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Role of Growth and Distribution in the Observed Change in Headcount Ratio Measure of Poverty : A Decomposition Exercise for India

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ABSTRACT

This paper presents a method and analysis the results of decomposing the change in headcount ratio measure of poverty (CHR) between 1970-71 and 1983, separately for rural and urban population of 20 states, into two additive components, viz., one attributable to growth in real average per capita total expenditure (APCTE) (growth effect) and the other to a change in the relative size distribution of PCTE (distribution effect). Based on regression analysis an attempt is also made to explain inter-state variations in CHR with the help fof growth in real APCTE and base-year headcount ratio and relate the residual from the regression equation to the distribution effect.

1. INTRODUCTION

It has been widely recognised that the incidence of poverty is affected by growth as well as distributional factors. In this context, the present paper proposes a method of decomposing the observed change in headcount ratio (*i.e.* the percentage of the population below a pre-specified poverty line) into two additive components which can be attributed to (*i*) change in real average per capita total expenditure (APCTE) or growth effect and (*ii*)

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change in relative size distribution of PCTE or distribution effect. This method is then applied to the rural and urban population of 20 states in India for empirically quantifying the role played by growth and distribution effects in the observed changes in state-specific headcount ratio between 1970-71 and 1983. An attempt is also made to explain inter-state variations in the change in headcount ratio with the help of a regression model.

Two studies came to our attention after the completion of the present paper. The first one is by Kakwani and Subbarao (1990). White the complete methodology has not been elaborated by Kakwani and Subbarao, operationally, it appears to be an exact decomposition that we have suggested. There are several methodological and empirical problems with this paper that we have pointed out in our critique (Tendulkar and Jain, 1990). Another study (as yet unpublished) is by Datt and Ravallion (1990). The basic difference between the Datt-Ravallion methodology and ours lies in the point that ours is an exact decomposition scheme whereas theirs contains a residual component. Both Kakwani-Subbarao and Datt-Ravallion papers do not address tothe social choice problem that arises in interpreting the distribution effect in cases of positive and negative growth. The decomposition scheme suggested in the present paper duely takes care of this problem.

The paper is organised as follows. Section 2 spells out the methodology of decomposition and important issues related to the interpretation of the decomposition exercise. Section 3 discusses computational procedures and data sources used in this paper. Section 4 is devoted to the discussion of empirical results. Section 5 recapitulates the major empirical findings.

2. Methodology of Decomposition

In this section, we discuss the rationale underlying the decomposition scheme adopted in this paper along with its implications. This scheme consists of decomposition of the change in headcount ratio between two time-points. In addition, we also discuss the regression model used by us to explain the inter-state variations in the change in headcount ratio over a given period of time and attempt to link it with the decomposition exercise.

Any decomposition scheme is basically a descriptive exercise which seeks to decompose the change in a given variable (headcount ratio in the present context) into components which are descriptively attributable to the chosen factors taken to influence the change in the variable under consideration. In the present paper, we postulate that, given the exogenously specified normative poverty line, the headcount ratio is influenced by two characteristics associated with the size distribution of per capita total expenditure (or PCTE), namely, (*i*) the average level of per capita total expenditure (or APCTE) for the entire population and (*ii*) the relative size distribution around APCTE as reflected in the Lorenz curve. The basic idea is to

decompose the change in headcount ratio between two time-points into two additive components which can be attributed to a change in APCTE and a change in the relative size distribution.

Given the exogenously specified absolute poverty line (x^*), APCTE ($\bar{x}$) and Lorenz curve (L), the headcount ratio H is taken to be a function

$$H = H\ (x^*,\ \bar{x},\ L)$$

All the three arguments are taken to be measured at prices prevailing in the year under consideration. Notice that as poverty line remains invariant over time in real terms and gets adjusted only to prices, we can drop x^* as an argument in determining H for the purpose of discussing the methodology of decomposition. Since $\bar{x}$ and L change over time, we denote H with two time subscripts, namely, the first referring to APCTE and the second to Lorenz curve. With this notation, the change in headcount ratio (CHR) between two time-points 'O' and 'T' is given by

$$CHR = H(\bar{x}_T,\ L_T) - H(\bar{x}_0, L_0)$$
$$= H_{TT} - H_{00}$$

This change is proposed to be decomposed into two components corresponding to a change in APCTE and a change in relative size distribution. For this purpose, we consider two alternative hypothetical situations and compute the corresponding headcount ratios. They are as follows:

First, what would be the headcount ratio if the real APCTE were to remain at the base year level but the relative size distribution or the Lorenz curve of PCTE were to pertain to the terminal year? This can be done either (*i*) by adjusting the base year APCTE and poverty line to the terminal year prices and keeping the relative size distribution at terminal year prices or (*ii*) by adjusting the relative size distribution in the terminal year to correspond to the base year prices and keeping APCTE and the poverty line at base year prices. We prefer (*i*) to (*ii*) as it involves minimal adjustment to the basic data.[1] Let the resulting headcount ratio be denoted by $H\ [\bar{x}_0\ (1+p),\ L_T] = H_{0T}$ where p is the rate of growth of prices between the base and the terminal year. This is equivaient to shifting the terminal year relative size distribution of PCTE to the left without changing the relative inequality in the size distribution (assuming that real APCTE has risen over time).

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[1]This choice is made on the basis of *a priori* considerations. However, we made an attempt to see what difference is made to the headcount ratio under alternatives (*i*) and (*ii*) mentioned in the text. This could be done only at the all-India level and the results are presented in the Appendix-B. It is shown that the results remain virtually unchanged whether we use method (*i*) or method (*ii*).

Second, what would be the headcount ratio if the real APCTE were to remain at the terminal year level but the relative size distribution were to pertain to the base year? Following the same procedure as in the previous paragraph, let the resulting headcount ratio be denoted by $H\,[\bar{x}_T/(1+p), L_0] = H_{T_0}$. This is equivalent to shifting base year relative size distribution of PCTE to the right without changing the relative inequality in the base year size distribution (assuming a rise in real APCTE over time). Needless to add, the direction of the shift in the size distribution implied in H_{0T} and H_{T_0} would get reversed when real APCTE declines over time.

Using these hypothetical headcount ratios, the change in headcount ratio can be decomposed in two alternative ways:

$$\begin{aligned} CHR &= H_{TT} - H_{00} \\ &= \underbrace{H_{TT} - H_{0T}}_{(A)} + \underbrace{H_{0T} - H_{00}}_{(B)} \end{aligned} \tag{1}$$

Alternatively,

$$CHR = \underbrace{H_{TT} - H_{T_0}}_{(C)} + \underbrace{H_{T_0} - H_{00}}_{(D)} \tag{2}$$

We now turn to the interpretation of the components (*A*) to (*D*) in (1) and (2) and to the considerations bearing on the choice between (1) and (2).

Component (*A*) in (1) indicates the change in headcount ratio keeping constant the terminal year relative size distribution but allowing real APCTE to change its level from the base to the terminal year. We refer to this as growth effect or *GE*(1). It reflects the effect of growth in real APCTE on the headcount ratio.

Component (*B*) in (1) indicates the change in headcount ratio keeping constant real APCTE at the base year level but allowing the relative size distribution to change from the base to the terminal year. The component reflects the impact on the headcount ratio of a change in the relative size distribution and hence is termed as distribution effect or DE(1).

Component (*C*) in (2) keeps the real APCTE constant at the terminal year level and reflects the change in headcount ratio that is attributable to the change in the relative size distribution. This is termed as distribution effect or DE(2).

Similar to (*A*) in (1), component (*D*) in (2) reflects the growth effect or *GE*(2) keeping unchanged the base year relative size distribution.

We now note some relevant properties of the components which would enable us to choose between the two alternative decomposition schemes (1) and (2).

First, the growth effect [$GE(1)$ or $GE(2)$] will be negative or positive depending on whether real APCTE in the terminal year rises or declines compared to its base year level. This can be established as follows: Notice that the growth effect freezes the Lorenz curve and allows real APCTE to change between two time-points. Also notice that headcount ratio is given by the value of abscissa corresponding to the point where the value of the tangent to the lorenz curve equals the ratio of the (pre-specified) poverty line to APCTE. Poverty line remaining the same, the value of the tangent will be lower (higher) if real APCTE rises (declines) between two time-points, thereby bringing a decline (rise) in the headcount ratio.

As regards the distribution effect, we keep the poverty line (which is exogenously specified) as well as APCTE (both measured at their respective prices prevailing in the same year) unchanged between two time-points. Consequently, the value of the tangent corresponding to the headcount ratio remains the same while Lorenz curve changes between two time-points. In this case, the distribution effect [$DE(1)$ or $DE(2)$] could go either way. If, around the tangency point corresponding to the headcount ratio, Lorenz curve in the terminal year shifts inside (outside) that for the base year, the distribution effect would be negative (positive). This would be the case irrespective of whatever happens to that portion of the Lorenz curve which pertains to the non-poor population at the upper end.

With this discussion of the expected direction of growth and distribution effects on *a priori* grounds, we turn to the question of choice between the two alternative decomposition schemes (1) and (2).

