

# Change in Number of Rural and Urban Poor between 1970-71 and 1983

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*This paper presents a method and analyses the results of decomposing the change in State-specific absolute number of poor between 1970-71 and 1983, into three additive components, attributable respectively to growth in real average per capita total expenditure (APCTE) (growth effect), growth in population (population effect) and a change in the relative size distribution of PCTE (distribution effect). The decomposition exercise is undertaken separately for the rural and the urban population of 20 States and all-India.*

## I Introduction

IN an earlier paper [5], we presented a method and analysed the results of decomposing the change in State-specific headcount ratio of poor (i.e. percentage of the population below a pre-specified poverty line) between 1970-71 and 1983, separately for the rural and the urban population of 20 States in India. In the present paper, the earlier headcount ratio decomposition method is extended to the decomposition of change in the absolute number of poor and applied to the rural and the urban segments of the same 20 States. Three additive components are distinguished in the present decomposition scheme, namely, (a) growth effect, i.e. change in the number of poor attributable to a growth in real average per capita total expenditure (APCTE), assuming relative size distribution of PCTE (as reflected in the Lorenz curve) and population to remain constant; (b) population effect, i.e. change attributable to growth in population, assuming real average PCTE and Lorenz curve to remain constant; (c) distribution effect, i.e. change attributable to a change in the relevant segments of the Lorenz curve affecting poverty, assuming population and real average PCTE to remain unchanged.

We may note that in practice demographic forces, distributional factors and changes in average real levels of living interact in a complex and inextricable manner. Decomposition exercise merely attempts to separate these individual components under clearly interpretable hypothetical situations. It, therefore, provides a starting point for explaining the role played by these factors in the observed change in the absolute number of poor. In the present paper, we have only analysed the results of the decomposition scheme. The explanation of forces governing the observed change requires investigation into their complex interaction in a given historical context. This is *not* attempted in this paper.

The paper is organised as follows. Section II describes the methodology and rationale underlying the decomposition scheme that we have adopted. Computational procedures and data sources are discussed in Section III.

Empirical results in Section IV are divided into three sub-sections. Overview of results at the all-India level are presented in the first sub-section. State-level results for rural and urban segments are analysed in the second sub-section by dividing the States into appropriate categories and sub-categories. Population effect is taken up for a detailed analysis in the third sub-section. Section V presents major conclusions.

## II Methodology of Decomposition

In this section, we discuss the rationale underlying the decomposition scheme adopted in this paper along with its implications.

In an earlier paper [5], we decomposed the change in headcount ratio between two time-points into two additive components: the first attributable to growth in real APCTE and the second to a change in relative size distribution of PCTE as reflected in the appropriate section of the Lorenz curve. Our present scheme of decomposing the change in absolute size of the poor population between two time-points is derived from the earlier headcount ratio decomposition.

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

$$H = H(x^*, x, L)$$

All the three arguments are taken to be measured at prices prevailing in the year under consideration. Notice that poverty line ( $x^*$ ) remains unchanged over time in real terms and gets adjusted only for changes in prices. It can therefore be omitted from the present discussion. Since  $x$  and  $L$  change over time, we denote  $H$  with two time subscripts, namely, the first relating to APCTE and the second relating to Lorenz curve. With this notation, the change in headcount ratio (CHR) between two time-points '0' and 'T' is given by

$$\begin{aligned} \text{CHR} &= H(\bar{x}_T, L_T) - H(\bar{x}_0, L_0) \\ &= H_{TT} - H_{00} \end{aligned} \quad (1)$$

This is decomposed in two alternative ways by calculating two hypothetical headcount ratios as follows.  $H_{11}$  represents the

hypothetical headcount ratio with terminal year APCTE and base year Lorenz curve.  $H_{01}$  represents alternative hypothetical headcount ratio with base year APCTE and terminal year Lorenz curve. The following two alternative decomposition schemes are derived by subtracting and adding

$$\begin{aligned} H_{T0} \text{ and } H_{0T} \text{ in (1)} \\ \text{CHR} &= H_{TT} - H_{01} + H_{01} - H_{00} \dots (2) \\ &\quad \text{GF(1)} \quad \text{DE(1)} \\ &= H_{T1} - H_{T0} + H_{T0} - H_{00} \dots (3) \\ &\quad \text{DE(2)} \quad \text{GE(2)} \end{aligned}$$

Interpretation of the various components is as follows:

GE(1) indicates the change in headcount ratio that arises from a change in real APCTE keeping the terminal year Lorenz curve unchanged. This is growth effect. This would be unambiguously negative whenever real APCTE rises over time.

DE(1) reflects the change in headcount ratio due to a change in the Lorenz curve keeping the base year APCTE constant. This is distribution effect.

DE(2) indicates the change in headcount ratio attributable to a change in Lorenz curve keeping the terminal year APCTE unchanged at the base and the terminal year.

GE(2) provides an alternative expression for the growth effect similar to GE(1) in (2). This would be negative whenever there is increase in real APCTE.

We have argued in our earlier paper that the decomposition scheme (2) may be taken to be applicable whenever real declines over time and (3) applies whenever real APCTE rises between the two time-points considered. This rule is suggested by treating the relative size distribution as a public good, i.e. it is not possible to allow for individual preferences in this regard (see [12] and [13]). Whenever the relative size distribution changes (as reflected in the distribution effect DE(1) or DE(2)), people cannot be expected to have any choice regarding the change in its shape nor can they be expected to know their exact position in the changed size distribution. Under these conditions, it would be plausible to postulate that they choose that hypothetical situation ( $H_{01}$  or  $H_{T0}$ ) which is associated with the higher of the base and the terminal year APCTE.

Once the choice is made between DE(1) or DE(2), growth effect GE(1) or GE(2) follows as a residual.

When we want to translate the headcount ratio decomposition schemes (2) and (3) into the change in absolute size of the poor population, we have the choice of multiplying  $H_{0T}$  in (2)  $H_{T0}$  in (3) either by the base year population ( $P_0$ ) or the terminal year population ( $P_T$ ). Consistent with our earlier logic in choosing between the decomposition schemes (2) and (3), we adopt the convention of choosing the time-point of population co-terminus with the time-point of APCTE. This yields the following scheme of decomposition:

$$\begin{aligned} \text{CNP} &= \text{Change in the Number of Poor} \\ &= H_{TT} P_T - H_{00} P_0 \\ &= H_{TT} P_T - H_{0T} P_0 + H_{0T} P_0 \\ &\quad - H_{00} P_0 \\ &= P_0 (H_{TT} - H_{0T}) + H_{TT} P_0 R/100 \\ &\quad \text{GEP(1)} \quad \text{PEP(1)} \\ &\quad + P_0 (H_{0T} - H_{00}) \quad \dots (4) \\ &\quad \text{DEP(1)} \end{aligned}$$

where  $R = 100 (P_T/P_0 - 1)$ . Alternatively

$$\begin{aligned} \text{CNP} &= H_{TT} P_T - H_{00} P_0 \\ &= H_{TT} P_T - H_{T0} P_T + H_{T0} P_T \\ &\quad - H_{00} P_0 \\ &= P_T (H_{TT} - H_{T0}) + H_{T0} P_0 R/100 \\ &\quad \text{DEP(2)} \quad \text{PEP(2)} \\ &\quad + P_0 (H_{T0} - H_{00}) \quad \dots (5) \\ &\quad \text{GEP(2)} \end{aligned}$$

Notice that in (4) we are adding and subtracting the number of base year poor if they were to be estimated with the terminal year size distribution. In (5), we add and subtract the number of terminal year poor if they were to be estimated with the base year relative size distribution.

