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Accounting for Inequality in India: Evidence from Household Expenditures

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FOREWORD

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ABSTRACT

The paper utilizes consumption expenditure data from India's National Sample Survey to shed light on the evolution of inequality between 1983 and 2004. Various measures of inequality show that inequality levels were relatively stable between 1983 and 1993, but increased between 1993 and 2004. However, the increases in inequality have not precluded reductions in poverty. They are also more of urban phenomena and can be accounted for by increased labor market returns to college education, especially among professional, technical, and managerial occupations. These findings are consistent with the importance of services, especially modern services, in driving economic growth in India. They also suggest that for the benefits of growth to be spread wider, greater dynamism in Indian agriculture and manufacturing will be essential.

I. INTRODUCTION

While poverty and inequality have for long been central to discussions about the Indian economy, they have received special attention in recent years from policymakers and researchers. There are two related reasons for the heightened interest in poverty and inequality. First, India has emerged as one of the faster growing economies in the developing world since the 1980s. The efficacy of economic growth on poverty reduction in a country with widespread poverty is quite naturally a subject of considerable interest. Second, while market-oriented economic reforms, initiated in the 1980s and accelerated in the 1990s, are widely believed to lie behind this high growth, there is considerable concern that the main beneficiaries of these reforms have been those at the higher end of the income distribution. In other words, there is concern that while India's economy is growing faster than it used to, lower income groups, and especially the poor, have not significantly participated in or benefited from growth.

Some recent analysis of National Sample Survey (NSS) quinquennial round data on consumer expenditures provides qualified support to such concerns. For example, Dev and Ravi (2007) find that poverty has unambiguously declined between 1983 and 2004: not only have poverty rates fallen, the absolute number of poor in 2004 is estimated to be lower than in either 1983 or 1993; however, they also find that the average annual percentage point reduction in poverty rates between 1993 and 2004 was lower than that between 1983 and 1993.[1] Since growth in per capita consumption has been higher during the more recent period, increases in inequality between 1993 and 2004 account for the slowdown in the extent of poverty reduction according to their analysis.

To the extent that inequality has increased, what explains this increase? This is the central focus of this paper and we utilize consumption expenditure data from three large sample rounds of the NSS to shed light on why inequality may have increased. To do so, we use a regression-based decomposition method developed by Fields (2003) to uncover the proximate factors associated with increases in inequality. We use the results of this analysis, as well as other recent work, to discuss some of the policy issues involved.

The empirical findings of this paper are as follows. First, inequality in per capita expenditures has increased between 1993 and 2004 in terms of a number of measures of inequality. Second, increases in inequality have not, however, precluded reductions in poverty (a point also stressed by Dev and Rani). In fact, per capita expenditures have increased for every statistical percentile group of individuals. As a result, the incidence of poverty has declined regardless of which poverty line one uses.[2] Third, in so far as the increases in inequality are concerned, they are much more of an urban phenomenon. Fourth, increased labor market returns to college education account for a large extent of the increases in urban inequality. Moreover, the largest increases in per capita expenditures between 1993 and 2004 have been for households whose main economic activity

[1] The poverty and inequality statistics for 1993 and 2004 pertain to estimates based on the 50th and 61st rounds of the NSS consumer expenditure surveys carried out from July 1993 to June 1994 and July 2004 to June 2005. We refer to the relevant estimates as pertaining to 1993 and 2004 for simplicity. It may be noted that poverty and inequality statistics for 1983 are based on the 38th round of the NSS consumer expenditure surveys carried out from January to December 1983.

[2] This result holds for not only the poverty rate, but also the poverty gap, and squared poverty gap.

entails employment in professional/technical and managerial occupations and in the services sector, especially modern services.

We argue that these findings are consistent with the importance of services, especially modern services, in driving economic growth in India. They also suggest to us that for the benefits of growth to be spread wider, greater dynamism in Indian agriculture and manufacturing will be essential.