It has been sugessted that the relative size distribution of income as reflected in the Lorenz curve can be treated as a public good because it exhibits two characteristics of public good, namely, inability to exclude anybody and inability to allow for individual preferences.[2] In other words, the degree of inequality in the society and the principles on which income and wealth are distributed are shared by everybody and they can not accommodate individual preferences nor can they be modified by isolated individual actions. Consequently, whenever size distribution changes, people individually cannot have any choice regarding the changes in its shape nor can they be expected to know their exact position in the changed size distribution. On the other hand, people could be deemed to have preferences which they can exercise as regards the choice of real APCTE between two situations. Given the public good character of relative size distribution and more specifically the inability of individuals to know their

[2]The suggestion for treating size distribution of income as a public good was made as early as 1964 by Scitovsky (1986). It also appears in the literature on public finace. For example, see Steiner (1974).

exact position in the changed relative size distribution under the hypothetical situations we have constructed, it is plausible to postulate that people would prefer a situation involving a higher real APCTE to a lower one. If this plausible postulate is accepted, then decomposition scheme (1) may be taken to apply whenever real APCTE declines over time. This is because under this condition, distribution effect (B) under scheme (1) would be chosen over its alternative (C) under scheme (2). Growth effect automatically follows as a residual. Conversely, using the same argument, decomposition scheme (2) may be taken to apply whenever there is a rise in real APCTE. We adopt this rule in our subsequent empirical analysis.

We have applied the foregoing decomposition scheme to analyse the change in headcount ratio for 20 states. In addition, we also undertake an exercise to explain the inter-state variation in the change in headcount ratio (CHR) between the two selected time-points. Among the explanatory factors, we consider the change in real APCTE (g) which can be measured either in percentage or absolute terms. We expect g to have an inverse relationship with the change in headcount ratio. Apart from g, we also introduce the initial headcount ratio (H_{00}) as an explanatory factor to assess what partial impact would g have on the change in headcount ratio keeping initial headcount ratio constant. Our two alternative regression-models become

$$CHR = a_0 + a_1 g + u_1$$

$$CHR = b_0 + b_1 g + b_2 H_{00} + u_2$$

where a_0, a_1, b_0, b_1 and b_2 are parameter values to be estimated and u_1 and u_2 are error terms following the standard properties of least squares.

The major omission from the above specification is the impact of changes in the relative size distribution. It is possible to devise summary measures like the standard Gini coefficient and include their changes over time to reflect the impact of the changes in relative size distribution. There are two difficulties in this approach. First, the appropriate measure to reflect changes in Gini coefficient need to be based on Lorenz curves at constant prices which are not easy to derive. Changes in the readily available Gini coefficients based on nominal Lorenz curves may turn out to be misleading in the absence of adjustment made for price changes (See Jain and Tendulkar, 1989). Secondly, even if Gini coefficient at constant prices were available, their summary nature (covering the entire range of the Lorenz curves) may not adequately capture the changes in the Lorenz curves around the poverty line which are important in determining the changes in headcount ratio. Consequently, we have preferred not to include changes in the summary measure of relative size distribution as an explanatory variable in the regression equations. Instead, we hypothesize that the residuals from the

regression equation would mostly reflect the impact of changes in the relative size distribution. We propose to verify this proposition by examining the association of the residuals from the regression equation with the distribution effect in our decomposition schemes (1) and (2).

3. Computational Procedures and Data Sources

We start with a brief explanation of the computational procedure adopted for calculating the hypothetical headcount ratios H_{T0} and H_{0T} in Section II. Since poverty line needs to be adjusted to price changes in the computational procedure, we re-introduce poverty line x^* as an explicit argument in the headcount ratio and write

$$H_{00} = H(x_0^*, \bar{x}_0, L_0) \text{ and } H_{TT} = H(x_T^*, \bar{x}_T, L_T)$$

As our discussion in section 2 focused on the changes in real APCTE, we define r and p such that

$$\bar{x}_T = \bar{x}_0 (1+r/100)(1+p) \qquad (E)$$

where p denotes the rate of growth of prices and r, the rate of growth (%) of real APCTE. We adopt the convention that x^*, $\bar{x}$ and L are measured in prices prevailing in the same year. Following our difinition of H_{0T} in Section 2, we may write

$$H_{0T} = H[x_T^*, \bar{x}_0(1+p), L_T] \qquad (1)$$

$$= H[x_T^*, \bar{x}_T/(1+r/100), L_T] \qquad (2)$$

$$= H[x_T^*(1+r/100), \bar{x}_T, L_T] \qquad (3)$$

Equivalence between (1) and (2) follows from (E). Notice that Lorenz curve remains unchanged in (1) to (3). The value of the tangent to the Lorenz curve corresponding to headcount ratio can be easily verified to be identical in (1) to (3). Hence equivalence between (1), (2) and (3) follows. Similarly, we can deduce

$$H_{T0} = H[x_0^*, \bar{x}_T/(1+p), L_0] \qquad (4)$$

$$= [x_0^*, \bar{x}_0(1+r/100), L_0] \qquad (5)$$

$$= H[x_0^*/(1+r/100), \bar{x}_0, L_0] \qquad (6)$$

Equivalence of (4) to (6) can be similarly established. For computational

purposes, we have used (3) and (6) as they require minimal adjustments to the observed data.

For the calculation of actual and hypothetical headcount ratios, we require the following information:

1. Poverty line at current prices (x^*)
2. Lorenz curve (L)
3. Nominal APCTE ($\bar{x}$)
4. Rate of growth of prices applicable to APCTE (p)
5. Rate of growth (%) of real APCTE (r)

Since one of the objectives of this paper is to assess the sensitivity of our decomposition exercise to the alternative specifications of all-India poverty line, we adopt two variants of all-India poverty line:

(*i*) Planning Commission's specification of monthly PCTE of Rs. 49.09 (rural) and Rs. 56.64 (urban) at all-India level and at 1973-74 prices. This was based on calorie norms. For details, see (Government of India, 1979).

(*ii*) Alternative specification of monthly PCTE of Rs. 15 (rural) and Rs. 18 (urban) at all-India level and at 1960-61 prices. These poverty lines have their origin in the study carried in 1962 out by the Perspective Planning Division (1962, 1974). Also, see Datta (1980), Bardhan (1974), and Rudra (1974).

For calculating the state-specific poverty line at current prices prevailing in the year of the survey, we use the following two-steps procedure.

First, the two pre-specified all-India poverty lines (rural or urban) indicated above are extended to the year of the survey (1970-71 or 1983) by using the appropriate middle-range consumer price index at all-India level. The all India poverty line thus obtained in 1970-71 or 1983 (at current prices) is adjusted in the second step for the differential in prices in a given state relative to all-India for that year. For this purpose, the price differential has been calculated for the year 1963-64 (rural) by Chatterjee and Bhattacharya (1974) and for the year 1961-62 (urban) by Minhas *et al* (1989b). This differential has been extended to the survey years (1970-71 and 1983) by multiplying it with the ratio of state-specific consumer price index to the all-India consumer price index, both indices being applicable to the middle-range of the population and given for the rural population by Minhas and Jain (1989) and urban population by Minhas *et al* (1988). Table 1 gives the data description and the data sources.

State-specific estimates of $\bar{x}_0$, $\bar{x}_T$ and $1+p$ are presented in Appendix Tables *A*.1 and *A*.2 for the rural and the urban population, respectively. These have been used in working out the estimates of r, the state-specific rate of growth (%) of real APCTE over the period from 1970-71 to 1983.

TABLE 1

DATA DESCRIPTION AND DATA SOURCES

Sl. No.	*Data Particular*	*Segment of population*	*Data Source*
1.	Nominal APCTE and Lorenz curve for 1970-71	Rural Urban	NSS Report No. 231
2.	Nominal APCTE and Lorenz curve for 1983	Rural Urban	*Sarvekshana*, Vol. IX, No. 4, 1986
3.	Rate of growth of prices applicable to APCTE between 1970-71 and 1983	Rural Urban	Minhas *et al* (1990) Minhas *et al* (1988)
4.	Cosumer price index for middle range of the population	Rural Urban	Minhas and Jain (1989) Minhas *et al* (1988, 1989a)
5.	State-specefic price index relative to all-India=100 for middle range of the population	Rural Urban	Chatterjee & Bhattacharya (1974) Minhas *et al* (1989b)

Notes: (1) This table provides a list of sources of basic data. Details of calculations especially for sl. no. 3 to 5 are given in the respective papers cited in this connection.

(2) Each variable has been calculated for each state and at the all-India level and separately for the rural and the urban population.

State-specific estimates of poverty lines x^*, x_T^*, $x^*/(1+r/100)$ $[=x_{T0}^*]$ and $x_T^*(1+r/100)$ $[=x_{0T}^*]$ which have been used for calculating H_{00}, H_{TT}, H_{T0} and H_{0T} respectively, appear in Appendix Tables *A*.1 and *A*.2 for the rural and urban populations respectively based on the Planning Commission's estimates of all-India poverty line and in Appendix Table *A*.4 for both the rural and the urban population using the alternative estimates of all-India poverty lines.

We use the foregoing poverty lines along with the size distributions of PCTE available from National Sample Surveys to calculate the actual and the hypothetical headcount ratios. For this purpose, linear interpolation procedure between ln x and P is used where x denotes monthly PCTE and P denotes the proportion of state-specific population (rural or urban) with monthly PCTE of x or less. Alternatively, we could have used interpolation based on the assumption of log-normality. This involves postulating a linear relationship between ln x and t_P where t_P stands for the abscissa upto which the area under the standard normal curve equals P. However, these two alternative procedures have been noted to yield virtually the same

estimates of the headcount ratio. Consequently, we have preferred the simpler former procedure to the latter. The calculated actual and hypothetical headcount ratios based on the Planning Commission's estimates of all-India poverty lines appear in Appendix Table *A*.3 and those based on the alternative all-India poverty lines appear in Appendix Table *A*.5.