We may note that the components GEP(1) and GEP(2) apply the respective growth effects GE(1) and GE(2) [in the headcount ratio decomposition schemes (2) and (3)] to the base year population. They provide a descriptive answer to the following hypothetical question: What would be the change in the number of poor if only real APCTE were to change keeping the base year population and the Lorenz curve (for the terminal year in GEP(1) and the base year in GEP(2)) unchanged? Since it abstracts from population growth and concentrates on change due to growth in real APCTE we term this as [G]rowth [E]ffect on [P]oor population. Notice that this effect would be negative (positive) whenever there is a rise (decline) in real APCTE.

Components PEP(1) and PEP(2) reflect the effects of population growth keeping APCTE and Lorenz curve unchanged. These can be termed as [P]opulation [I]ffect on [P]oor population. Notice that this component would always raise the number of poor

in a situation of growing population.

Components DEP(1) and DEP(2) apply the distribution effect from decomposition scheme (2) and (3) to the base year and the terminal year population respectively. They reflect the [D]istribution [E]ffect on [P]oor population. They describe the contribution of a change in Lorenz curve to change in the number of poor assuming population and real APCTE to remain constant.

Two general comments may be noted. First, we apply the same rule regarding the choice between schemes (4) and (5) as we did in the case of schemes (2) and (3). In other words, DEP(1) under (4) applies whenever there is a decline in real APCTE and DEP(2) under (5) when there is an increase in real APCTE between two time-points. Once the choice is made regarding the distribution effect DCEP between (4) and (5), other two

effects, viz. GEP and PEP follow from the choice of the decomposition scheme.

For purposes of interpretation, the following conditions may be mentioned:

- (a) GEP (i) 0 according as GE(i) 0  
 (b) DEP (i) 0 according as DE(i) 0  
 (c) PEP (i) 0 so long as R 0  
 where i = 1 or 2.

Since GE(1) or GE(2) would be negative (positive) with a rise (decline) in real APCTE, this would lead to a reduction (rise) in GEP(1) or GEP(2). PEP(1) or PEP(2) would always be positive with growing population. DEP(1) and DEP(2) would go in either direction depending on the change in the relative size distribution around the poverty line. The net result of these three components would be reflected in change in the number of poor (CNP).

TABLE 1: DATA DESCRIPTION AND DATA SOURCES

Sl No	Description of Variable	Segment of Population	Data Source
1	Nominal APCTE and Lorenz curve for 1970-71	Rural and Urban	NSS Report No 231
2	Nominal APCTE and Lorenz curve for 1983	Rural and Urban	<i>Samvekshana</i> , Vol IX, No 4 April 1986
3	Rate of growth of prices applicable to APCTE between 1970-71 and 1983	Rural and Urban	Minhas et al [8] Minhas et al [6]
4	Consumer price index for middle range of the population	Rural and Urban	Minhas and Jain [9] Minhas et al [6] and [7]
5	State-specific price index relative to all-India=100 for middle range of the population	Rural and Urban	Chatterjee and Bhattacharya [2] Minhas et al [10]
6	Population in 1970-71	Rural and Urban	Population Census for 1971
7	Population in 1983	Rural and Urban	<i>Samvekshana</i> , Vol XI, No 4, Issue 35, April 1988, Table (P) on page S-222.

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.

TABLE 2: HEADCOUNT RATIO AND NUMBER OF POOR: A COMPARISON OF DIRECT ALL-INDIA ESTIMATE WITH THAT AGGREGATED FOR 20 STATES

Sl No	Segment of Population	Year	Direct All-India Estimate		Estimate Aggregated for 20 States		Indirect All-India Estimate of Number of Poor (Million)
			Headcount Ratio (Per Cent)	Number of Poor (Million)	Headcount Ratio (Per Cent)	Number of Poor (Million)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Rural	1970-71	45.29	198.85	47.11	205.25	206.84
2	Urban	1970-71	37.06	40.44	37.20	40.23	40.59
3	Rural and urban	1970-71	43.65	239.29	45.14	245.48	247.43
4	Rural	1983	37.45	204.69	39.28	212.62	214.18
5	Urban	1983	28.77	50.08	30.21	51.99	52.59
6	Rural and urban	1983	35.42	254.77	37.09	264.61	266.77

Notes: (1) Poverty line is monthly PCTE of Rs 15 (rural) and Rs 18 (urban) at the all-India level at 1960-61 prices.

(2) Indirect all-India estimate in column (8) is obtained by applying the headcount ratio aggregated for 20 states (given in column (6)) to the corresponding all-India estimates of population.

Source: Table A 3, line 21 for column (4). These headcount ratios have been multiplied by all-India populations (given in Table A 4, line 23) to derive column (5). Table A 4, line 24 for column (6) and line 22 and columns (6) to (9) in Table A 4 for column (7) of this Table.

### III

#### Computational Procedures and Data Sources

In this paper we have followed identical computational procedures as that in our earlier paper [5] on the headcount ratio decomposition. Briefly,  $H_{10}$  and  $H_{11}$  are derived directly from the size distributions for the two time-points 1970-71 and 1983 given the poverty line at prices prevailing in the same year. As regards the hypothetical headcount ratios  $H_{10}$  and  $H_{07}$ , we have two alternatives: (a) to change the price-base of APCTE to that underlying the Lorenz curve or (b) to change the price-base applicable to the Lorenz curve to that underlying APCTE. We have preferred (a) to (b) because (a) involves minimal adjustment to the basic data.<sup>1</sup>

We establish the following relation between APCTE ( $x$ ) in the base and the terminal year.

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

where  $p$  denotes the rate of growth of prices and  $r$  the rate of growth (percentage) of real APCTE. Given this relation, it has been shown [5] that the effective poverty lines for calculating  $H_{07}$  and  $H_{70}$  are  $x^*_{07} [= x^*_T (1 + r/100)]$  and  $x^*_{70} [= x^*_0 / (1 + r/100)]$ , where  $x^*_0$  and  $x^*_T$  denote poverty lines at prices prevailing in the base and the terminal year respectively. These adjusted poverty lines are applied to the size distributions of PCTE in the terminal and the base year respectively for deriving  $H_{07}$  and  $H_{70}$ .

In this study, we have adopted the all-India poverty line in terms of monthly PCTE of Rs 15 (rural) and Rs 18 (urban) at 1960-61 prices. These have been used by researchers in the past (see [1], [3] and [11]). In our earlier paper [5], we had experimented with an alternative set of poverty lines used by the Planning Commission which are higher than the ones adopted in this study (at comparable prices). It has been shown [5] that the headcount ratio decomposition results are not sensitive to these two alternative sets of poverty lines. We have chosen the lower of these two sets in the present study. The chosen poverty lines at the all-India level have been converted to the State-specific prices prevailing in the base year (1970-71) and the terminal year (1983) by using two adjustment factors, namely, (i) Consumer price index for a given State relative to all-India (= 100) for the middle range of the population. This allows for the price differential in a given State in comparison with all-India;

(ii) Change between 1960-61 and 1970-71 or 1983 in the consumer price index for a given State for the middle range of the population.

State-specific estimates of poverty lines  $x^*_{10}$ ,  $x^*_{11}$ ,  $x^*_{07}/(1 + r/100) [= x^*_{70}]$  and  $x^*_{70}/(1 + r/100) [= x^*_{07}]$  which have been used for calculating  $H_{07}$ ,  $H_{11}$ ,  $H_{10}$  and  $H_{07}$  respectively, appear in Appendix Tables A.1

and A.2 for the rural and urban population respectively.

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  $\ln P$  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 lower. The calculated actual and hypothetical headcount ratios appear in Appendix Table A.3.