The remainder of this paper is organized as follows. Section II provides a brief discussion of data issues. Section III provides estimates of poverty and inequality based on unit-level data from the NSS consumer expenditure surveys. This section also discusses decompositions of poverty into "growth" and "distribution" components. Section IV goes deeper into the factors accounting for inequality using regression-based decomposition techniques. Section V concludes with a discussion of policy issues related to inequality.

II. DATA

This paper's analysis is based on unit-level data from three large sample rounds of the NSS consumer expenditure surveys: round 38 (January–December 1983); round 50 (July 1993 to June 1994); and round 61 (July 2004 to June 2005). Estimates of consumption expenditure in round 38 are based on a uniform recall period of 30 days while those from rounds 50 and 61 can be based on a mixed recall period (i.e., 365 days for five subgroups of goods and services purchased with low-frequency and 30 days for the remaining items) as well as a uniform recall of 30 days for all goods and services. To ensure comparability with 1983, we use the expenditure data from rounds 50 and 61 based on the 30 day (uniform) recall.

We restrict our attention to the rural and urban sectors of 16 major states.[3] However, because of its prominence (as well as its size), we also include data from urban Delhi in our analysis.

Our poverty estimates are based on state-wise official poverty lines (see Appendix Table 1). We also use these poverty lines to back-out implicit price indexes that vary spatially as well as temporally (with urban Delhi 2004 as the base; see Appendix Table 2). These price indexes are then applied to current household expenditures in order to adjust them not only for price changes over time, but also for price differentials across states and between rural and urban areas within states. Both poverty as well as inequality measures are computed on a per capita basis by dividing household expenditures by household size.

In principle, inequality estimates (and decompositions) based on expenditures adjusted for spatial price differentials are superior to those based on current expenditures where the implicit assumption is of common prices everywhere in the country. In practice, however, the situation is not as clear as any deficiencies of the official poverty line will carry over to the implicit price indexes we use. One particular problem is that price differences across rural and urban areas may get exaggerated due to the fact that a part of the difference in monetary values between the rural and urban official poverty line stems from different calorie norms implicit in the rural and urban poverty lines: 2,400 calories per person per day in rural areas and 2,100 calories per person per day in urban areas. This problem can be alleviated by keeping the analysis poverty and inequality of urban and rural

[3] After 2000, three new states were formed: Chattisgarh, formerly part of Madhya Pradesh; Jharkhand, formerly part of Bihar; and Uttaranchal, formerly part of Uttar Pradesh. Some of our analysis draws upon state-level information. In order to maintain consistency across years, we do not consider these new states separately and instead consider the earlier state boundaries.

areas separate. A second problem with using the official poverty lines for deriving price indexes is that the specific weights used for aggregating price indexes of individual consumption goods and services implicit in the official poverty lines may not be the most appropriate to use for analysis of inequality issues.[4] We leave this question as an open issue for future research to address.

III. POVERTY AND INEQUALITY IN INDIA: 1983–2004

Table 1 presents poverty rates based on official poverty lines for rural and urban areas (based on data for 16 states plus urban Delhi).[5] The table also presents the rates of change in poverty between 1983 and 1993 and between 1993 and 2004. For almost all state-sector groups (e.g., rural Andhra Pradesh), poverty rates have fallen over time (see Appendix Tables 3a and 3b). How fast have poverty rates fallen? The rate of poverty reduction in the rural sector as a whole has been similar across the two periods, 1983 to 1993 and 1993 to 2004. If anything, the record over 1993–2004 has been a bit better. As can be seen from Table 1, the compounded average annual reduction in poverty in the more recent period has been 2.6% per annum versus 2.0% for the earlier period. The situation in the urban sector is a little different with the rate of poverty reduction having fallen between 1993 and 2004.[6]

Table 1
Headcount Ratios: Levels and Changes

States	Headcount Ratios (Percent)			Annual Change (Percent)		Annual Percentage Point Change	
	1983	1993	2004	1983–1993	1993–2004	1983–1993	1993–2004
Rural (16 states)	46.2	37.2	27.7	–2.04	–2.65	–0.86	–0.86
Urban (16 states + Delhi)	42.3	33.2	26.3	–2.30	–2.08	–0.88	–0.62