4. Empirical Results

We start by breifly commenting on the consideration which have operated in our choice of the two time-points, namely, 1970-71 and 1983 for the decomposition exercise. The relevent data for the decomposition exercise were available in a comparable form for the five recent rounds of the National Sample Survey from 1970-71 onwards. These rounds were 25th (July 1970 to June 1971), 27th (October 1972 to September 1973), 28th (October 1973 to June 1974), 32nd (July 1977 to June 1978) and 38th (January to December 1983). Of these five rounds, the 27th and the 28th rounds were marked by extreme inflationary pressures for the rural as well as the urban pouplation. During these rounds, for most of the states, headcount ratio also rose compared to the 25th round (see Minhas et al (1989a) and Minhas and Jain (1989)). We have, therefore, left out the 27th and 28th rounds as being abnormal. The choice is thus available between the 25th (1970-71), the 32nd (1977-78) and the 38th (1983) rounds. Of these, the 38th round is marked by the lowest headcount ratio for most of the states for both the rural and the urban population. Since this is also the latest round for which data are available, we have taken 1983 as the terminal end-point. As regards the initial time point, we have to choose between 1970-71 and 1977-78. For most of the states, headcount ratio turned out to be lower for 1977-78 than for 1970-71, although both were higher than those in 1983. From this point of view, 1977-78 would have been preferable to 1970-71 in order to examine the impact of growth and distribution on the headcount ratio. However, we have noted in an earlier study (Jain and Tendulkar, 1989) that there was a serious data problem with respect to both APCTE and Lorenz curve in 32nd round. Consequently, 1970-71 was chosen as the base year and 1983 as the terminal year. This also provided the longest period over which the decomposition exercise could be carried out. We may also note that the agricultural year—July 1970 to June 1971—was a local peak around that time. Similarly, the Rabi harvest of 1982-83 and the Kharif harvest of 1983-84 (which together broadly correspond to the calender year 1983) constitute the local peak around that time also. In addition, it has been found at the all-India level that for each fractile-group of the rural and urban population, real mean per capita total expenditure turned out to be higher in 1983 than in each of the four survey years including 1970-71 (see Jain and Tendulkar, 1989). The period from 1970-71 to 1983 thus offers an opportunity to study the impact of growth

and distribution on the change in headcount ratio measure of poverty over twelve and half years period bounded by two reasonably 'normal' years.

We note that the coverage of this study extends to 20 states[3] which together accounted for around 99 percent of the rural and the urban population of India in 1970-71 and 1983. In tables given in the text as well as in the appendix-A, we provide (*a*) a direct all-India estimate of the headcount ratio based on the all-India poverty line and the coressponding APCTE and Lorenz curve, and (*b*) headcount ratio estimate aggregated for 20 states which is obtained as a weighted average of the estimates of headcount ratios for 20 states using state-specific population shares as weights.

We may note a general aggregation problem in the present context. Let $H(s)$ and $w(s)$ denote the headcount ratio and the share in all-India population for state 's'. It is plausible to expect that the weighted average over all states *i.e.* $\Sigma_s\, w(s)\, H(s)$ would correspond to the direct all-India estimate of the headcount ratio. This is so if and only if an identical poverty line is used for all the states as well as for all-India estimate. In the present study, as mentioned earlier in Section III, we have appropriately allowed for state-specific price-differential relative to all-India at a point of time as well as state-specific changes over time in the consumer price-index applicable to the expected poverty population in deriving state-specific poverty line for 1970-71 and 1983. Consequently, the state-specific poverty lines differ among themselves as also from the one at the all-India level (See Tables *A*.1, *A*.2 and *A*.4). Moreover, we do not cover all the states in the Indian union. Consequently, the general aggregation mentioned above cannot be expected to hold in our study. Table 2 illustrates the differences in headcount ratios based on direct all-India estimate as also that aggregated for 20 states considered in this study. It may be noted that in all the cases, the direct all-India estimate turns out to be lower than that aggregated for 20 states even though 20 states together do not cover the entire all-India population. This is not an inconsistency in the estimates but to be expected on the basis of adjustment made for the inter-state price variations.

Since the 20 states in this study cover an overwhelming percentage of the all-India population, it would be more appropriate to accept the aggregated headcount ratio for 20 states (which is given in column (4) of Table 2) as a representative all-India estimate.

We may note that estimates of the headcount ratios in Table 2 are based on the lower of the two sets of all-India poverty lines used in this study.

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[3]Results for Assam are not comparable over the period from 1970-71 and 1983, as the boundaries of the state underwent change during this period.

TABLE 2

HEADCOUNT RATIO: A COMPARISON OF DIRECT ALL-INDIA ESTIMATE WITH THAT AGGREGATED FOR 20 STATES (BASED ON ALTERNATIVE ALL-INDIA POVERTY LINES)

Sl. No.	*Segment of population*	*Year*	*Direct all-Indja estimate* (%)	*Estimate aggregated for* 20 *states* (%)
(0)	(1)	(2)	(3)	(4)
1	Rural	1970-71	45.29	47.11
2	Rural	1983	37.54	38.97
3	Urban	1970-71	37.06	37.20
4	Urban	1983	28.77	30.27

Note: Alternative poverty lines refer to monthly PCTE of Rs. 15 and Rs. 18 for all-India rural and urban populations respectively, at 1960-61 prices.

Sourve: Table A.5, line 21 for column (3) and Table A.6, line 24 for column (4).

The rest of the empirical results are organised as follows. Section 4.1 examines the decomposition of the change in headcount ratio for 20 states using two alternative set of all-India poverty lines. Section 4.2 attempts to explain the inter-state variations in the change in headcount ratio and connect it to the decomposition exercise.

4.1 *Decomposition of Headcount Ratio*

As mentioned in Section 2, we have used two sets of exogenously specified all-India poverty lines in this study. The first set is based on the poverty lines used by the Planning Commission in their planning exercises for the Sixth Plan. The second set uses the poverty lines which have been widely adopted by the various researchers in this field. At comparable set of prices, the Planning Commission's poverty line is higher than the alternative one, both for the rural and the urban population at the all-India as well as the state level (see Table *A*.1, *A*.2 and *A*.4). We are of the view that there exists an inherent and irreducible element of arbitrariness in the specification of the poverty line (see Sundaram and Tendulkar, 1988). Consequently, we decided to examine the sensitivity of the decomposition exercise to the specification of two alternative all-India poverty lines.

Using the decomposition schemes (1) and (2) in Section 2, Table 3 presents the results based on the Planning Commission's poverty lines and

Table 4 based on the alternative poverty lines. We may note that using the Planning Commission's poverty lines, seven states (rural) and fourteen states (urban) report favourable distribution effect. With alternative poverty lines, six states (rural) and sixteen states (urban) experience favourable distribution effect. The detailed results are organised by classifying the states into the following four categories.

Category *A*: Rise in *H* and rise in real APCTE
Category B: Rise in *H* and fall in real APCTE
Category *C*: Fall in *H* and rise in real APCTE
Category *D*: Fall in *H* and fall in real APCTE

Notice that we have combined movements in *H* with those in real APCTE because the impact of movement in real APCTE on *H* is unambiguously predictable. Within each category, states are arranged according to ascending order of the change in headcount ratio between 1970-71 and 1983. Two components of decomposition, namely, growth effect (*GE*) and distribution effect (*DE*) along with the rate of growth of real APCTE (*r*) are given for the rural and the urban population of 20 states. The all-India (*AI*) estimate in these tables relates to the direct estimate based on the size distribution, APCTE and poverty line all at the all-India level.

Comparing the two tables, we find that the broad orders of magnitudes of changes in headcount ratio are not very different under the two alternative sets of all-India poverty lines. Majority of states (18 in rural and 14 in urban) lie in category *C* reflecting a rise in real APCTE and a decline in *H*. In this category, growth effect mostly dominates over distribution effect. The composition of the states as also their broad ranking remains the same for the rural population under the two alternative poverty lines. The same conclusion holds for the urban population with the exception of Punjab and Orissa. In Punjab there is a decline in the headcount ratio using the Planning Commission's poverty line and a slight increase using the alternative poverty line. The situation gets reversed in Orissa.

In the remaining categories *A*, *B* and *D*, the differences in the classification of the states are insignificant with respect to the two sets of poverty lines.

We may like to draw attention to category *D* where there is a decline in the headcount ratio despite a reduction in real APCTE. In this category, the distribution effect is found unequivocally to dominate the growth effect. For the rural population, no state gets classified into category *D* using the Planning Commission's poverty lines, whereas based on the alternative poverty lines, only Jammu and Kashmir falls into category *D*. In the urban population, the same three states, namely, Tamil nadu, Delhi and Bihar belong to this category *D* in Table 3 as weas in Table 4. A striking case

TABLE 3

CLASSIFICATION OF STATES INTO FOUR CATEGORIES IN RESPECT OF RISE/ FALL IN HEADCOUNT RATIO (H) AND IN REAL AVERAGE PER CAPITA TOTAL EXPENDITURE (APCTE) FROM 1970-71 TO 1983 : RURAL AND URBAN INDIA. (BASED ON PLANNING COMMISSION POVERTY LINES)