### IV

#### Empirical Results

As argued in our earlier paper [5], the choice of the base year 1970-71 and the terminal year 1983 has been governed by two considerations. First, these happened to be the years of local peaks in agricultural harvest around each chosen year. The other years for which the relevant data were available were either not 'normal' or had some serious data problems. Secondly, this is the longest period over which the decomposition exercise could be carried out.

We note that the coverage of this study extends to 20 States<sup>2</sup> which together accounted for around 99 per cent of the rural and the urban population of the Indian Union in both 1970-71 and 1983. In tables given in the text as well as in the Appendix, we provide (a) a direct all-India estimate of the headcount ratio and the number of poor based on the all-India poverty line along with the corresponding APCTE and Lorenz curve, (b) headcount ratio estimate and the

number of poor aggregated for 20 States. Since we have adjusted the all-India poverty line for price differential in each State relative to all-India as also State-specific changes in consumer price index over time, the State-specific poverty lines are different from those at the all-India level. Consequently, the figures aggregated for 20 States would differ from those directly calculated at the all-India level.

#### DECOMPOSITION: OVERVIEW OF ALL-INDIA RESULTS

Table 2 provides alternative estimates of the headcount ratios as well as the number of poor. It may be noted that the estimates aggregated for 20 States (column (7)) and the indirect estimate (column (8)) are higher than the direct estimates given in column (5) with the sole exception of the urban population in 1970-71. The differences are attributable to the different State-specific poverty lines used in deriving the aggregated headcount ratios in column (6). At all-India level, we prefer the estimates given in column (8) to those in column (5) because the former are based on the conceptually more appropriate estimates of the State-specific poverty lines. Table 3 provides the estimates of change in the number of poor based on alternative estimates presented in Table 2. It may be noted that direct all-India estimates are lower than the two sets of alternative estimates by about 1.5 million for the rural population and about 2 million for the urban population. We decompose the estimates given in columns (3) and (4) of Table 3.

Panel (A) of Table 4 highlights the con-

TABLE 3: CHANGE IN THE NUMBER OF POOR BETWEEN 1970-71 AND 1983: ALTERNATIVE ESTIMATES (Millions)

Sl No	Segment of Population	Direct All-India Estimate	Estimate Aggregated for 20 States	Indirect All-India Estimate
(1)	(2)	(3)	(4)	(5)
1	Rural	5.84	7.37	7.34
2	Urban	9.64	11.76	12.00
3	Rural and urban	15.48	19.13	19.34

Source: Table 2 columns (5), (7) and (8).

TABLE 4: DECOMPOSITION OF CHANGE IN THE NUMBER OF POOR BETWEEN 1970-71 AND 1983 (In million)

Sl No	Segment of Population	Change in Number of Poor (CNP)	Change in Growth in Real APCTE (GEP)	Change in Population Growth (PPG)	Change in Distribution (DEP)
(1)	(2)	(3)	(4)	(5)	(6)
(A) Aggregated results for 20 States					
1	Rural	7.368	-39.092	40.311	6.149
2	Urban	11.763	-4.199	20.252	4.290
3	Rural and urban	19.131	-43.291	60.563	1.859
(B) Results based on all-India estimates					
4	Rural	5.850	-40.743	38.250	8.343
5	Urban	9.644	-7.136	19.827	-3.047
6	Rural and urban	15.494	-47.879	58.077	5.296

Source: Table 6, lines 21 and 22.



solidated picture of decomposition for 20 States for the rural and the urban population separately and together. It is interesting to note that between 1970-71 and 1983 while the headcount ratio declined from 47.11 per cent to 39.28 per cent (rural) and from 37.20 per cent to 30.21 per cent (urban) [Table 2, column (6), the absolute number of poor increased by 7.4 million in the rural and 11.8 million in the urban segment or about 19 million in all. Column (4) of Table 4 indicates that if only the growth effect in real APCTE, by itself, were to operate keeping unchanged the population and the relative size distribution, the number of poor should have declined by 39 million (rural) and 4 million (urban). Distribution effect was adverse and increased the number of poor in the rural areas. It was favourable and reduced the number of poor in the urban areas (column (6). The most striking effect is that of population growth. Increase in the number of poor due to population growth while keeping APCTE and relative size distribution unchanged, amounted to 40 million (rural) and as high as 20 million for the urban population. Thus, population growth more than neutralised the reduction that could have been brought about by a rise in real APCTE for the rural population. Adverse distribution effect accentuated the population effect. For the urban segment, population growth offsets the favourable impact of both the growth in real APCTE and change in relative size distribution. It may

be noted that urban population growth is brought about by three sources, namely, natural growth rate of population, redefinition of urban areas and migration. The relative importance of these factors will be examined later.

Decomposition based on the directly observed changes in the all India relative size distribution, real APCTE and poverty line is presented in Panel (B) of Table 4. Compared to the aggregated picture for 20 States presented in Panel (A), we find the favourable growth effect to be stronger and the population effect to be weaker in both the rural and the urban segments as also for the combined all-India population. As regards the effect due to distributional change, it is more adverse for the rural and less favourable for the urban population. When combined for the rural and the urban population, the impact of distributional change turns out to be distinctly adverse. The differences in figures in the two panels are primarily due to State-specific poverty lines used in Panel (A) which are different from all-India poverty line used in Panel (B).

#### DECOMPOSITION: STATE LEVEL RURAL AND URBAN SEGMENTS

Discussion of the detailed State-specific results (given in Table 5) requires a convenient categorisation of the various possibilities. At this point we explain the logic of the categories we have distinguished.

These categories are summarised in Table 6. For this purpose, we start with the possible end-result (i.e., decline or rise) in terms of the movement in the headcount ratio (column (2) of Table 6) and the associated possible change (i.e., decline or rise) in real APCTE (column (3) of Table 6). The reason for focusing on movements in real APCTE is the unambiguous predictability of growth effect (indicated in column (4) of Table 6). The direction of the associated distribution effect (indicated in column (4) of Table 6). The direction of the associated distribution effect is predictable only in two cases given the prior information regarding the movement in headcount ratio. These unambiguously predictable results are underlined in column (5) of Table 6. Thus, in category II, given an adverse growth effect, distribution effect has to be favourable in order to bring about the end-result of a decline in headcount ratio. Similarly, in category III, a favourable growth effect has to be associated with an adverse distribution effect in order to give rise to an increase in headcount ratio. In the remaining cases (categories I and IV), distribution effect could be adverse or favourable thus providing cases (a) and (b) in these categories. Thus, we could have mutually reinforcing growth and distribution effects (category I(a)) or a favourable growth effect more than offsetting adverse distribution effect (category I(b)). Similarly, we could have adverse growth effect swamping favourable

TABLE 5: DECOMPOSITION OF THE STATE-SPECIFIC CHANGE IN NUMBER OF POOR IN 1983 OVER 1970-71, FOR RURAL AND URBAN POPULATIONS (In millions)