The finding that the rate of poverty reduction between 1993 and 2004 has been roughly similar (a bit higher in the rural sector and a bit lower in the urban sector) to that achieved between 1983 and 1993 is a bit surprising in view of the fact that India's economy grew faster in the later period. While per capita gross domestic product grew by 3.1% per annum between 1983 and 1993, it grew by 4.6% between 1993 and 2004 (World Development Indicators Online, World Bank). Why did the rate of poverty reduction not increase (significantly)? Does the answer have to do with slow growth of average per capita expenditures as captured by the NSS data? As is by now well known, there can be wide discrepancies between national account statistics and

[4] The underlying price indexes are based on the same prices used for the consumer price index for agricultural labor and consumer price index for industrial workers series, but reweighted on the basis of consumption patterns of people around the poverty line in 1973–1974.

[5] The figures using the official poverty lines differ from the India-wide numbers published by the Planning Commission for the corresponding years on two counts. First, our state coverage is different. As noted above, we are working with the rural and urban areas of 16 states plus urban Delhi. Second, our poverty estimates are calculated using unit-level records, while those from the Planning Commission are extrapolated from published tables on per capita expenditures across various expenditure classes. Appendix Tables 3a and 3b describe our poverty estimates by state, while Appendix Table 4 contains the corresponding official poverty headcount ratios published by the Planning Commission.

[6] This result is not due to the inclusion of data from Delhi. For example, excluding Delhi, the reduction in urban between 1983 and 1993 is 2.24%, while the reduction between 1993 and 2004 is still lower at 2.08%.

household survey data on consumption expenditure of households. Or has the pattern of growth in consumer expenditures tended to favor the nonpoor over the poor?

Table 2 sheds light on this. The table presents decompositions of poverty reduction into growth and distribution components using the method of Datt and Ravallion (1992).[7] The growth component of poverty reduction is computed as the reduction of poverty that would result if the actual growth experienced had taken place in the context of unchanged distribution. The distribution component of poverty reduction is the reduction of poverty that would result if the distributional change actually registered had taken place in the context of zero growth.

Table 2 describes the results of these growth and inequality decompositions of poverty change for the two time periods of interest, 1983–1993 and 1993–2004. There are several interesting features of the results. First, the main driver for poverty reduction in both periods has been the growth component. Second, the growth component has been much larger in the second period. However, changes in the distribution of per capita expenditures between 1993 and 2004 worked against the poor so that the positive impact of growth on poverty reduction was reduced, especially in the urban sector.[8]

Table 2
Growth and Inequality Decompositions (percent)

	1983–1993	1993–2004
Rural		
Change in poverty	−8.98	−9.51
Growth component	−6.65	−11.56
Redistribution component	−2.34	2.05
Urban		
Change in poverty	−9.19	−6.83
Growth component	−9.67	−12.39
Redistribution component	0.47	5.56

The above suggests that inequality has increased between 1993 and 2004, especially in urban areas. We thus turn to a direct examination of inequality estimates. Table 3 presents various estimates of inequality. In addition to the Gini coefficient, inequality indexes belonging to the generalized entropy (GE) class of inequality measures are provided: GE(0), or the mean log deviation; GE(1), or the Theil index; and GE(2), or half the square of the coefficient of variation. The GE(0) is especially sensitive to expenditures at the bottom of the distribution, GE(2) is more sensitive to expenditures at the top of the distribution, and GE(1) exhibits a constant responsiveness across all ranges of expenditures. The Gini coefficient is more sensitive to expenditures around the middle of the distribution.

Table 3 shows that between 1983 and 1993 all inequality estimates for the rural sector declined, while in the urban sector, all estimates increased, albeit marginally in most cases—the GE (2) measure being the exception. Between 1993 and 2004, all inequality estimates register

[7] Growth is of survey-based mean per capita consumption expenditure.

[8] The growth and inequality decomposition analysis, as well as the growth incidence curves discussed below, have been generated using Stata programs contained in the Poverty Analysis Toolkit website of the World Bank (http://go.worldbank.org/9877902MV0).

increases in both the rural and urban sectors. The inequality increases in rural areas are generally quite marginal, however. Those in urban areas have been larger.