	Rural					*Urban*				
Sl. No.	*State name*	*CHR*	*GE*	*DE*	*r*	*State name*	*CHR*	*GE*	*DE*	*r*
(0)	(1)	(2)	(3)	(3)	(5)	(6)	(7)	(8)	(9)	(10)
				Category A : Rise in H and rise in Real APCTE						
1.	—	—	—	—	—	ORS	0.31	—0.13	0.44	0.15
				Category B : Rise in H and fall in Real APCTE						
2.	J & K	1.58	8.84	—7.26	—8.01	MHR	0.27	1.09	—0.82	—1.68
3.	BHR	1.65	0.20	1.45	—0.28	ASM	2.02	4.63	—2.61	—5.91
				Category C : Fall in H abd rise in Real APCTE						
4.	MNP	—42.63	—41.04	—1.59	41.26	MNP	—23.64	—18.73	—4.91	15.19
5.	KER	—21.83	—22.81	0.98	42.25	J & K	—14.95	—11.55	—3.40	15.95
6.	GJT	—21.44	—20.93	—0.51	20.87	KER	—14.64	—12.43	—2.21	24.83
7.	AP	—16.65	—19.19	2.54	24.38	HRY	—13.25	—11.56	—1.69	21.69
8.	HRY	—16.01	—11.56	—4.45	15.70	GJT	—12.99	—14.42	1.43	16.30
9.	RJN	—12.74	—14.34	1.60	21.81	HP	—11.68	—11.09	—0.59	35.81
10.	KRN	—12.56	—12.63	0.07	13.99	AP	—10.67	—10.75	0.08	14.29
11.	WB	—10.80	—11.31	0.51	18.01	KRN	—9.36	—8.88	—0.48	16.66
12.	TRP	—10.25	—12.73	2.48	12.04	RJN	—8.78	—3.30	—5.48	4.56

13.	PNB	—10.20	—5.87	—4.33	7.83	MP	—6.42	—1.56	—4.86	2.17
14.	TN	—9.60	—14.88	5.28	19.52	UP	—5.67	—5.26	—0.41	7.63
15.	ORS	—9.56	—7.98	—1.58	12.37	WB	—4.23	—4.59	0.36	7.32
16.	MP	—8.34	—7.24	—1.10	10.33	PNB	—3.06	—5.83	2.77	7.46
17.	DLI	—6.48	—12.27	5.79	37.00	TRP	—2.10	—4.84	2.74	10.61
18.	HP	—5.77	—7.01	1.24	8.45	AI	—7.56	—6.44	—1.12	9.74
19.	MHR	—1.71	—6.92	5.21	8.35	—	—	—	—	—
20.	UP	—1.58	—1.87	0.29	2.22	—	—	—	—	—
21.	ASM	—1.12	—4.01	2.89	3.16	—	—	—	—	—
22.	AI	—8.31	—10.01	1.70	12.33	—	—	—	—	—
					Category D : Fall in H and fall in Real APCTE					
23.	—	—	—	—	—	TN	—11.02	2.39	—13.41	—3.10
24.	—	—	—	—	—	BHR	—2.96	1.52	—4.48	—2.00
25.	—	—	—	—	—	DLI	—2.69	1.88	—4.57	—2.48

Notes: (1) Planning Commission poverty lines refer to the monthly FCTE of Rs. 49.09 and Rs. 56.64 for All-India rural and urban populations, respectively, at 1973-74 prices.

(2) *CHR* ($=H_{TT}—H_{00}$) refers to difference in the headcount ratio (%) in 1983 from that in 1970-71.

(3) *GE* refers to change in the headcount ratio (%) because of growth only in the real APCTE between 1970-71 and 1983.

(4) *DE* refers to change in the headcount ratio (%) because of change only in the size-distribution from 1970-71 to 1983.

(5) *r* refers fto the growth rate (%) of the real APCTE over the period from 1970-71 to 1983.

(6) Within each category, states are arranged according to ascending order of the change in headcount ratio (CHR) between 1970-71 and 1983.

(7) See Table A.1 for explanation of the abbreviations used for the state name.

Sources : Appendix Tables A.1 to A.3.

TABLE 4

CLASSIFICATION OF STATES INTO FOUR CATEGORIES IN RESPECT OF RISE/FALL IN HEADCOUNT RATIO(H) AND IN REAL AVERAGE PER CAPITA TOTAL EXPENDITURE (APCTE) EROM 1970-71 TO 1983 : RURAL AND URBAN INDIA. (BASED ON ALTERNATIVE POVERTY LINES)

	Rural					*Urban*			
Sl. No.	*State name*	*CHR*	*GE*	*DE*	*r*	*State name*	*CHR*	*GE*	*DE*	*r*
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Category A : Rise in H and rise in Real APCTE					
1.	—	—		—	—	PNB	0.52	—3.30	3.82	7.46
					Category B : Rise in H and fall in Real APCTE					
2.	BHR	0.86	0.24	0.62	—0.28	MHR	0.27	1.13	—0.86	—1.68
3.	—	—	—	—	—	ASM	0.94	2.07	—1.13	—5.91
					Category C : Fall in H and rise in Real APCTE					
4.	MNP	—39.13	—41.26	2.13	41.26	KER	—16.20	—14.89	—1.31	24.83
5.	KER	—23.96	—25.22	1.26	42.25	CJT	—13.20	—12.82	—0.38	16.30
6.	GJT	—18.04	—16.88	—1.16	20.87	MNP	—12.61	—6.62	—5.99	15.19
7.	AP	—15.84	—18.77	2.93	24.38	HRY	—12.07	—8.44	—3.63	21.69
8.	HRY	—14.40	—9.75	—4.65	15.70	J&K	—10.64	—9.20	—1.44	15.95
9.	WB	—12.14	—13.62	1.48	18.01	NRM	—10.41	—11.97	1.56	16.66
10.	RJN	—11.22	—11.69	0.47	21.81	AP	—9.98	—9.87	—0.11	14.29
11.	ORS	—10.84	—9.42	—1.42	12.37	MP	—8.98	—1.66	—7.32	2.17
12.	MP	—10.16	—7.73	—2.43	10.33	RJN	—8.91	—3.18	—5.73	4.56

13.	TRP	—9.86	—12.10	2.24	12.04	HP	—8.83	—8.34	—0.49	35.81
14.	TN	—8.84	—15.17	6.33	19.52	UP	—6.75	—5.16	—1.59	7.63
15.	KRN	—8.72	—9.94	1.22	13.99	WB	—4.99	—6.07	1.08	7.32
16.	PNB	—6.69	—6.08	—0.61	7.83	TRP	—1.73	—3.96	2.23	10.61
17.	HP	—3.89	—5.37	1.48	8.45	ORS	—1.05	—0.10	—0.95	0.15
18.	DLI	—1.92	—3.83	1.91	37.00	AI	—8.29	—6.54	—1.75	9.74
19.	UP	—1.58	—1.81	0.23	2.22	—	—	—	—	—
20.	MHR	—1.57	—6.84	5.27	8.35		—	—	—	—
21.	ASM	—1.06	—2.97	1.91	3.16	—	—	—	—	—
22.	AI	—7.75	—9.28	1.53	12.33	—	—	—	—	—
				Category D : Fall in H and fall in Real APCTE						
23.	J&K	—1.30	4.89	—6.19	—8.01	TN	—11.73	2.38	—14.11	—3.10
24.	—	—	—	—	—	DLI	—5.81	1.88	—7.69	—2.48
25.	—	—	—	—	—	BHR	—4.30	1.53	—5.83	—2.00

Notes : (1) Alternative poverty lines refer to the monthly PCTE of Rs. 15 and Rs. 18 for All-India rural and urban populations, respectively, at 1960-61 prices.

(2) Same as Notes (2) to (7) of Table 3.

Sources : Appendix Tables A.4 and A.5.

is presented by Tamil Nadu (urban) where distribution effect considerable overwhelms growth effect. The factors underlying this result may have something to do with the various urban-oriented welfare-schemes started by the state government.

The foregoing discussion clearly indicates that the decomposition results are only marginally affected by the choice between the two alternative sets of poverty lines. The subsequent analysis is, therefore, confined to the lower of the two sets of poverty lines (referred as alternative poverty lines) which would result in the lower of the two estimates of headcount ratio corresponding to the two variants of poverty lines.

Further analytical sub-categories within the four major categories given in Table 4 can be distinguished on the basis of the relative importance of growth and distribution effects. This analysis is presented in Table 5 for the rural and the urban population. This table provides the following summary information for each of the analytical sub-categories:

(1) names of the states [columns (2) and (7)];

(2) percentage share of the states included within each sub-category to the total for 20 states with respect to:

(*i*) total population in 1970-71 [columns (5) and (8)];

(*ii*) poor population in 1970-71 [columns (6) and (9)];

(3) implied headcount ratio for 1970-71 and 1983 (columns (5), (6), (10) & (11). We may note that all the population shares in Table 5 relate to the total of 20 states included in this study for the year 1970-71.

The major category in Table 4 has been noted to be the one where a decline in H is combined with a rise in real APCTE. In this case, growth effect unambiguously dominates over distribution effect. However, we may distinguish those cases where distribution effect reinforces growth effect from those where distribution effect is adverse but not strong enough to offset growth effect. These are given as sub-categories $I(a)$ and $I(b)$ in Table 5.

We first discuss the regularities emerging from Table 5 for the rural population. For nearly two-third of the total rural population in 13 out of 20 states covered in this study, favourable growth effect is partially offset by adverse distribution effect. For this group, in 5 out of 13 states, headcount ratio declined from about 52 per cent in 1970-71 to 39 percent in 1983. These five states were marked by a reduction in the headcount ratio of more than ten percentage points between 1970-71 and 1983 [columns (4) and (5) for

sub-category *I*(*b*)(*i*)]. In the remaining eight states, headcount ratio declined only marginally from nearly 42 in 1970-71 to 38 per cent in 1983 [sub-category *I*(*b*)(*ii*)]. Five more states out of 20 experienced mutually reinforcing growth and distribution effects [sub-category *I*(*a*)]. Consequently, headcount ratio for this group declined markedly from 46 in 1970-71 to 34 per cent in 1983. More than 85 per cent of the rural population in 1970-71 is covered by 18 states belonging to these two sub-categories [*I*(*a*) and *I*(*b*)].