Sl. No	Name of the State	Rural				Urban					
		No of Poor in 1970-71	CNP	GEP	PEP	DEP	No of Poor in 1970-71	CNP	GEP	PEP	DEP
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
1	Andhra Pradesh (AP)	13.787	-3.864	-6.588	1.483	1.241	3.013	0.510	-0.829	1.354	-0.015
2	Assam (ASM)	4.378	1.580	-0.397	1.619	0.358	0.136	0.121	0.027	0.109	-0.015
3	Bihar (BHR)	29.452	8.148	0.122	7.711	0.315	2.592	1.431	0.086	1.674	-0.329
4	Gujarat (GJT)	8.099	-2.222	-3.226	1.287	-0.283	2.862	-0.021	-0.961	0.983	-0.043
5	Haryana (HRY)	2.391	-0.852	-0.806	0.447	0.493	0.457	-0.022	-0.150	0.243	-0.115
6	Himachal Pradesh (HIP)	0.574	0.001	-0.173	0.113	0.061	0.032	-0.016	-0.020	0.006	-0.002
7	Jammu and Kashmir (J and K)	0.635	0.134	0.184	0.183	-0.233	0.142	-0.061	-0.079	0.038	-0.020
8	Karnataka (KRN)	8.760	-0.364	-2.204	1.508	0.332	2.832	0.615	-0.853	1.285	0.183
9	Kerala (KER)	10.766	3.012	-4.513	1.227	0.274	1.886	0.131	-0.516	0.714	-0.067
10	Madhya Pradesh (MP)	18.142	-0.063	-2.695	3.681	-1.049	3.301	1.348	-0.113	2.318	0.857
11	Maharashtra (MHR)	15.178	2.619	-2.374	2.769	2.224	4.971	2.598	0.178	2.555	-0.135
12	Manipur (MNP)	0.530	-0.335	-0.384	0.025	0.024	0.027	-0.001	-0.009	0.033	-0.025
13	Orissa (ORS)	12.544	0.125	1.893	2.367	-0.349	0.798	0.682	-0.002	0.717	-0.033
14	Punjab (PNB)	1.818	-0.453	-0.628	0.251	-0.076	0.485	0.302	-0.106	0.215	0.193
15	Rajasthan (RJN)	9.249	-0.037	-2.481	2.310	0.134	1.662	0.554	-0.144	1.156	-0.458
16	Tamil Nadu (TN)	15.893	-0.370	-4.934	1.782	2.782	5.886	0.112	-0.297	1.574	-1.759
17	Tripura (TRP)	0.543	0.020	-0.169	0.145	0.044	0.025	0.008	-0.006	0.008	0.006
18	Uttar Pradesh (UP)	30.115	5.736	1.375	6.895	0.216	5.538	2.874	-0.639	3.866	-0.353
19	West Bengal (WB)	22.381	0.584	-4.542	4.507	0.619	2.718	0.319	-0.429	0.914	-0.166
20	Delhi (DLI)	0.018	-0.007	-0.016	0.001	0.008	0.865	0.279	0.069	0.490	-0.280
21	20 States (TS)	205.253	7.368	-39.092	40.311	6.149	40.228	11.763	-4.199	20.252	-4.290
22	All-India (AI)	198.844	5.850	-40.743	38.250	8.343	40.437	9.644	-7.136	19.827	-3.047

Notes: (1) The results given in this table are based on all-India poverty lines of Rs 15 (rural) and Rs 18 (urban), in terms of monthly PCTE at 1960-61 prices. Using the procedure discussed in Section III in the text, the state-specific poverty lines have been derived and used in the state-specific decomposition exercise.

(2) CNP refers to total change in number of poor in 1983 over 1970-71.

(3) GEP, PEP and DEP respectively refer to change in the poor population attributable to growth (in real APCTE), population growth and distributional change.

(4) Line (21), referring to 20 States, is obtained as aggregation of the 20 states.

distribution effect (category IV(a)) or adverse and mutually accentuating growth as well as distribution effects (category IV(b)).

Turning to the decomposition of change in the number of poor (CNP), the end-result is a rise or decline in the size of the poor population. In this case, we have the possibility that there could be a rise in the poor population despite the reduction in the headcount ratio when the reduction in the headcount ratio is inadequate to offset the effect of population growth. Consequently, we have to allow for CNP to be positive or negative in those cases involving a decline in the headcount ratio. Notice that when the headcount ratio increases over time, CNP is unambiguously positive. It may be noted that in our decomposition scheme discussed in Section II, we have separated the population effect (PEP) from growth effect attributable to growth in real APCTE (GEP). With this separation, GEP in the absolute decomposition and GE in the headcount ratio decomposition would move in the same direction. Similarly, distribution effect DEP and DE would also move in the same direction. The number of possible categories rises because the end-result in terms of CNP is the outcome of combination of three effects, namely, GEP, PEP and DEP. In a situation of growing population rural and the urban segments of all States, PEP would turn out to be unambiguously adverse, i.e., there would be a rise in the number of poor due to population growth keeping constant real APCTE as well as the relative size distribution. On the basis of these a priori considerations, an enlarged set of categories emerges. In each case, the sub-categories are formed on the basis of the end-result in respect of CNP (i.e., CNP > 0) and the combination of GEP and PEP (whose impact is unambiguously predictable) and subsequently bringing DEP (whose impact can not be unambiguously predicted) into the picture. The summary results appear in Table 7.

In category I(a), a decline in headcount ratio arises because of mutually reinforcing and favourable growth and distribution effects. There are five States accounting for 43 million rural poor and 12 States with over 22 million urban poor in 1970-71 (Table 7). The number of poor declined by nearly 3.5 million in the rural segments of five States and increased by as much as 6.3 million in the urban segments of the 12 States. These States can be divided into the following three sub-categories:

**Category I(a)(i):** A net decline in the number of poor takes place because mutually reinforcing and favourable growth and distribution effects together offset adverse population effect. Rural population of Madhya Pradesh with over 18 million rural poor and the urban population of Gujarat, Haryana and Manipur with over 3.3 million urban poor in 1970-71 belong to this category. The absolute magnitudes of net decline are not significant.

**Category I(a)(ii):** A net decline in the number of poor takes place because growth

effect is, by itself, strong enough to offset adverse population growth and a favourable distribution effect contributes further to the reduction in the number of poor. As many as 12.3 million rural poor located in Gujarat, Haryana and Punjab in 1970-71 find themselves in this category. The urban segment of this category is negligible with the two States of Himachal Pradesh and Jammu and Kashmir.

**Category I(a)(iii):** This category is characterised by a net increase in the number of poor despite a reduction in headcount ratio because adverse population effect dominates the combined and mutually reinforcing and favourable growth and distribution effects. There are 12.5 million rural poor in Orissa and nearly 19 million urban poor in 1970-71 in seven States (Andhra Pradesh, Kerala, Madhya Pradesh, Uttar Pradesh, Orissa, Rajasthan and West Bengal) in this category. This category is numerically the largest among the urban poor. In these seven States, the number of urban poor increased by 6.4 million. Population growth, by itself, would have resulted in increasing the number of urban poor by as much as 11 million but it was partially neutralised by favourable growth as well as distribution effects (Table 7, line 3, column (10) to (14)).

In category I(b), a decline in headcount ratio is brought about by a dominant and favourable growth effect offsetting adverse distribution effect. Thirteen States with the rural poor population of over 132 million in 1970-71 and two States with 2.9 million urban poor are in this category. The number of rural poor increased by 2.55 million and that of urban poor by 0.62 million in this broad category. The following sub-categories may be distinguished:

**Category I(b)(i):** A net decline in the number of poor takes place because favourable growth effect is strong enough to offset the adverse distribution as well as population effect. Rural segments of the seven States are located in this category involving a net reduction in the number of rural poor by nearly 8 million. The rural areas of the States of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Manipur, Rajasthan and Delhi are to be found in this category (Table 7, line 4, columns (5) to (8)). In these States, growth by itself would have reduced the number of poor by as much as

21 million. This was brought down by 13 million due to adverse population and distribution effects.

**Category I(b)(ii):** Pure growth effect is strong enough to neutralise the population growth effect but not adequate to offset the additional impact of adverse distribution effect. The rural areas of Himachal Pradesh, Tripura and West Bengal were in this category.

**Category I(b)(iii):** A net increase in the number of poor takes place because adverse distribution and population effects together more than neutralise favourable growth effect. There is an increase in the number of rural poor by nearly 10 million and the number of urban poor by less than 1 million in this category despite a decline in the headcount ratio. The rural segment of the three States of Assam, Maharashtra and Uttar Pradesh and the urban segment of Karnataka and Tripura experienced this combination.