TABLE 3
INEQUALITY ESTIMATES

	1983	1993	2004
Rural			
Gini	0.312	0.285	0.298
GE(0)	0.163	0.136	0.149
GE(1)	0.192	0.170	0.196
GE(2)	0.525	0.428	0.502
Urban			
Gini	0.339	0.342	0.378
GE(0)	0.189	0.193	0.236
GE(1)	0.215	0.233	0.289
GE(2)	0.344	0.726	0.828

The increase in inequality between 1993 and 2004, especially in urban areas, suggests that richer individuals have experienced faster growth in terms of their consumption expenditures than poorer individuals. This can be confirmed visually by using an increasingly popular graphical tool for inequality analysis, the growth incidence curve (GIC). The GIC shows growth in per capita expenditures at different statistical percentiles of the expenditure distribution over the time period between two surveys.

The GICs for various time periods and sectors are presented in Figures 1 to 4. The shape of the GIC provides information on how growth in expenditure is distributed. As can be seen from the GIC for rural India between 1983 and 1993 (Figure 1), growth was broadly downward sloping, i.e., those at the lower (higher) end of the distribution saw their per capita expenditure levels grow more quickly (more slowly) than mean growth. This pattern of the distribution of growth in per capita expenditures changed between 1993 and 2004 (Figure 2). The extremely well off (those in the top 5 percentile) experienced faster growth in their expenditures than most of the rest of the population. Expenditures of most others (from around the 5th to the 95th percentile) increased by between 1% and less than 1.4%. Only the extremely poor experienced more than average growth in their expenditures.

In contrast, the GIC for the urban sector goes from having no clear pattern from 1983 to 1993 (Figure 3) to having a clear upward slope between 1993 and 2004 (Figure 4). Thus, the better off (statistically) have seen faster growth in their expenditures.

It is important to note that while the GICs reveal the pattern of expenditure growth to favor the better-off between 1993 and 2004, especially in urban areas, they also reveal that growth rates of expenditures have been positive at all percentiles. Thus, all measures of absolute poverty would show a decline in poverty regardless of the monetary value of the poverty line. More generally, the fact that per capita expenditure levels have increased at each percentile of the distribution means that despite increasing inequality over time, social welfare has improved from the standpoint of social welfare functions that are anonymous and increasing in expenditure.[9]

[9] This follows from the fact that whether we are comparing the 1983 distribution with the 1993 distribution, or the 1993 distribution with the 2004 distribution, the more recent distribution "first order dominates" the earlier distribution.

Figure 1
Annualized Growth in Real Per Capita Expenditures, Rural, 1983 to 1993 (percent)