These same two sub-categories [*I*(*a*) and *I*(*b*)] cover more than 60 per cent of the urban population located in 14 out of 20 states. Among them, however, 11 states covering 44 per cent of the urban population experienced favourable growth as well distribution effects [sub-category *I*(*a*)]. For a little over one-sixth of the urban population located in three out of 20 states, growth effect was partially offset by adverse distribution effect [sub-category *I*(*b*)]. Headcount ratio for these sub-categories recorded declines between seven to fourteen percentage points [columns (10) and (11) for *I*(*a*)(*i*), *I*(*a*)(*ii*) and *I*(*b*)].

Apart from the major and dominant category I mentioned above, we have distinguished three other categories. Category II consists of a reduction in *H* despite a decline in real APCTE. This can be brought about only by favourable distribution effect offsetting adverse growth effect. Nearly one-fifth of the urban population located in three (including Tamil Nadu and Bihar) out of 20 states experienced this combination [sub-category *II*(*a*)]. This sub-category was insignificant for the rural population. Category III covers those cases where there is an increase in *H* notwithstanding a rise in real APCTE. This can arise only because a favourable growth effect is more than offset by an adverse distribution effect. This category is non-existant for the rural population and covers urban population of only one state (Punjab) with a slight rise in the headcount ratio. The final category IV refers to cases where there is a rise in *H* alongwith a decline in real APCTE. This can happen in two ways. Either both growth and distribution effects are adverse or favourable distribution effect being more than offset by adverse growth effect. Bihar accounting for 11 per cent of the rural population in 20 states belongs to the former case (not separately shown in the table) and Assam and Maharashtra with around 15 per cent of the total urban population in 20 states belong to the latter case i.e. (subcategory *IV*(*a*) in Table 5).

Overall, we find that the rural population of the 20 states fall in two extreme categories, namely, decline in *H* combined with a rise in real APCTE (category I) and a rise in *H* alongwith a fall in real APCTE (category IV). This implies that the presence or absence of growth played a deminant role in the observed movement in headcount ratio between 1970-71 and 1983 for the rural population. For the urban population, besides the two categories *I* and *IV* one more category *II*, namely, a decline in both *H* and real

TABLE 5

CLASSIFICATION OF STATE-SPECIFIC RURAL AND URBAN POPULATION (TOTAL AND POOR) INTO SUB-CATEGORIES OF FOUR CATEGORIES (GIVEN IN TABLE 4) ACCORDING TO THE RELATIVE IMPORTANCE OF GROWTH AND DISTRIBUTION EFFECTS (GE AND DE).

(BASED ON ALTERNATIVE POVERTY LINES)

Sub-category	*Rural*					*Urban*				
	States belonging to the sub-category	*% age share in 1970-71's 20 states*		*Headcount ratio (%)*		*States belonging to the sub-category*	*% age share in 1970-71's 20 states*		*Headcount ratio (%)*	
		Total popln	*Poor popln*	1970-71	1983		*Total popln*	*Poor popln*	1970-71	1983
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
I. Decline in H and Rise in Real APCTE										
I(*a*). *GE* and *DE* both favourable										
I(*a*)(*i*). Reduction in *H* exceeding 10 percentage points.	GJT, HRY, MP,ORS	18.92	20.07	49.97	33.35	KER,GJT, MNP, HRY, J&K	12.71	13.44	39.37	25.17
I(*a*)(*ii*). Reduction in *H* not exceeding 10 percentage points.	PNB	2.37	0.89	17.59	10.90	AP, MP, RJN,HP UP, ORS	31.62	35.62	41.94	34.20
I(*b*). Favourable *GE* offsetting advarse *DE*										
I(*b*)(*i*). Reduction in *H* exceeding 10 percentage points.	MNP,KER, AP,WB, RJN	24.89	27.64	53.32	38.51	KRN	6.58	7.03	39.77	29.36

I(*b*)(*ii*). Reduction in *H* not exceeding 10 percentage points.	TRP,TN, KRN,HP, DLI,UP, MHR,ASM	41.31	36.76	41.92	38.10	WB,TRP	10.29	6.81	24.64	19.67
II. Decline in both H and Real APCTE										
I(*a*). Favourable *DE* offsetting adverse *GE*	J&K	0.86	0.31	16.90	15.60	TN,DLI, BHR	20.11	23.20	42.95	33.90
III. Rise in both H and Real APCTE										
III(*a*). Favourable *GE* offset by adverse *DE*	None	—	—	—	—	PNB	2.98	1.20	15.07	15.59
IV. Rise in H and Fall in Real APCTE										
IV(*a*). Favourable *DE* offset by adverse *GE*	BHR	11.64	14.35	58.07	58.93	ASM,MHR	15.71	12.69	30.07	30.13

Notes: (1) Alternative Poverty Lines refer to monthly PCTE of Rs. 15 and Rs. 18 for all-India rural and urban, at 1960-61 prices.
(2) For the explanation of notations *H, APCTE, GE* and *DE* see Table 3 and of abbreviations for state names see Table A.1.
(3) Percentages given in columns (3), (4), (8) and (9) are compiled from Table A.6.
(4) Headcount ratio of a group of states within each sub-category given in column (5)/(10) is derived on dividing column (4)/(9) by column (3)/(8) and multiplying by headcount ratio in 1970-71 for rural/urban population of 20 states. Similar procedure is applied for columns (6) and (11) using relevent information given in Table A.6.

Sources: Tables 4 and A.6.

APCTE, is also important. Category *II* is interesting insofar as favourable distribution effect has been found to dominate over adverse growth effect. One-fifth of the urban population in 20 states is found to be located in this category.

So far, we have concentrated on the relative magnitude of the two effects in our analysis. If we concentrate on the direction of one effect irrespective of the magnitude of the other effect, we can assess the extent of population affected by favourable growth effect by itself or favourable distribution effect by itself. Notice that categories *I* and *III* in Table 5 are marked by favourable growth effect if we ignore the direction of distribution effect. Similarly, categories *I(a)*, *II* and *IV(a)* in Table 5 are characterised by favourable distribution effect if we ignore the direction of growth effect. We note that around 87 per cent of the rural population in 18 out of 20 states (in categories *I* and *III*) and 64 per cent of the urban population in 15 out of 20 states experienced favourable growth effect. In comparison, favourable distribution effect, by itself, accounted for 34 per cent of the rural population in 7 out of 20 states and 47 per cent of the urban population in 9 out of 20 states [categories *I(a)*, *II* and *IV(a)*]. Two major conclusions follow. First, growth effect was much more dominant than distribution effect for both the rural and the urban population. Secondly, relatively speaking, favourable distribution effect was more important for the urban than for the rural population.

Our analysis so far has been confined to groups of states having a common pattern of the growth and the distribution effects. We now examine growth and distribution effects in major states with reference to their growth in real APCTE to discern the underlying patterns, if any. This discussion is based on Table 4.

For the rural population, distribution effect was favourable and significant (in terms of absolute percentage points) (*a*) in Jammu and Kashmir which experienced negative growth and (*b*) more interestingly in Haryana and Punjab both of which experienced desparate rates of growth in real APCTE. At the upper end of the unfavourable distribution effect, we find Tamil Nadu with a reasonably high growth and Maharashtra with one of the lowest growth rates in real APCTE. Kerala with the highest growth in real APCTE experienced a mildly unfavourable distribution effect.

We may now turn to the urban population. At the upper end of the high and favourable distribution effect we find (*a*) Tamil Nadu, Delhi and Bihar with negative growth in real APCTE and (*b*) relatively slow-growing states of Madhya Pradesh and Rajasthan. Interestingly again, Punjab with not very high growth reported the highest magnitude of unfavourable distribution effect. Kerala with the second highest growth rate had a mildly favourable distribution effect.

It is apparent from the foregoing cases that there was no strong and clear association between high growth in real APCTE and adverse distribution effect. This also emerges from the calculation of the Spearman's rank correlation coefficient between the growth rate of real APCTE (ranked from the highest to the lowest) and the magnitude of distribution effect (ranked from the most unfavourable to the most favourable). The value of the rank-correlation coefficient turned out to be 0.32 (rural) and 0.38 (urban), both being positive but very much on the lower side.

It is possible to argue that it is not appropiate to compare the rank of a state with respect to the magnitude of distribution effect with its rank with reference to the growth rate of real APCTE because the former is not normalised with respect to the magnitude of base year headcount ratio. Consequently, we calculated the Spearman's rank correlation coefficient between the rank of a state according to distribution effect as percent of base year headcount ratio and the rank according to growth rate of real APCTE. This was found to be 0.38 (rural) and 0.33 (urban). Our conclusion regarding the association between the growth rate of real APCTE and distribution effect remains unchanged, namely, that it is very weak. Needless to add, this statement is *not* to be taken in a causal sense but in the sense of a crude inter-state association between the two variables under consideration.

4.2 *Explanation of Inter-state Variations in the Change in Headcount Ratio*

Our decomposition exercise brings out the powerful influence exerted by growth in real APCTE on the observed change in headcount ratios between 1970-71 and 1983. This suggests that the change in real APCTE would be a major factor governing the inter-state variations in the change in headcount ratio. We tried this variable in the regression specification discussed in Section II in terms of percentage change as well as absolute change in real APCTE. It is the former which provided statistically better results. In addition, in order to assess the influence of growth in real APCTE while keeping the base year headcount ratio constant, we included base-year headcount ratio as an additional explanatory variable. The regression results are summarised in Table 6.