Category II consists of those cases where there is a decline in the headcount ratio despite adverse growth effect. This can come about only because of a strong and favourable distribution effect. In this case, the change in the number of poor could rise or decline. A decline in the number of poor could come about if a strong and favourable distribution effect offsets the adverse growth and population effects. This sub-category was non-existent. Alternatively, a rise in the number of poor could be brought about when the favourable distribution effect is more than neutralised by adverse growth and population effects. Nine million urban poor from Tamil Nadu, Bihar and Delhi and 0.64 million rural poor from Jammu and Kashmir in 1970-71 were found in this category. They experienced a net increase of 1.8 million (urban) and 0.13 million (rural) poor over the period considered in this study.

Category III contains those cases where there is a rise in the headcount ratio despite a favourable growth effect which is more than neutralised by a strong and adverse distribution effect. Interestingly, urban Punjab belongs to this category where population effect accentuates the adverse distribution effect. This combination more than offsets the favourable growth effect thereby bringing about an increase in the number of poor by 0.3 million. This is a

TABLE 6: CATEGORISATION OF HEADCOUNT RATIO DECOMPOSITION RESULTS

Category	Movement in Headcount Ratio (2)	Movement in Real APCTE (3)	Growth Effect (4)	Distribution Effect (5)
I(1)				
I(a)	Decline	Rise	<u>Favourable</u>	Favourable
I(b)	Decline	Rise	<u>Favourable</u>	Adverse
II	Decline	Decline	<u>Adverse</u>	<u>Favourable</u>
III	Rise	Rise	<u>Favourable</u>	<u>Adverse</u>
IV(a)	Rise	Decline	<u>Adverse</u>	Favourable
IV(h)	Rise	Decline	<u>Adverse</u>	Adverse

Note: Unambiguous results based on the association noted in columns (2) and (3) are underlined in columns (4) and (5).

sharp increase in numerical magnitude compared to the base year poor of 0.5 million (Table 7, line 8, columns (10) to (14)).

Category IV covers those cases where there is a rise in headcount ratio combined with an adverse growth effect. This could come about due to favourable but weak distribution effect (category IV(a)) or both effects turning out to be adverse (category IV(b)). Because of a rise in headcount ratio, there is an unambiguous increase in the number of poor. Urban areas of Assam and Maharashtra belong to the category IV(a) and rural Bihar to category IV(b). A common feature of both is the sharp population effect which, by itself, could have brought about a rise in the number of poor by 7.7 million in Bihar and 2.7 million in Assam and Maharashtra (Table 7, lines 9 and 10).

#### POPULATION EFFECT: AN ANALYSIS

In this section, we analyse the population effect (PEP) in the decomposition of change in the number of poor between 1970-71 and 1983. It may be recalled from section II, that

$$\begin{aligned} \text{PEP}(1) &= H_{TT} P_0 R / 100 \\ &= (P_T - P_0) H_{TT} \text{ from (4).} \end{aligned}$$

or, alternatively we have

$$\begin{aligned} \text{PEP}(2) &= H_{T0} P_0 R / 100 \\ &= (P_T - P_0) H_{T0} \text{ from (5).} \end{aligned}$$

where  $P_0$  is base year population,  $R$  is the observed rate of growth (percentage) of population,  $H_{TT}$  is the observed headcount ratio for the terminal year and  $H_{T0}$  is the hypothetical headcount ratio with the terminal year APCTE and the base year Lorenz curve. PEP indicates the effect of population growth holding constant the level of real APCTE and the Lorenz curve.

Since the basic-unit of observation in the National Sample Survey is 'household', it would be useful to re-cast PEP in terms of the number of households ( $h$ ) and the average household size ( $n$ ). Let us denote by  $h_{0T}$  the number of households that can be identified as being present in both the base and the terminal year and  $h^*$  to be the residual number of non-common households in the base or the terminal year. With this notation, we have

$$\begin{aligned} h_T &= \text{Total number of households in the} \\ &\quad \text{terminal year.} \\ &= h_{0T} + h^*_T \end{aligned}$$

Similarly,

$$h_0 = h_{0T} + h^*_0$$

Assuming for simplicity that the observed household size in the base and the terminal year applies to both the sets of households, we can write

$$\begin{aligned} P_T &= h_T n_T = (h_{0T} + h^*_T) n_T \\ \text{and } P_0 &= h_0 n_0 = (h_{0T} + h^*_0) n_0 \end{aligned}$$

The following argument applies to PEP(1) as well as PEP(2) by interchanging  $H_{TT}$  and  $H_{T0}$ . We illustrate for PEP(1). We can re-write PEP(1) as

$$\begin{aligned} \text{PEP}(1) &= (P_T - P_0) H_{TT} \\ &= [(h_{0T} + h^*_T) n_T - (h_{0T} + h^*_0) n_0] H_{TT} \\ &\quad - h_{0T} H_{TT} (n_T - n_0) \\ &\quad \text{(A)} \\ &\quad + H_{TT} (h^*_T n_T - h^*_0 n_0) \\ &\quad \text{(B)} \end{aligned}$$

In this expression, component (A) can be interpreted as the hypothetical increase in the number of poor due to the natural rate of population increase located in the common set of households assuming the headcount ratio to remain unchanged. Component (B) reflects the hypothetical increase/decrease in the number of poor that is attributable to other causes of population increase, namely, migration and area reclassification. In other words,  $h^*_0 n_0$  would include the following two sets of population:

(i) population in those households which were located in a given segment (rural or urban) of a given State in the base year but migrated out by the terminal year.

TABLE 7: CLASSIFICATION OF STATE-SPECIFIC CHANGE IN NUMBER OF POOR IN 1983 OVER 1970-71 INTO CATEGORIES FORMED ACCORDING TO THE RELATIVE IMPORTANCE OF GROWTH, POPULATION AND DISTRIBUTION EFFECTS, SEPARATELY FOR RURAL AND URBAN POPULATION (In millions)

Sl No	Category	Rural						Urban					
		States Belonging to the Category	No of Poor in 1970-71	CNP	GEP	PEP	DEP	States Belonging to the Category	No of Poor in 1970-71	CNP	GEP	PEP	DEP
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
<i>I(a) Decline in H and rise in real APCTE: GE and DE both favourable</i>													
1	I(a) (i)	MP	18,142	-0.063	-2.695	3.681	-1.049	GJT,HRY, MNP	3,346	-0.044	-1.120	1.259	-0.183
2	I(a) (ii)	GJT,HRY, PNB	12,308	-3.527	-4.660	1.985	-0.852	HP, J&K	0.174	-0.077	-0.099	0.044	-0.022
3	I(a) (iii)	ORS	12,544	0.125	-1.893	2.367	-0.349	AP,KER, MP,UP,ORS, RJN,WB	18,916	6.418	-2.672	11.039	-1.949
<i>I(b) Decline in H and rise in real APCTE: favourable GE offsetting adverse DE</i>													
4	I(b) (i)	AP,KRN, KER,TN, MNP, RJN,DLI	59,003	-7.989	-21.120	8.336	4.795	None	—	—	—	—	—
5	I(b) (ii)	HP, TRP, WB	23,498	0.605	-4.884	4.765	0.724	None	—	—	—	—	—
6	I(b) (iii)	ASM, MHR,UP	49,671	9.935	-4.146	11.283	2.798	KRN,TRP	2,857	-0.623	-0.859	1.293	0.189
<i>II(a) Decline in both H and real APCTE: favourable DE offsetting adverse GE</i>													
7	II(a)	J and K	0.635	0.134	0.184	0.183	-0.233	BHR,TN, DLI	9,343	1.822	0.452	3.738	-2.368
<i>III(a) Rise in both H and real APCTE: favourable GE offset by adverse DE</i>													
8	III(a)	None	—	—	—	—	—	PNB	0.485	0.302	-0.106	0.215	0.193
<i>IV(a) Rise in H and fall in real APCTE: favourable DE offset by adverse GE</i>													
9	IV(a)	None	—	—	—	—	—	ASM,MHR	5,107	2.719	0.205	2.664	-0.150
<i>IV(b) Rise in H and fall in real APCTE: both GE and DE adverse</i>													
10	IV(b)	BHR	29,452	8.148	0.122	7.711	0.315	None	—	—	—	—	—

Notes: (1) Same as of Table 5. (2) GE and DE refer to change in headcount ratio only because of pure growth (in real APCTE) and change in distribution between 1970-71 and 1983, respectively.