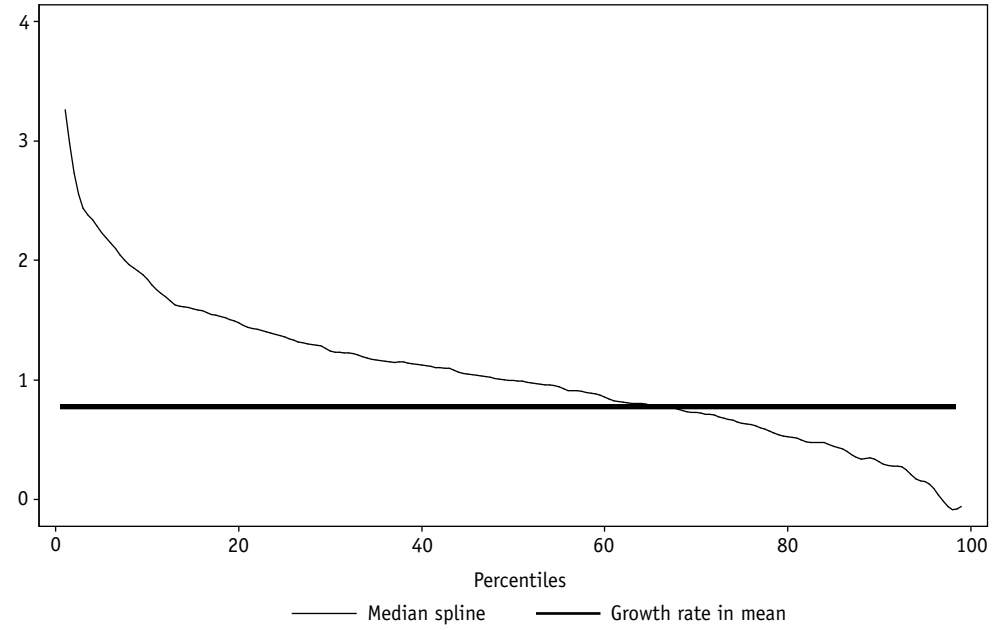


Figure 2
Annualized Growth in Real Per Capita Expenditures, Rural, 1993 to 2004 (percent)

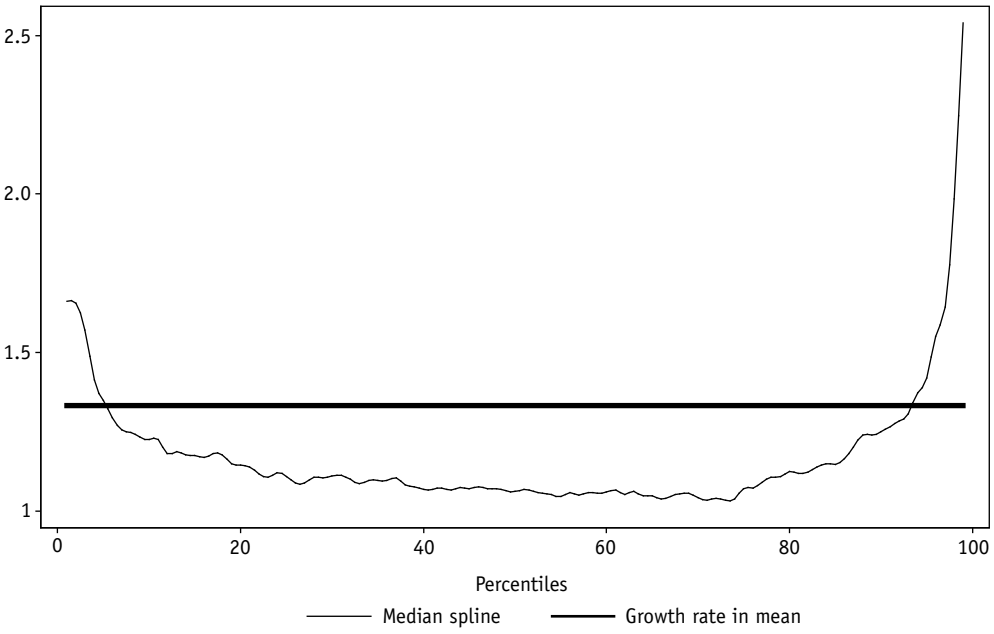


Figure 3
Annualized Growth in Real Per Capita Expenditures, Urban, 1983 to 1993 (percent)

