 30.4 | 7.5 | 361.34 | 13.3 | 17.1 | 6.7 |
| Karnataka | 309.59 | 32.6 | 30.1 | 16.8 | 322.60 | 40.8 | 37.9 | 20.5 |
| Kerala | 374.79 | 29.5 | 25.4 | 9.4 | 373.94 | 23.8 | 19.5 | 9.2 |
| Madhya Pradesh | 311.34 | 42.0 | 40.7 | 37.3 | 288.89 | 43.7 | 36.7 | 30.1 |
| Maharashtra | 318.63 | 41.0 | 37.9 | 23.2 | 319.85 | 44.3 | 42.9 | 23.5 |
| Orissa | 323.92 | 58.7 | 49.8 | 47.8 | 300.34 | 50.4 | 43.5 | 40.0 |
| Punjab | 362.68 | 12.8 | 11.7 | 6.0 | 316.49 | 6.6 | 6.2 | 2.7 |
| Rajasthan | 344.03 | 33.3 | 26.4 | 13.5 | 323.92 | 35.3 | 23.0 | 10.3 |
| Tamil Nadu | 307.64 | 46.3 | 33.0 | 20.0 | 336.52 | 49.0 | 38.5 | 27.7 |
| Uttar Pradesh | 336.88 | 41.9 | 42.3 | 31.1 | 280.49 | 34.9 | 28.7 | 15.7 |
| West Bengal | 350.17 | 48.8 | 41.2 | 31.7 | 306.84 | 36.3 | 25.1 | 21.4 |
| All-India | 327.56 | 39.4 | 37.1 | 27.0 | 303.52 | 39.0 | 32.9 | 21.6 |
| **Urban** | | | | | | | | |
| Andhra Pradesh | 457.40 | 41.1 | 38.8 | 27.2 | 344.76 | 23.4 | 17.8 | 9.4 |
| Assam | 343.99 | 11.3 | 7.9 | 7.5 | 378.99 | 13.6 | 13.0 | 10.7 |
| Bihar | 379.78 | 51.9 | 34.8 | 33.5 | 321.64 | 38.1 | 26.7 | 18.0 |
| Gujarat | 474.41 | 38.5 | 28.3 | 14.8 | 369.36 | 16.4 | 14.7 | 4.0 |
| Haryana | 420.20 | 18.4 | 16.5 | 10.0 | 358.38 | 11.8 | 10.6 | 4.8 |
| Himachal Pradesh | 420.20 | 7.2 | 9.3 | 4.6 | 377.65 | 1.7 | 3.6 | 2.2 |
| Karnataka | 511.44 | 49.2 | 39.9 | 24.6 | 367.22 | 26.0 | 21.4 | 8.5 |
| Kerala | 477.06 | 39.8 | 24.3 | 19.8 | 386.23 | 21.0 | 13.9 | 8.7 |
| Madhya Pradesh | 481.65 | 47.3 | 48.1 | 38.5 | 321.29 | 20.7 | 18.5 | 10.7 |
| Maharashtra | 539.71 | 40.3 | 35.0 | 26.7 | 385.36 | 21.2 | 18.2 | 10.6 |
| Orissa | 473.12 | 42.6 | 40.6 | 43.5 | 312.34 | 20.8 | 15.2 | 13.3 |
| Punjab | 388.15 | 13.7 | 10.9 | 5.5 | 350.53 | 6.6 | 7.8 | 2.9 |
| Rajasthan | 465.92 | 37.9 | 31.0 | 19.4 | 353.15 | 19.8 | 18.3 | 6.1 |
| Tamil Nadu | 475.60 | 40.2 | 39.9 | 22.5 | 366.08 | 26.2 | 20.9 | 9.0 |
| Uttar Pradesh | 416.29 | 44.9 | 35.1 | 30.8 | 320.42 | 29.3 | 21.7 | 13.5 |
| West Bengal | 409.22 | 33.7 | 23.0 | 14.7 | 343.51 | 22.3 | 15.5 | 6.8 |
| Delhi | 505.45 | 15.1 | 16.1 | 9.2 | 400.43 | 4.7 | 8.8 | 3.2 |
| All-India | 454.11 | 39.1 | 33.2 | 23.5 | 349.22 | 22.8 | 18.1 | 9.5 |

plausible, there is no guarantee that they hold; given that the questions were asked differently, there is no assumption-free method of recovering what would have happened had the survey been run in the traditional manner! The most important assumption is that the probability of being poor, conditional on reported expenditures on the items collected in the same way, remains the same in the 55th round as it was in the 50th round. Some evidence for the validity of this assumption is presented in my earlier paper.

Table 6 presents the results of making the adjustments using the formulas in Deaton (2003), but with the poverty lines and price indexes of this paper in place of the official ones. The first two columns repeat the headcount ratios from the 43rd and 50th rounds from Table 5. These need no adjustment. Column 3 then shows my 'final' estimate of the headcount ratios from the 55th round. These estimates include both sets of adjustments, for potential overestimation of total per capita expenditures in the survey, as well as for the recalculated price indexes. The last three columns are based on the first three and show the changes in the headcount ratios from 1987-88 to 1993-94, from 1993-94 to 1999-2000, and over the whole period. The effect of the adjustment for the questionnaire design is typically to raise the headcount ratios for the 55th round compared with the unadjusted figures in the last column of Table 5. About three quarters (rural) and two-thirds (urban) of the reduction in poverty from the unadjusted figures survives the adjustment. In the final analysis, I estimate that rural poverty fell by 1.3 percentage points a year from 1993-94 to 1999-2000, while the corresponding figure for the urban sector is 0.9 per cent points a year. Even with the adjustment, there has been very substantial poverty reduction in India in the 1990s.