Source: Table 5.



(ii) population in those households which were located in an area in the base year that went out of given segment (rural or urban) of a given State due to reclassification of the entire area by the terminal year.

Symmetrically,  $h^* \cdot n_T$  would include the population in households which in-migrated in the terminal year or belong to the newly included reclassified area into the segment (rural or urban) of a given State by the terminal year.

As regards the direction of change of the two components, the natural rate of population increase would be positive for both the rural and the urban segments of the population. Component (B) may be expected to be negative for the rural and positive for the urban segment of any given State. This component would be numerically significant in magnitude for the urban population especially during the rapid phase of urbanisation, with a low initial share of the urban population. On the other hand, given the predominantly agrarian and rural character of the economy, component (B) may be safely assumed to be negative but negligible in magnitude relative to the size of the rural population. Consequently, in the subsequent discussion we assume that the observed rate of growth of rural population is a close lower bound on the natural rate of growth of population. For the urban population, we attempt to distinguish the relative magnitude of natural rate of increase, migration and reclassification of area.

We may emphasise at this point that the foregoing analysis implicitly assumes the State boundaries to remain the same at the two time points being considered. This may not, in fact, be true as, for example, in the case of Assam between 1970-71 and 1983. We have, however, not been able to account for this factor in our subsequent analysis. For most of the States considered in this section, the changes in boundaries have been marginal in significance.

Table 8 provides a list of rural segments of seven States where PEP was found to be numerically significant, i.e., exceeding 2 million. These seven States belong to the 10 most populous States among the 20 considered in this study. They cover nearly 62 per cent of the rural population in 20 States and contained a little more than two-thirds of the rural poor in 1970-71 (Table 8, line 8). Population effect given in column (6) indicates that population growth, by itself, would have increased the size of the rural poor population in these States ranging between 7.7 million (Bihar) to 2.3 million (Rajasthan). They accounted for three-fourth of the population effect for 20 States put together.

Five of the seven States in Table 8 were located in the central and eastern parts of India (West Bengal, Orissa, Bihar, Uttar Pradesh and Madhya Pradesh), whereas the remaining two belong to the western region. Four States (Bihar, Uttar Pradesh, West Bengal and Rajasthan) had large size of the

base year rural population as well as above-average growth rate of the rural population in comparison with the growth in the all-India rural population of 24.19 per cent over the period considered. In the remaining three States, it is the size of the base year rural population that is relatively more important in giving rise to the numerically large population effect. In Bihar, Uttar Pradesh and Maharashtra, PEP dominates in the total change in the number of poor. In the remaining States, it has been mostly offset by growth effect (Table 5).

Table 9 presents a list of eight States in descending order of the magnitude of PEP which exceeds one million for the urban segments of these States. In relation to the total for 20 States, these eight States account for two-third of the total urban population and nearly three-fourth of the urban poor population in 1970-71. They also contribute 78 per cent to the total population effect for 20 States put together (Table 9, line 9). Furthermore, they belong to the nine largest States in terms of the size of the urban population, the only populous State left out being West Bengal. Barring Maharashtra and Tamil Nadu, the remaining six also experienced above 59.53 per cent (i.e., the average growth rate of total urban population over the period under consideration) so that both the base year size and the growth rate contributed towards producing numerically large PEP. An examination of the last three columns of Table 9 indicates:

(i) that area-reclassification and natural rate

of increase were almost equally responsible for the total change in urban population in Uttar Pradesh;

(ii) that migration was a reasonably important factor (31 per cent) only in Maharashtra though this factor was around 25 per cent for Andhra Pradesh and Bihar;

(iii) migration and reclassification together were responsible for nearly 44 per cent of the increase in urban population in Madhya Pradesh;

(iv) with the exception of Uttar Pradesh and Madhya Pradesh, the natural rate of population increase accounted for more than 63 per cent of the observed increase in urban population in the remaining six States.

Unlike in the rural segment, growth effect turned out to be reasonably important only in the urban areas of Andhra Pradesh and Karnataka. In all other States, population growth effect was mostly offset by favourable distribution effect. However, in all the eight States, there was a net increase in the total number of urban poor (Table 5).

## V

### Main Conclusions from the Decomposition Exercise

At the all-India level, aggregated results for 20 States included in this study indicated a net increase in the number of rural poor by nearly 7 million and in the number of urban poor by nearly 12 million despite a reduction in the headcount ratio. Population

TABLE 8: STATES MAKING MAJOR CONTRIBUTION TO THE POPULATION EFFECT FOR THE RURAL POPULATION

Sl No	Name of the State	Population in 1970-71 (Million)	No of Poor in 1970-71 (Million)	Change in No of Poor (Million)	Population Effect (Million)	Rate of Growth Real APCTE (Per Cent)	Rate of Growth Population (Per Cent)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Bihar	50.72 (11.64)	29.45 (14.35)	8.15	7.71 (19.13)	-0.28	25.80
2	Uttar Pradesh	75.95 (17.43)	30.12 (14.67)	5.74	6.90 (17.12)	2.22	34.00
3	West Bengal	33.35 (7.66)	22.38 (10.90)	0.58	4.51 (11.19)	15.01	25.30
4	Madhya Pradesh	34.87 (8.00)	18.14 (8.84)	0.06	3.68 (9.13)	10.33	23.80
5	Maharashtra	34.70 (7.96)	15.18 (7.40)	2.62	2.77 (6.87)	8.35	21.70
6	Orissa	20.10 (4.61)	12.54 (6.11)	0.13	2.37 (5.88)	12.37	19.30
7	Rajasthan	21.22 (4.87)	9.25 (4.51)	-0.04	2.31 (5.73)	21.81	34.10
8	Total for 7 states	270.91 (62.17)	137.06 (66.78)	17.12	30.25 (75.05)	—	—
9	Total for 20 states	435.66 (100.00)	205.25 (100.00)	7.37	40.31 (100.00)	—	—

Notes: (1) The states have been ranked in descending order according to Population Effect given in column (6). The cut-off point is 2 million.

(2) Figures in brackets in columns (3), (4) and (6) are percentage share of the corresponding total for 20 states given in line 9.

Sources: 1 Table 5 for columns (4), (5) and (6).

2 Appendix-Table A 1 for columns (7) and (8).

3 1971 Population Census for column (3).

growth effect turned out to be the dominant factor in both the segments. However, it was accentuated by adverse distribution effect only to be partially offset by favourable growth effect in the rural segment. Both growth and distribution effects in the aggregate were favourable in the urban segment but were too weak to offset the adverse population effect.

In the rural segment (Section 4(b), Table 7), four southern States of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu and three northern States of Manipur, Rajasthan and Delhi together accounting for 59 million rural poor in 1970-71 form the numerically largest category (I(b)(i)). These States were marked by very strong growth effect more than offsetting adverse distribution as well as population effect.