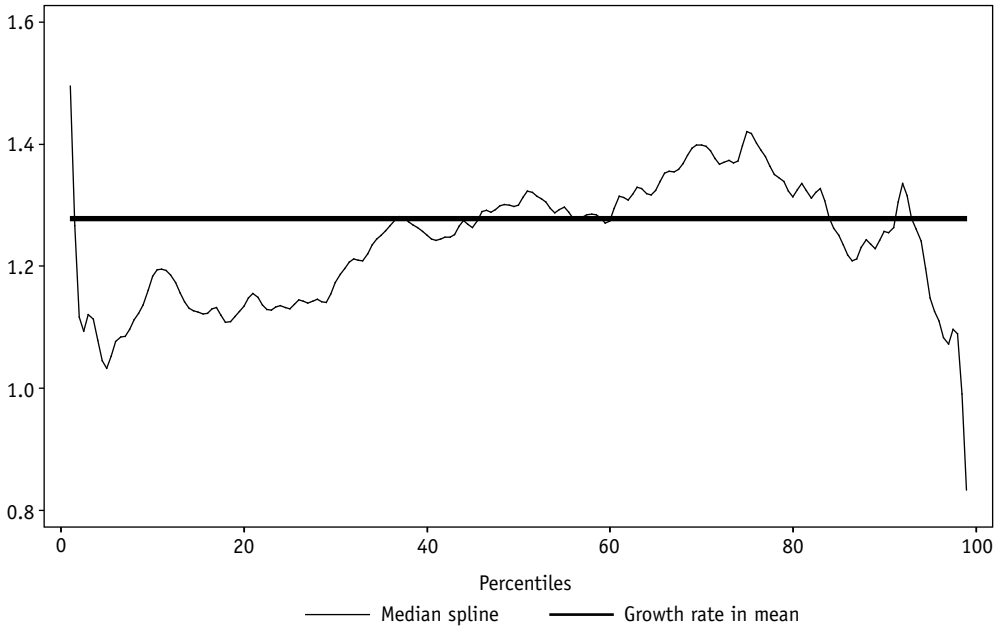
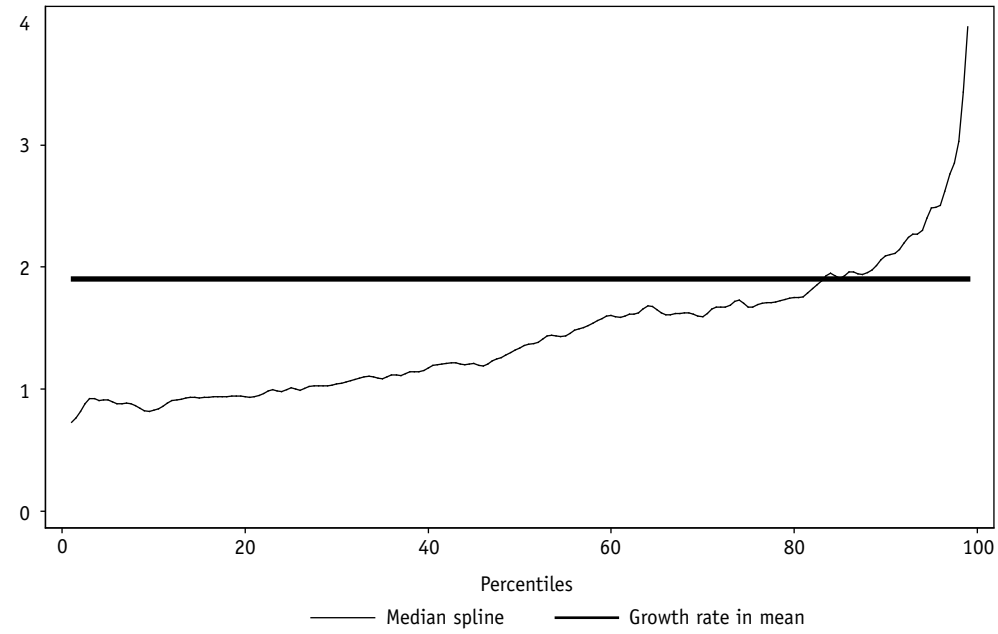


Figure 4
Annualized Growth in Real Per Capita Expenditures, Urban, 1993 to 2004 (percent)



IV. ACCOUNTING FOR INEQUALITY BETWEEN 1993 AND 2004

As we have just seen, inequality increased between 1993 and 2004; marginally in the rural sector and more substantially in the urban sector. What factors account for inequality and its changes between 1993 and 2004? In what follows we use a regression-based decomposition technique developed by Fields (2003) to determine what proportion of total inequality, and its change, can be accounted for by various observable household characteristics. It is crucial to point out that decomposition techniques provide a description of how various household characteristics are related to inequality. Decomposition results do not imply causation. Nevertheless, used with caution, the results can be suggestive of the deeper factors explaining or driving inequality. In this way, they can be a useful tool in analyzing inequality.