All the regression equations bring out the statistically significant impact exerted by growth in real APCTE on reducing the headcount ratio. This impact does not appear to be different in absolute magnitude whether we include the base-year headcount ratio in the equation or not. In other words, it is not sensitive to the level of the initial headcount ratio. An increase of one percentage points in the growth rate of real APCTE between 1970-71 and 1983 brought about, on an average, between 0.5 and 0.6 percentage point reduction at the margin in the change in rural headcount ratio and between 0.3 and 0.4 percentage point reduction in the change in urban headcount ratio. Using the criterion of squared multiple correlation coefficient

TABLE 6

REGRESSION EQUATIONS FOR EXPLAINING CHANGE IN STATE-SPECIFIC HEADCOUNT RATIO AND CORRELATION COEFFICIENT BETWEEN THE RESIDUALS FROM REGRESSION LINE AND THE DISTRIBUTION EFFECT

Sl. No.	*Dependent variable*	*Independent variables*			R^2	$r_{RES,DE}$
		Constant	H_{001}/H_{002}	*g*		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Rural Population			
1	CHR1	—1.75007 (—0.77)		—0.53095 (—4.75)	0.5560	0.3234
2	CHR1	4.18186 (1.14)	—0.16145 (—1.97)	—0.48810 (—4.60)	0.6387	0.4496
3	CHR2	—1.56396 (—0.69)		—0.59361 (—5.30)	0.6091	0.6045
4	CHR2	4.20384 (0.89)	—0.11775 (—1.39)	—0.56374 (—5.06)	0.6488	0.6618
			Urban Population			
5	CHR1	—4.74475 (—3.79)		—0.27789 (—3.12)	0.3514	0.7575
6	CHR1	1.26688 (0.57)	—0.18037 (—3.08)	—0.31225 (—4.21)	0.5841	0.6410
7	CHR2	—4.12502 (—2.79)		—0.39364 (—3.75)	0.4382	0.6574
8	CHR2	1.12672 (0.31)	—0.12384 (—1.55)	—0.41778 (—4.08)	0.5081	0.5928

Notes: (1) CHR1 and CHR2 represent change (percentage points) in state-specific headcount ratio between 1970-71 and 1983, based respectively on the Alternative poverty lines and those adopted by the Planning Commission. H_{001}/H_{002} in column (4) represents the state-specific headcount ratio (percent) in 1970-71 corresponding to the Alternative/Planning Comission poverty lines used in the dependent variable CHR1/CHR2.

(2) *g* represents the state-specific rate of growth (percent) in real APCTE between 1970-71 and 1983 (denoted as *r* in Section III).

(3) R^2 denotes the squared multiple correlation coefficient.

(4) $r_{RES,DE}$ in column (7) represents the correlation coefficient between the residuals from the regression line for each state and the distribution effect for that state given in columns (4) and (9) of Tables 3 and 4.

(5) Figure in brackets below the estimated parameters indicates its *t*-value.

(R^2), we find that the growth in real APCTE is relatively more important for the rural than for the urban population in explaining the inter-state variations in the change in headcount ratio. We may also note that R^2 is more sensitive to the introduction of the base year headcount ratio in the case of alternative set of all-India poverty lines than that based on the set of poverty lines adopted by the Planning Commission.

As pointed out in Section 2, our specification of the regression equations in Table 6 does not contain expilcitly the impact of distributional factors on changes in state-specific headcount ratio. We argued there that distributional factors are difficult to capture satisfactorily in any available summary measure. Consequently, the impact of the ommitted distributional factors would get reflected in the residuals from the estimated regression equation in Table 6. If the ommitted distributional factors constitute the major influence on changes in headcount ratio, we would expect the residuals from the regression equation to be closely correlated with the magnitude of distribution effect in our decomposition of the change in headcount ratio discussed in Section 4.1. These correlation coeficients are given in column (7) of Table 6.

It may be noted that the residuals from the regression equation are more closely correlated with the distribution effect from our decomposition scheme for the urban population than for the rural population in three out of four cases. These correlations are sensitive to the choice of the poverty line as well as to the specification of the regression equation. However, no discernable pattern emerges as regards the impact of these variations. Given the alternative set of poverty lines, it appears that the ommitted distributional factors from the regression specification are relatively important and that they are more closely correlated with the distribution effect in our decomposition scheme for the urban than for the rural population.

5. Concluding Observations

This paper presented a method and analysed the results of decomposing the change in headcount ratio between 1970-71 and 1983, separately for the rural and the urban population of 20 states. The decomposition exercise distinguished two additive components: one attributable to growth in state-specific real average per capita total expenditure (APCTE) and the other due to a change in the state-specific relative size distribution of PCTE. Based on regression analysis, an attempt has also been made tc explain inter-state variations in the change in headcount ratio with the help of growth in real APCTE and base-year headcount ratio and relate the residuals from the regression equation to the distribution effect from the decomposition of change in headcount ratio.

We now recapitulate the salient results of the paper.

1. The decomposition of change in headcount ratio was carried out with two alternative sets of all-India poverty lines explained in Section 3. The results were found to be only marginally affected by the choice of poverty line. The remaining discussion was, therefore, confined to the lower of the two variants of poverty lines (Section 4.1).

2. Growth in real APCTE had a much stronger influence in reducing the observed headcount ratio between 1970-71 and 1983 than change in the relative size distribution. This was so both for the rural and the urban population of a state. Distribution effect was mostly adverse but mild for the rural population. Between the rural and urban segments of a state, distribution effect was mostly favourable and relatively more important for the urban population. In particular, for one-fifth of urban population in 1970-71 in 20 states, located in Tamil Nadu, Delhi and Bihar, a dominant and favourable distribution effect offset the adverse growth effect in bringing down the headcount ratio. The inter-state association between the growth rate of real APCTE and the distribution effect was found to be positive but weak whether the distribution effect is considered as it is from our decomposition scheme or whether it was normalised in relation to the base year headcount ratio (Section 4.1).

3. Our inter-state regression exercises pointed out that an increase of one percentage point in the growth rate of real APCTE brought about, on an average, between 0.5 and 0.6 percentage point reduction at the margin in the change in rural headcount ratio. The corresponding decline in the change in urban headcount ratio ranged between 0.3 and 0.4 percentage point. The residuals from the regression equation were found to be more strongly correlated with the distribution effect from the decomposition exercise for the urban than for the rural population.

Finally, we may caution that in actual practice, the processes of growth and distribution are inextricably linked in a complex fashion and the choice is not frequently available in terms of a simple trade-off or complementarity between growth and distribution. The decomposition exercise undertaken in this paper has attempted to descriptively separate the impact of growth from that of distribution by computing hypothetical headcount ratios discussed in Section 2. It does not seek to unravel the inextricable link that exists in reality.

The decomposition exercise in this paper has been confined to a change in headcount ratio between two time-points. This change, in turn, implies a corresponding change in the absolute number of poor between the two time-points. The decomposition of this change in the absolute number of poor would form the topic of another paper in preparation.

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APPENDIX-A

TABLE A.1

STATE-WISE RURAL POVERTY LINES AND AVERAGE PER CAPITA TOTAL EXPENDITURE (APCTE) IN 1970-71 AND 1983 (BASED ON PLANNING COMMISSION POVERTY LINE)

(Rs. p.m.)

Sl. No.	Name of the State	1970-71		1983				
		x_0^*	$\bar{x}_0$	x_T^*	$\bar{x}_T$	$1+p$	x_{T0}^*	x_{0T}^*
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Andhra Pradesh (AP)	30.15	34.35	80.31	115.40	2.701	24.24	99.89
2.	Assam (ASM)	38.53	40.27	103.50	113.00	2.720	37.35	106.77
3.	Bihar (BHR)	37.06	33.15	105.33	93.75	2.836	37.16	105.03
4.	Gujarat (GJT)	33.64	36.64	92.64	122.72	2.771	27.83	111.97
5.	Haryana (HRY)	35.77	48.86	95.27	151.78	2.685	30.92	110.23
6.	Himachal Pradesh (HP)	35.77	50.75	96.49	150.81	2.740	32.98	104.64
7.	Jammu & Kashmir (J&K)	30.83	44.87	95.37	129.27	3.132	33.51	87.73
8.	Karnataka (KRN)	31.63	35.89	87.37	116.84	2.856	27.75	99.60
9.	Kerala (KER)	38.62	36.12	110.23	145.20	2.826	27.15	156.80
10.	Madhya Pradesh (MP)	31.86	32.88	87.86	100.52	2.771	28.88	96.94
11.	Maharashtra (MHR)	34.96	36.39	97.45	110.44	2.801	32.27	105.58
12.	Manipur (MNP)	38.53	34.05	104.43	131.50	2.734	27.27	147.52
13.	Orissa (ORS)	34.13	28.86	103.53	98.75	3.045	30.37	116.34
14.	Punjab (PNB)	35.77	57.99	96.77	170.52	2.725	33.17	104.35
15.	Rajasthan (RJN)	31.55	35.39	90.50	127.00	2.946	25.90	110.23

16. Tamil Nadu (TN)	31.74	29.98	99.77	112.23	3.132	26.56	119.25
17. Tripura (TRP)	38.53	41.72	102.18	126.21	2.700	34.39	114.48
18. Uttar Pradesh (UP)	30.17	35.08	87.48	104.49	2.914	29.51	89.42
19. West Bengal (WB)	41.19	33.32	109.69	104.59	2.660	34.90	129.44
20. Delhi (DLI)	35.77	57.91	96.45	217.45	2.737	26.11	132.13
21. All India (AI)	33.01	35.31	93.16	112.45	2.835	29.39	104.65

Notes: (1) Planning Commission Poverty Lines refer to monthly PCTE of Rs. 49.09 and Rs. 56.46 for All-India rural and urban population, respectively, at 1973-74 prices.