The second largest category (I(b)(iii)) consists of the three States of Assam, Maharashtra and Uttar Pradesh with nearly 50 million rural poor in 1970-71. These together experienced a large increase of about 10 million in the number of rural poor. The major contributing factor was the population effect which was accentuated by adverse distribution effect. Growth effect was favourable but too weak to offset these two adverse effects put together.

Bihar was a category (IV(b)(i)) by itself, with 29.5 million rural poor in 1970-71. It experienced an equally large rise of 8 million in its poor population. The major factor was adverse population effect. The other effects were also adverse but numerically insigni-

ficant.

The 11 States mentioned above accounted for two-third of the total number of rural poor in 20 States in 1970-71. It is mostly in the southern States that the growth effect overwhelmed the population effect. The northern States in this group of 11 present a contrast in this respect (with the exception of Rajasthan).

In the urban segment (Section 4(b), Table 7), the largest category (I(a)(iii)) consists of seven States of Andhra Pradesh, Kerala, Madhya Pradesh, Uttar Pradesh, Orissa, Rajasthan and West Bengal containing nearly 19 million out of 40 million urban poor in 20 States in 1970-71. These were marked by dominant population effect which could not be offset by favourable growth and distribution effects.

Bihar, Tamil Nadu and Delhi were in the second largest category (II(a)) with 9 million urban poor in 1970-71. The distribution effect was favourable and significant but inadequate to offset adverse growth as well as population effects. Assam and Maharashtra were in the third largest category (IV(a)) with 5 million urban poor in 1970-71. Here the situation was similar to the three States in the second largest category except that the distribution effect was mildly favourable.

The 10 States in the largest two categories accounted for 73 per cent of the urban poor in 20 States in 1970-71. The addition of two States of the third largest category brings the percentage to 83.

The population effect was analysed in

Section IV for those States where it turned out to be quantitatively large in magnitude, i.e., exceeding 2 million for the rural and 1 million for the urban segments.

In the rural segment, seven States had the population effect exceeding 2 million (Table 8). Of these, five are from the central and the eastern region, namely, Bihar, Uttar Pradesh, West Bengal, Madhya Pradesh and Orissa. The remaining two, namely, Maharashtra and Rajasthan were from the western region. These seven States together accounted for three-fourth of the aggregated population effect and two-third of the rural poor in 1970-71 in 20 States. In Bihar, Uttar Pradesh and Maharashtra, population effect dominated the total change in the number of poor. In the remaining four States, it was favourable impact of growth that was important in mostly offsetting the adverse population effect. The distribution effect was favourable and significant (though not dominant) only in Madhya Pradesh. In all the seven States, the large size of the base year population was important in producing a numerically significant population effect. The four States of Bihar, Uttar Pradesh, West Bengal and Rajasthan also experienced above-average natural rate of population growth. It is noteworthy that none of the southern States features in this list.

In the urban segment, eight States had the population effect exceeding one million. They accounted for 78 per cent of the aggregated population effect in 20 States. In Uttar

TABLE 9: STATES MAKING MAJOR CONTRIBUTION TO THE POPULATION EFFECT FOR THE URBAN POPULATION

Sl No	Name of the State	Population in 1970-71 (million)	No of Poor in 1970-71 (Million)	Change in No of Poor (Million)	Population Effect (Million)	Rate of Growth		Percentage Share in 1971-81's Population Increase, of		
						Real APCTE (Per Cent)	Population (Per Cent)	Total Migration (Per Cent)	Area Reclassification (Per Cent)	Natural Increase (Per Cent)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Uttar Pradesh	12.39 (11.46)	5.54 (13.77)	2.87	3.87 (19.11)	7.63	78.9	6.3	43.9	49.8
2	Maharashtra	15.71 (14.53)	4.97 (12.35)	2.60	2.56 (12.64)	1.68	51.0	31.5	5.3	63.2
3	Madhya Pradesh	6.79 (6.28)	3.30 (8.20)	1.35	2.32 (11.46)	2.17	72.7	23.7	20.3	56.0
4	Bihar	5.63 (5.21)	2.59 (6.44)	1.43	1.67 (8.25)	-2.00	71.3	24.4	12.4	63.3
5	Tamil Nadu	12.47 (11.53)	5.89 (14.64)	0.11	1.57 (7.75)	-3.10	35.6	13.4	5.8	80.8
6	Andhra Pradesh	8.40 (7.77)	3.01 (7.48)	0.51	1.35 (6.67)	14.29	62.0	25.9	10.0	64.1
7	Karnataka	7.12 (6.58)	2.83 (7.03)	0.62	1.29 (6.37)	16.66	64.6	17.2	17.4	65.4
8	Rajasthan	4.54 (4.20)	1.66 (4.13)	0.55	1.16 (5.73)	4.56	66.3	11.7	20.3	68.0
9	Total for 8 states	73.05 (67.56)	29.79 (74.04)	10.04	15.79 (77.98)	—	—	—	—	—
10	Total for 20 states	108.15 (100.00)	40.23 (100.00)	11.76	20.25 (100.00)	—	—	—	—	—

Notes: 1 The states have been ranked in descending order according to population growth effect given in column (6). The cut-off point is 1 million.

2 Figures in brackets in columns (3), (4) and (6) are percentage shares of the corresponding total for 20 states given in line 10.

Sources: 1 Table 5 for columns (4), (5) and (6).

2 Appendix-Table A I for columns (7) and (8).

3 1971 Population Census for column (3).

4 Sundaram (1989), Table 8.3, pp 184 for columns (9) to (11).



Pradesh, Maharashtra, Madhya Pradesh and Bihar, population effect dominated the total change in the number of poor. In the remaining four, namely, Tamil Nadu, Andhra Pradesh, Karnataka and Rajasthan, it has been partly offset by growth and/or distribution effects. These eight States belong to the set of nine largest States in terms of the size of the urban population and six of them

(except Tamil Nadu and Maharashtra) also experienced above average growth in urban population so that both the base year size and the growth rate of population are responsible for the numerically large population growth, namely, natural increase, area reclassification and migration, natural increase was numerically dominant in all the

eight States. It accounted for between 49.8 per cent (Uttar Pradesh) to 80.8 per cent (Tamil Nadu) of total urban population growth between 1971 and 1981. Area reclassification was significant (i.e., 43.9 per cent) only in Uttar Pradesh. Migration was reasonably important (around 31 per cent) only in Maharashtra though it was around 25 in Bihar and Andhra Pradesh.