As always, there is a good deal of difference in rates of poverty across the different states. There are two patterns that are particularly notable. The first is the widely noted superior performance of the southern and western states relative to those in the north and east. In rural Tamil Nadu, for example, nearly half of the population lived below the poverty line in 1987-88; 12 years later, it was only a quarter. What is more surprising, although it appears to a lesser extent in the official figures, is the large estimates of poverty reduction in some of the poorest states. There was a 15.3 percentage point reduction in the headcount ratio in rural Bihar between 1987-88 and 1999-2000, of which 9.3 percentage points took place between 1993-94 and 1999-2000. The corresponding figures for rural Rajasthan are 19.1 and 6.8 percentage points, and for rural Uttar Pradesh 14.2 and 7.9 per cent. A good deal of this mild convergence in headcount rates is a largely automatic consequence of the fact that, in states with high headcount rates, there is a relatively large fraction of the population near the poverty line, so that even modest growth is capable of having a large effect on the fraction in poverty. As explained in some detail in Deaton and Drèze (2002), the overall picture between the 50th and 55th rounds is one of divergence and increasing inequality, between the more successful states in the south and west, between rural and urban sectors of each state, and within the urban sectors of many states. EPW

**Table 6: Headcount Ratios with Adjustment for 55th Round Expenditure Overstatement**

| | $HCR_{43}$ | $HCR_{50}$ | $HCR_{55}$ | Change 43-50 | Change 50-55 | Change 43-55 |
|---|---|---|---|---|---|---|
| **Rural** | | | | | | |
| Andhra Pradesh | 35.0 | 29.2 | 27.9 | –5.8 | –1.3 | –7.1 |
| Assam | 36.1 | 35.4 | 35.7 | –0.7 | 0.3 | –0.4 |
| Bihar | 54.6 | 48.6 | 39.3 | –6.0 | –9.3 | –15.3 |
| Gujarat | 39.4 | 32.5 | 20.4 | –7.0 | –12.1 | –19.1 |
| Haryana | 13.6 | 17.0 | 6.5 | 3.4 | –10.5 | –7.1 |
| Himachal Pradesh | 13.3 | 17.1 | 12.5 | –3.9 | –4.6 | –0.7 |
| Karnataka | 40.8 | 37.9 | 30.3 | –2.9 | –7.6 | –10.5 |
| Kerala | 23.8 | 19.5 | 11.6 | –4.3 | –7.9 | –12.2 |
| Madhya Pradesh | 43.7 | 36.7 | 31.2 | –7.1 | –5.5 | –12.6 |
| Maharashtra | 44.3 | 42.9 | 30.8 | –1.4 | –12.1 | –13.5 |
| Orissa | 50.4 | 43.5 | 41.3 | –6.9 | –2.2 | –9.1 |
| Punjab | 6.6 | 6.2 | 2.8 | –0.5 | –3.4 | –3.9 |
| Rajasthan | 35.3 | 23.0 | 16.2 | –12.3 | –6.8 | –19.1 |
| Tamil Nadu | 49.0 | 38.5 | 25.6 | –10.6 | –12.9 | –23.5 |
| Uttar Pradesh | 34.9 | 28.7 | 20.8 | –6.3 | –7.9 | 14.2 |
| West Bengal | 36.3 | 25.1 | 22.7 | –11.2 | –2.4 | –13.6 |
| All-India | 39.0 | 32.9 | 25.3 | –6.0 | –7.6 | –13.6 |
| **Urban** | | | | | | |
| Andhra Pradesh | 23.4 | 17.8 | 11.3 | –5.7 | –6.5 | –12.2 |
| Assam | 13.6 | 13.0 | 12.1 | –0.6 | –0.9 | –1.5 |
| Bihar | 38.1 | 26.7 | 23.5 | –11.5 | –3.2 | –14.7 |
| Gujarat | 16.4 | 14.7 | 6.6 | –1.7 | –8.1 | –9.8 |
| Haryana | 11.8 | 10.6 | 5.1 | –1.2 | –5.5 | –6.7 |
| Himachal Pradesh | 1.7 | 3.6 | 1.7 | 2.0 | –1.9 | 0.1 |
| Karnataka | 26.0 | 21.4 | 11.5 | –4.5 | –9.9 | –14.4 |
| Kerala | 21.0 | 13.9 | 10.5 | –7.1 | –3.4 | –10.5 |
| Madhya Pradesh | 20.7 | 18.5 | 14.1 | –2.2 | –4.4 | –6.6 |
| Maharashtra | 21.2 | 18.2 | 13.0 | –2.9 | –5.2 | –8.1 |
| Orissa | 20.8 | 15.2 | 15.6 | –5.6 | 0.4 | –5.2 |
| Punjab | 6.6 | 7.8 | 4.0 | 1.2 | –3.8 | –2.6 |
| Rajasthan | 19.8 | 18.3 | 10.6 | –1.5 | –7.7 | –9.2 |
| Tamil Nadu | 26.2 | 20.9 | 11.1 | –5.3 | –9.8 | –15.1 |
| Uttar Pradesh | 29.3 | 21.7 | 16.5 | –7.6 | –5.2 | –12.8 |
| West Bengal | 22.3 | 15.5 | 11.4 | –6.7 | –4.2 | –10.9 |
| Delhi | 4.7 | 8.8 | 2.7 | 4.1 | –6.1 | –2.0 |
| All-India | 22.8 | 18.1 | 12.5 | –4.7 | –5.6 | –10.3 |

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