A. Mean Per Capita Expenditure by Household Characteristics

Over which household characteristics should inequality be decomposed? In answering this question, we are obviously limited to choosing from what is available in the NSS consumer expenditure survey data. Nevertheless, quite a bit is available. In addition to knowing the state and sector in which a household is located, and whether or not a household belongs to a scheduled caste or tribe group, we also have information on the household head's gender and level of educational attainment, and the principal production sector and occupation that form the main source of household income.[10] We consider five categories for the principal production sector of the household: agriculture; manufacturing industry; nonmanufacturing industry; modern services (business services, education and scientific research, health and medical subsectors); and traditional services (remaining services). We also consider three occupation groups: high-skilled occupations (professional/technical and managerial occupations); medium-skilled occupations (clerical and sales occupations); and low-skilled occupations (agricultural workers, production workers, and service workers). Finally we consider four levels of educational attainment (below primary, primary, secondary, and tertiary and above).[11] These characteristics of households suggest natural groupings over which inequality and its changes may be decomposed. Before considering the results of these decompositions, however, it is instructive to consider how per capita expenditures compare on average across these household characteristics.

Tables 4 and 5 present both levels as well as changes in average per capita expenditures for various population subgroups and over time for the rural and urban sectors, respectively. In both periods, i.e., 1983–1993 and 1993–2004, average per capita expenditures grew faster in urban areas. Additionally, per capita expenditures within both sectors grew faster in 1993–2004 as compared to 1983–1993. Those households whose heads were college-educated; engaged in the service sector (especially its modern subcomponent); and had a high-skilled occupation (i.e., professional, technical, and managerial occupations), experienced the fastest growth in their per capita expenditures, particularly in the 1993–2004 period. Households belonging to scheduled caste and scheduled tribe groups, on the other hand, experienced slower growth in per capita

[10] Scheduled castes are the bottom rung of the hierarchy in the Hindu caste system. Scheduled tribes are groups outside the caste system.

[11] Appendix Table 5 shows the concordance between the different educational levels listed in each of the three NSS rounds (columns 1-3) and the four educational categories we choose to work with (column 4). The table also includes the estimated number of years that correspond to each level of education (column 6). As is explained later, the regression-based decomposition of education's contribution to inequality into various factors requires that education enter the analysis not in terms of categories but as a continuous variable.

expenditures than others. In view of the number of dimensions in which gender biases can exist, including possible discrimination in the labor market, one surprising finding from Tables 4 and 5 is that mean per capita expenditures are higher among female-headed households.[12]

Table 4
Average Monthly per Capita Expenditures, Rural
(urban Delhi, 2004 rupees)

				ANNUAL CHANGE (PERCENT)	
GROUPS	**1983**	**1993**	**2004**	**1983–1993**	**1993–2004**
Overall	774.98	837.33	955.74	0.74	1.21
Quintile					
Bottom 20%	334.38	403.48	457.91	1.81	1.16
Lower middle 20%	498.15	564.59	629.87	1.20	1.00
Middle 20%	641.33	707.70	786.53	0.94	0.96
Upper middle 20%	842.20	903.27	1,003.74	0.67	0.96
Top 20%	1,558.89	1,607.82	1,900.72	0.29	1.53
Gender					
Male	772.02	834.43	951.43	0.74	1.20
Female	799.09	880.28	1,007.50	0.93	1.23
Social Group					
Scheduled tribe/caste	628.98	704.78	781.05	1.09	0.94
Others	832.33	898.64	1,032.03	0.73	1.27
Level of Education					
Below primary	713.82	759.55	828.66	0.59	0.79
Primary	887.18	924.98	1,013.01	0.40	0.83
Secondary	1,133.68	1,145.46	1,244.41	0.10	0.76
Tertiary and above	1,258.53	1,415.91	1,746.64	1.13	1.93
Production Sector					
Agricultural	756.56	804.89	893.55	0.59	0.95
Manufacturing industry	800.06	882.02	1,008.50	0.93	1.23
Nonmanufacturing industry	787.95	805.24	880.80	0.21	0.82
Traditional services	771.78	887.12	1,063.47	1.34	1.66
Modern services	1,124.66	1,254.78	1,543.78	1.05	1.90
Occupation					
High-skilled	1,188.25	1,139.04	1,582.20	-0.40	3.03
Medium-skilled	848.94	997.76	1,154.18	1.55	1.33
Low-skilled	759.20	807.17	900.93	0.59	1.00