(2) x_0^* and x_T^* refer to the state-specific poverty lines at current prices for 1970-71 and 1983, respectively.

(3) $\bar{x}_0$ and $\bar{x}_T$ refer to the state-specific APCTE at current prices for 1970-71 and 1983, respectively.

(4) $1+p$ refers to the state-specific consumer price index for 1983 with 1970-71=1.

(5) $x_{T0}^*(=x_0^*/(1+r/100))$ and $x_{0T}^*(=x_T^*(1+r/100))$ refer to the state-specific pouerty lines used for calculating H_{T0} and H_{0T}, respectively, where r [$=100(\bar{x}_T/(1+p)\bar{x}_0-1)$] denotes growth rate (%) of the real APCTE over the period from, 1970-71 to 1983.

Sources (1) NSS report No. 231 for column (3) and *Savekshana*, Vol. IX, No. 4, April 1986 for column (5).
(2) Minhas *et.al.* (1990) for column (6).

TABLE A.2

STATE-WISE URBAN POVERTY LINES AND AVERAGE PER CAPITA TOTAL EXPEDITURES FOR 1970-71 AND 1983 (BASED ON PLAMNING COMMISSION POVERTY LINE)

Sl. No.	*Name of the State*	1970-71		1983				
		x_0^*	$\bar{x}_0$	x_T^*	$\bar{x}_T$	$1+p$	x_{0T}^*	x_{T0}^*
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1.	Andhra Pradesh	38.69	49.27	104.69	153.48	2.726	33.85	119.65
2.	Assam	38.57	64.24	96.23	154.01	2.548	40.99	90.54
3.	Bihar	42.09	51.02	116.81	138.53	2.771	42.94	114.48
4.	Gujarat	41.58	48.83	120.48	163.61	2.881	35.75	140.12
5.	Haryana	37.56	55.13	103.46	186.86	2.785	30.86	125.90
6.	Himachal Pradesh	34.90	73.94	92.89	258.62	2.576	25.70	126.16
7.	Jammu & Kashmir	30.65	45.84	90.78	155.29	2.922	26.43	105.26
8.	Karnataka	39.47	50.71	110.36	166.32	2.811	33.83	128.75
9.	Kerala	42.12	47.63	125.71	176.36	2.966	33.75	156.93
10.	Madhya Pradesh	43.22	50.37	121.26	144.87	2.815	42.30	123.89
11.	Maharashtra	41.54	63.30	126.05	184.35	2.962	42.25	123.93
12.	Manipur	38.57	47.10	96.23	138.25	2.548	33.49	110.85
13.	Orissa	44.86	52.65	129.94	151.42	2.866	44.79	130.13
14.	Punjab	37.79	65.89	98.12	185.20	2.616	35.17	105.44

15. Rajasthan	40.09	54.13	112.92	159.92	2.826	38.35	118.07
16. Tamil Nadu	37.09	44.69	117.26	163.74	3.078	38.27	113.62
17. Tripura	38.57	66.21	96.23	186.61	2.548	34.87	106.44
18. Uttar Pradesh	38.22	45.17	106.80	135.48	2.787	35.51	114.95
19. West Bengal	38.96	60.89	100.12	169.95	2.601	36.30	107.45
20. Delhi	46.38	82.36	122.15	228.81	2.659	47.56	119.12
21. All India	39.04	52.85	111.25	164.04	2.828	35.57	122.09

Notes : Same as that of Table A.1.

Sources: (1) Same as Source (1) of Table A.1.
(2) Minhas *et al.* (1988) for column (6).

TABLE A.3

STATE-WISE RURAL AND URBAN HEADCOUNT RATIO IN 1970-71 AND 1983
(BASED ON PLANNING COMMISSION POVERTY LINES)

Sl. No.	*Name of the State*	*Rural*				*Urban*			
		H_{00}	H_{TT}	H_{T_0}	H_{0T}	H_{00}	H_{TT}	H_{T_0}	H_{0T}
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Andhra Pradesh	51.57	34.92	32.38	53.15	46.15	35.48	35.40	46.24
2.	Assam	50.36	49.24	46.35	53.16	19.00	21.02	23.06	16.39
3.	Bihar	68.79	70.44	68.99	70.24	54.25	51.29	55.56	49.77
4.	Gujarat	57.76	36.32	36.83	54.66	50.33	37.34	35.91	51.87
5.	Haryana	40.02	24.01	28.46	35.76	34.55	21.30	22.99	37.08
6.	Himachal Pradesh	28.73	22.96	21.72	29.69	18.73	7.05	7.64	20.18
7.	Jammu & Kashmir	27.67	29.25	34.70	20.41	26.71	11.76	15.16	23.13
8.	Karnataka	52.82	40.26	40.19	49.88	47.01	37.65	38.13	47.90
9.	Kerala	69.03	47.20	46.22	72.65	62.42	47.78	49.99	63.80
10.	Madhya Pradesh	62.40	54.04	55.15	62.26	58.37	51.95	56.81	54.02
11.	Maharashtra	55.75	54.04	48.83	60.33	40.08	40.35	41.20	39.26
12.	Manipur	72.87	30.24	31.83	69.25	37.02	13.38	18.29	25.25
13.	Orissa	74.61	65.05	64.47	73.63	52.53	52.54	52.11	52.67
14.	Punjab	28.65	18.45	22.78	23.49	24.64	21.58	18.81	25.85

15. Rajasthan	54.74	42.00	40.31	56.20	46.00	37.22	42.70	40.60
16. Tamil Nadu	66.45	56.84	51.56	70.36	56.16	45.14	58.04	42.75
17. Tripura	54.54	44.29	41.81	55.23	21.35	19.25	16.51	25.35
18. Uttar Pradesh	51.36	49.78	49.49	51.58	53.81	48.14	48.55	54.31
19. West Bengal	76.67	65.87	65.36	76.89	33.07	28.84	28.48	33.84
20. Delhi	13.79	7.31	1.52	28.74	30.14	27.45	31.54	25.57
21. All India	57.33	49.02	47.32	58.43	45.89	38.33	39.45	45.48

Notes: (1) Planning Commission Poverty Lines refer to monthly PCTE of Rs. 49.09 and Rs. 56.64 for All-India rural and urban populations, respectively, at 1973-74 prices.

(2) H_{ij} denotes the state-specific headcount ratio (% age) with APCTE for the year 'i' and size-distribution for the year 'j', where $i,j=O$ and T with O referring to 1970-71 and T to 1983.

(3) State-specific poverty lines for calculating these headcount ratios are given in Tables A.1 and A.2. Size-distributions for 1970-71 and 1983 are obtained from NSS report No. 231 and *Sarvekshana*, Vol. IX, No. 4, April 1986, respectively.

TABLE A.4

STATE-WISE RURAL AND URBAN POVERTY LINES FOR 1970-71 AND 1983
(BASED ON ALTERNATIVE POVERTY LINES)

Sl. No.	Name of the state	*Rural*				*Urban*			
		x_0^*	x_T^*	x_{0T}^*	x_{0T}^*	x_0^*	x_T^*	x_{T0}^*	x_{0T}^*
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Andhra Pradesh	26.21	69.82	21.07	86.84	34.06	92.17	29.80	105.34
2.	Assam	33.50	89.98	32.47	92.82	33.96	84.73	36.09	79.72
3.	Bihar	32.22	91.57	32.31	91.31	37.05	102.85	37.81	100.79
4.	Gujarat	29.25	80.54	24.20	97.34	36.60	106.08	31.47	123.37
5.	Haryana	31.10	82.83	26.88	95.83	33.06	91.09	27.17	110.85
6.	Himachal Pradesh	31.10	83.88	28.68	90.97	30.73	81.79	22.62	111.08
7.	Jammu & Kashmir	26.80	82.91	29.14	76.27	26.98	79.93	23.27	92.68
8.	Karnataka	27.50	75.96	24.12	86.59	34.75	97.17	29.79	113.35
9.	Kerala	33.58	95.83	23.61	136.31	37.09	110.68	29.71	138.17
10.	Madhya Pradesh	27.70	76.38	25.11	84.27	38.05	106.77	37.24	109.08
11.	Maharashtra	30.40	84.72	28.05	91.79	36.57	110.98	37.19	109.11
12.	Manipur	33.50	90.79	23.71	128.25	33.96	84.73	29.48	97.60
13.	Orissa	29.67	90.00	26.40	101.14	39.49	114.41	39.43	114.58
14.	Punjab	31.10	84.13	28.84	90.72	33.27	86.39	30.96	92.84

15. Rajasthan	27.43	78.67	22.52	95.83	35.30	99.42	33.76	103.95
16. Tamil Nadu	27.60	86.74	23.09	103.67	32.65	103.24	33.70	100.04
17. Tripura	33.50	88.83	29.90	99.52	33.96	84.73	30.70	93.72
18. Uttar Pradesh	26.23	76.05	25.66	77.74	33.65	94.03	31.26	101.21
19. West Bengal	35.81	95.36	30.35	112.53	34.30	88.15	31.96	94.61
20. Delhi	31.10	83.85	22.70	114.87	40.83	107.55	41.87	104.88
21. All India	28.70	80.99	25.55	90.98	34.37	97.95	31.32	107.49

Notes: (1) Alternative Poverty Lines refer to monthly PCTE of Rs. 15 and Rs. 18 for All-India rural and urban populations, respectively, at 1960-61 prices.