### Appendix

TABLE A. 1: STATE-WISE RURAL POVERTY LINES AND AVERAGE PER CAPITA TOTAL EXPENDITURE (APCTE) IN 1970-71 AND 1983

Sl No	Name of the State (1)	1970-71		1983		I+p	$x_{TO}^*$	$x_{OT}^*$	r	R
		$\bar{x}_O$	$\bar{x}_T$	$x_O^*$	$x_T^*$					
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Andhra Pradesh	26.21	34.35	69.82	115.40	2.701	21.07	86.84	24.38	20.61
2	Assam	33.50	40.27	89.98	113.00	2.720	32.47	92.82	3.16	40.68
3	Bihar	32.22	33.15	91.57	93.75	2.836	32.31	91.31	-0.28	25.80
4	Gujarat	29.25	36.64	80.54	122.72	2.771	24.20	97.34	20.87	26.80
5	Haryana	31.10	48.86	82.83	151.78	2.685	26.88	95.83	15.70	28.19
6	Himachal Pradesh	31.10	50.75	83.88	150.81	2.740	28.68	90.97	8.45	28.15
7	Jammu and Kashmir	26.80	44.87	82.91	129.27	3.132	29.14	76.27	-8.01	31.15
8	Karnataka	27.50	35.89	75.96	116.84	2.856	24.12	86.59	13.99	23.01
9	Kerala	33.58	36.12	95.83	145.20	2.826	23.61	136.31	42.25	19.63
10	Madhya Pradesh	27.70	32.88	76.38	100.52	2.771	25.11	84.27	10.33	23.83
11	Maharashtra	30.40	36.39	84.72	110.44	2.801	28.05	91.79	8.35	21.62
12	Manipur	33.50	34.05	90.79	131.50	2.734	23.71	128.25	41.26	17.51
13	Orissa	29.67	28.86	90.00	98.75	3.045	26.40	101.14	12.37	19.32
14	Punjab	31.10	57.99	84.13	170.52	2.725	28.84	90.72	7.83	21.00
15	Rajasthan	27.43	35.39	78.67	127.00	2.946	22.52	95.83	21.81	34.13
16	Tamil Nadu	27.60	29.98	86.74	112.23	3.132	23.09	103.67	19.52	16.25
17	Tripura	33.50	41.72	88.83	126.21	2.700	29.90	99.52	12.04	38.74
18	Uttar Pradesh	26.23	35.08	76.05	104.49	2.914	25.66	77.74	2.22	33.99
19	West Bengal	35.83	33.32	95.36	104.59	2.660	30.35	112.53	18.01	25.26
20	Delhi	31.10	57.91	83.85	217.14	2.737	22.70	114.87	37.00	8.61
21	All India	28.70	35.31	80.99	112.45	2.835	25.55	90.98	12.33	24.19

Notes: (1)  $x_O^*$  and  $x_T^*$  refer to the state-specific poverty lines at current prices for 1970-71 and 1983, and correspond to monthly PCTE of Rs 15 and Rs 18 for all-India rural and urban population, respectively, at 1960-61 prices. (2)  $\bar{x}_O$  and  $\bar{x}_T$  refer to the state-specific APCTE at current prices for 1970-71 and 1983, respectively. (3) I+p refers to the state-specific consumer price index for 1983 with 1970-71 = 1. (4) r refers to state-specific growth rate (per cent) of real APCTE over the period from 1970-71 to 1983 and is given by  $100[\bar{x}_T/(I+p)\bar{x}_O - 1]$ . (5)  $x_{TO}^*$  ( $=x_O^*/(I+p/100)$ ) and  $x_{OT}^*$  ( $=x_T^*/(I+p/100)$ ) refer to the state-specific poverty lines used for calculating  $H_{TO}$  and  $H_{OT}$ , respectively. (6) R [ $=100(P_T/P_O - 1)$ ] refers to state-specific growth rate (per cent) of population over the period from 1970-71 to 1983, where  $P_O$  and  $P_T$  denote state-specific population in 1970-71 and 1983, respectively.

Sources: (1) NSS report No. 231 for column (3) and Sarvekshana, Vol IX, No 4, April 1986 for column (5). (2) Minhas et al [8] for column (6). (3) 1971 census and Sarvekshana, Vol XI, No 4, Issue No 35, Table (P), pp S-222 for column (10).

TABLE A. 2: STATE-WISE URBAN POVERTY LINES AND AVERAGE PER CAPITA TOTAL EXPENDITURE (APCTE) IN 1970-71 AND 1983

Sl No	Name of the State (1)	1970-71		1983		I+p	$x_{TO}^*$	$x_{OT}^*$	r	R
		$\bar{x}_O$	$\bar{x}_T$	$x_O^*$	$x_T^*$					
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	Andhra Pradesh	34.06	49.27	92.17	153.48	2.726	29.80	105.34	14.29	62.03
2	Assam	33.96	64.24	84.73	154.01	2.548	36.09	79.72	5.91	73.47
3	Bihar	37.05	51.02	102.85	138.53	2.771	37.81	100.79	2.00	71.25
4	Gujarat	36.60	48.83	106.08	163.61	2.881	31.47	123.37	16.30	51.77
5	Haryana	33.06	55.13	91.09	186.86	2.785	27.17	110.85	21.69	79.08
6	Himachal Pradesh	30.73	73.94	81.79	258.62	2.576	22.62	111.08	35.81	43.49
7	Jammu and Kashmir	26.98	45.84	79.93	155.29	2.922	23.27	92.68	15.95	58.97
8	Karnataka	34.75	50.71	97.17	166.32	2.811	29.79	113.35	16.66	64.62
9	Kerala	37.09	47.63	110.68	176.36	2.966	29.71	138.17	24.83	48.54
10	Madhya Pradesh	38.05	50.37	106.77	144.87	2.815	37.24	109.08	2.17	72.70
11	Maharashtra	36.57	63.30	110.98	184.35	2.962	37.19	109.11	-1.68	50.97
12	Manipur	33.96	47.10	84.73	138.25	2.548	29.48	97.60	15.19	192.91
13	Orissa	39.49	52.75	114.41	151.42	2.866	39.43	114.58	0.15	90.14
14	Punjab	33.27	65.89	86.39	185.20	2.616	30.96	92.84	7.46	57.03
15	Rajasthan	35.30	54.13	99.42	159.92	2.826	33.76	103.95	4.56	76.25
16	Tamil Nadu	32.65	44.69	103.24	163.74	3.078	33.70	100.04	-3.10	35.59
17	Tripura	33.96	66.21	84.73	186.61	2.548	30.70	93.72	10.61	49.38
18	Uttar Pradesh	33.65	45.17	94.03	135.48	2.787	31.26	101.21	7.63	78.89
19	West Bengal	34.30	60.89	88.15	169.95	2.601	31.96	94.61	7.32	39.94
20	Delhi	40.83	82.36	107.55	228.81	2.659	41.87	104.88	-2.48	75.08
21	All India	34.37	52.85	97.95	164.03	2.828	31.32	107.49	9.74	59.53

Notes and Sources: Same as that of Table A. 1.

TABLE A 3: STATE-WISE RURAL AND URBAN HEADCOUNT RATIOS FOR 1970-71 AND 1983

Sl No	Name of the State (1)	Rural				Urban			
		H <sub>OT</sub>	H <sub>TT</sub>	H <sub>TO</sub>	H <sub>OT</sub>	H <sub>OO</sub>	H <sub>TT</sub>	H <sub>TO</sub>	H <sub>OT</sub>
		(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 and 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) H<sub>ij</sub> denotes headcount ratio based on the use of APCTE for the year 'i' and size-distribution for the year 'j', where i as well as j takes values O and T referring to years 1970-71 and 1983, respectively.

(2) Poverty lines for calculating these headcount ratios for rural and urban populations are given in Tables A 1 and A 2, respectively. Size-distributions for 1970-71 and 1983 are obtained from NSS report No. 231 and *Sarvekshana*, Vol (X, No 4, April 1986, respectively

TABLE A 4: STATE-SPECIFIC PERCENTAGE SHARES IN 20 STATES' TOTAL POPULATION AND POOR POPULATION, RURAL AND URBAN, AND FOR 1970-71 AND 1983

Sl No	Name of the State (1)	Percentage Share in 20 States							
		Total Population				Poor Population			
		1970-71		1983		1970-71		1983	
	Rural (2)	Urban (3)	Rural (4)	Urban (5)	Rural (6)	Urban (7)	Rural (8)	Urban (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 and 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	14.56
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	Headcount Ratio (per cent) for 20 States	—	—	—	—	47.11	37.20	39.28	30.21

Notes: (1) 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.

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

## Notes

- 1 It has been shown in Appendix-B of our earlier paper [5] that this choice does not change the results in any substantial fashion.
- 2 Results for State Assam are not comparable over the period from 1970-71 and 1983, as the boundaries of the state underwent change during this period.

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