(2) Same as notes (2) and (5) of Table A.1.

(3) Columns (4) and (8) and columns (5) and (9) refer to the state-specific poverty lines used for calculating H_{T_0} and H_{T_0}, respectively.

Sources: Same as of Tables A.1 and A.2.

TABLE A.5

STATE-WISE RURAL AND URBAN HEAD-COUNT RATIOS FOR 1970-71 AND 1983
(BASED ON ALTERNATIVE POVERTY LINES)

Sl. No.	*Name of the state*	*Rural*				*Urban*			
		H_{00}	H_{TT}	H_{T_0}	H_{0T}	H_{00}	H_{TT}	H_{T_0}	H_{0T}
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Andhra Pradesh	39.28	23.44	20.51	41.39	35.86	25.88	25.99	35.98
2.	Assam	32.83	31.76	29.85	35.63	10.54	11.48	14.57	9.41
3.	Bihar	58.07	58.93	58.32	58.69	46.00	41.70	47.31	40.17
4.	Gujarat	42.18	24.14	25.30	40.80	38.17	24.97	25.35	39.65
5.	Haryana	28.93	14.53	19.18	24.43	25.76	13.69	17.32	26.85
6.	Himachal Pradesh	17.82	13.93	12.45	19.00	13.40	4.57	5.06	13.98
7.	Jammu & Kashmir	16.90	15.60	22.91	10.71	16.59	5.95	7.39	13.04
8.	Karnataka	39.50	30.78	29.56	39.59	39.77	29.36	27.80	39.40
9.	Kerala	60.21	36.25	34.97	63.45	55.36	39.16	40.47	55.10
10.	Madhya Pradesh	52.03	41.87	44.30	50.53	48.65	39.67	46.99	41.74
11.	Maharashtra	43.74	42.17	36.90	48.97	31.64	31.91	32.76	30.78
12.	Manipur	56.91	17.78	15.65	51.21	18.94	6.33	12.32	14.17
13.	Orissa	62.41	51.57	52.99	63.33	43.24	42.19	43.14	42.31

14. Punjab	17.59	10.90	11.51	14.85	15.07	15.59	11.77	18.98
15. Rajasthan	43.58	32.36	31.89	46.25	36.58	27.67	33.40	30.96
16. Tamil Nadu	55.31	46.47	38.14	59.74	47.22	35.49	50.14	33.11
17. Tripura	38.96	29.10	26.86	41.69	15.24	13.51	11.28	18.06
18. Uttar Pradesh	39.65	38.07	37.84	39.92	44.71	37.96	39.55	43.64
19. West Bengal	67.12	54.98	53.50	67.71	24.78	19.79	20.87	24.81
20. Delhi	4.40	2.48	.57	18.92	23.73	17.92	24.79	16.04
21. All India	45.29	37.54	36.01	47.03	37.06	28.77	30.52	35.69

Notes: (1) Alternative Poverty Lines refer to monthly PCTE of Rs. 15 and Rs. 18 for All-India rural and urban populations, respectively, at 1960-61 prices.

(2) Same as Note (2) of Table A.3.

(3) State-specific poverty lines for calculating these head-count ratios are given in Table A.4. Size-distributions for 1970-71 and 1983 are obtained from NSS report No. 231 and *Sarvekshana*, Vol. IX, No. 4, April 1986, respectively.

TABLE A.6

STATE-SPECIFIC PERCENTAGE SHARES IN 20 STATES' TOTAL POPULATION AND POOR POPULATION, RURAL AND URBAN, AND FOR 1970-71 AND 1983
(BASED ON ALTERNATIVE POVERTY LINES)

Sl. No.	Name of the state	Percentage share in 20 States'							
		Total population				Poor population			
		1970-71		1983		1970-71		1983	
		rural	urban	rural	urban	rural	urban	rural	urban
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.	Andhra Pradesh	8.06	7.76	7.82	7.91	6.72	7.48	4.67	6.78
2.	Assam	3.06	1.18	3.46	1.30	2.13	0.34	2.80	0.49
3.	Bihar	11.64	5.21	11.79	5.61	14.35	6.43	17.69	7.74
4.	Gujarat	4.41	6.93	4.50	6.61	3.95	7.11	2.76	5.46
5.	Haryana	1.90	1.64	1.96	1.84	1.17	1.13	0.72	0.84
6.	Himachal Pradesh	0.74	0.22	0.76	0.20	0.28	0.08	0.27	0.03
7.	Jammu & Kashmir	0.86	0.80	0.91	0.79	0.31	0.36	0.36	0.16
8.	Karnataka	5.09	6.58	5.04	6.82	4.27	7.03	3.95	6.63
9.	Kerala	4.10	3.21	3.95	2.99	5.25	4.77	3.65	3.88
10.	Madhya Pradesh	8.00	6.27	7.98	6.81	8.84	8.19	8.50	8.94
11.	Maharashtra	7.98	14.53	7.80	13.79	7.39	12.35	8.37	14.59
12.	Manipur	0.21	0.13	0.20	0.24	0.26	0.07	0.09	0.05

13. Orissa	4.61	1.70	4.54	2.04	6.11	1.98	5.96	2.85
14. Punjab	2.37	2.98	2.31	2.93	0.89	1.20	0.64	1.51
15. Rajasthan	4.87	4.21	5.26	4.65	4.51	4.13	4.33	4.26
16. Tamil Nadu	6.59	11.53	6.17	9.82	7.74	14.62	7.30	11.54
17. Tripura	0.32	0.15	0.36	0.14	0.27	0.06	0.26	0.06
18. Uttar Pradesh	17.43	11.46	17.39	12.88	14.67	13.76	16.87	16.18
19. West Bengal	7.65	10.14	7.72	8.92	10.90	6.75	10.80	5.84
20. Delhi	0.10	3.37	0.08	3.71	0.008	2.15	0.005	2.20
21. 20 States	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
22. Population in 20 States (millions)	435.66	108.15	541.33	172.10	205.25	40.23	212.62	51.99
23. Population All-India (millions)	439.05	109.11	545.27	174.08	—	—	—	—
24. Head-count Ratio (%) for 20 States	—	—	—	—	47.11	37.20	39.28	30.21

Notes: (1) Alternative Poverty Lines refer to monthly PCTE of Rs. 15 and Rs. 18 for All-India rural and urban populations, respectively, at 1960-61 prices.

(2) Columns (2) to (5) are worked out from state-specific rural and urban total population estimates in 1970-71 and 1983 given in 1971 Census and *Sarvekshana*, Vol. XI, No. 4, Issue No. 35, April 1988, Table (*P*) on page no. S-222, respectively.

(3) Columns (6) to (9) are obtained from columns (2) to (5) on applying the respective headcount ratios given in Table A.5.

APPENDIX—B

A COMPARISON OF DIFFERENT METHODS OF CALCULATING HYPOTHETICAL HEADCOUNT RATIO

As discussed in Section II, our decomposition scheme uses two hypothetical headcount ratios under the two alternative sets of assumptions, namely, what could be the headcount ratio if (*a*) the base year level of real average per capita total expenditure (APCTE) were to apply to the terminal year Lorenz curve (denoted as H_{0T}) and (*b*) the terminal year real APCTE were to apply to the base year Lorenz curve (denoted as H_{T0}). We have also mentioned that there are two alternative ways of deriving (say) H_{0T}, namely:

Method (*i*): Adjust base year APCTE to the terminal year prices and apply it to the terminal year Lorenz curve at current prices in order to estimate headcount ratio H_{0T} given the poverty line at terminal year prices.

Method (*ii*): Adjust the terminal year Lorenz curve to base year prices and use the base year APCTE along with poverty line at base year prices to estimate H_{0T}.

In the text, we have preferred method (*i*) to method (*ii*) arguing that it involves minimal adjustment to the basic data. In this Appendix we compare the results of these two methods in computing H_{0T}. This could be done only at the all-India level, separately for the rural and the urban population. For this purpose, we draw on another paper (Jain and Tendulkar, 1989) where we have used fractile-group-specific consumer price indices to get APCTE for each fractile-group at constant 1970-71 prices and derived Lorenz curve in 1983 at 1970-71 prices. This enables up to apply method (ii) described above.

For applying method (*i*), we require the terminal year Lorenz curve (i.e. in 1983) at current prices. Given the results in our earlier paper (Jain and Tendulkar, 1989), this can be derived by using two alternative ways, one consists of using the frequency

TABLE B.1

ESTIMATES OF HYPOTHETICAL HEADCOUNT RATIO H_{0T} BASED ON ALTERNATIVE METHODS

Sl. No.	*Method*	*Rural*	*Urban*
1.	Method (*ia*)	47.04	35.69
2.	Method (*ib*)	46.73	35.69
3.	Method (*ii*)	46.64	35.62

Note : The headcount ratios are based on the alternative set of poverty lines defined at the all-India level at Rs. 15 (Rural) and Rs. 18 (Urban) in terms of monthly PCTE at 1960-61 prices.

distribution according to PCTE class-intervals given in the published NSS report and the other uses the frequency distribution according to decile-groups as derived in our paper (Jain and Tendulkar, 1989). The use of Method (*i*) to the terminal year Lorenz curve derived by these two alternative ways is distinguished by referring it as application of Methods (*ia*) and (*ib*).

Table B.1 presents the estimates of H_{0T} using alternative methods. It should be obvious that the results are virtually invariant to the choice of method. We have used method (*ia*) in this paper for the reason mentioned earlier, namely, it involves minimal adjustment to the basic data.