[12] There may be several reasons for this, all of which can be consistent with the existence of gender biases. For example, female-headed households may be supported by various types of transfers that push up their expenditures; the women heading these households may have atypical educational and occupational profiles, etc. While a detailed analysis of this issue is beyond the scope of this paper, it may be noted that the NSS employment–unemployment survey data set for round 61 indicates that female-headed households tend to be smaller and to have a higher proportion of working to nonworking members. Thus, the employment profile of female-headed households could be a factor explaining their higher than average per capita expenditures.

Table 5
Average monthly per capita expenditures, Urban
(urban Delhi, 2004 rupees)

				Annual change (percent)	
Groups	**1983**	**1993**	**2004**	**1983–1993**	**1993–2004**
Overall	864.01	981.02	1,184.14	1.22	1.73
Quintile					
Bottom 20%	340.35	390.41	432.71	1.32	0.94
Lower middle 20%	504.07	569.44	634.24	1.17	0.98
Middle 20%	649.20	720.87	803.38	1.00	0.99
Upper middle 20%	862.38	939.83	1,067.14	0.82	1.16
Top 20%	1,697.01	1,839.33	2,277.85	0.77	1.96
Gender					
Male	865.48	984.54	1,188.56	1.24	1.73
Female	826.00	938.16	1,135.74	1.22	1.75
Social group					
Scheduled tribe/caste	681.92	741.02	858.52	0.79	1.35
Others	895.79	1,029.87	1,256.59	1.34	1.83
Level of education					
Below primary	658.77	689.85	742.62	0.44	0.67
Primary	794.55	867.96	960.00	0.85	0.92
Secondary	1,117.06	1,182.06	1,362.71	0.54	1.30
Tertiary and above	1,529.51	1,697.02	2,147.62	0.99	2.16
Production sector					
Agricultural	712.55	856.72	849.07	1.77	-0.08
Manufacturing industry	826.40	981.73	1,152.57	1.65	1.47
Nonmanufacturing industry	805.01	872.95	890.56	0.77	0.18
Traditional services	792.99	897.84	1,063.40	1.19	1.55
Modern services	1,114.45	1,273.81	1,631.62	1.28	2.28
Occupation					
High-skilled	1,287.90	1,436.52	1,798.28	1.05	2.06
Medium-skilled	911.10	1,032.88	1,228.46	1.20	1.59
Low-skilled	734.84	791.50	885.66	0.71	1.03

While Tables 4 and 5 suggest that the returns to higher education and certain production sectors and occupations may be driving the increases in inequality documented in the previous section, they cannot tell us whether this actually has been the case or not. The regression decompositions, to which we now turn, inform us about this.

B. Regression-Based Decompositions

The regression-based decomposition technique developed by Fields (2003) enables us to answer two questions. First, how much inequality in per capita expenditures can be accounted for by various household characteristics? Second, to what extent do these characteristics account

for the change in inequality over time? The answer to the first question—pertaining to the *level* of inequality—applies to a broad class of inequality measures including the Gini coefficient and the GE measures. On the other hand, answers to the second question—pertaining to *changes* in inequality—depend on the inequality measure being adopted.

Answering the first question entails taking two steps. In the first step, the log of per capita expenditures is regressed on various household characteristics:

$$\ln(Y_{it}) = \alpha_t + \beta_t X_{it} + \varepsilon_{it} \quad (1)$$

where the subscript *i* refers to the household, *t* denotes year, *Y* refers to the per capita expenditures of the household, and *X* is a vector of explanatory variables composed of relevant household characteristics. These include the household head's age, age squared, a dummy variable for gender, and dummy variables for educational attainment; dummy variables for the industry and occupation comprising the main economic activity of the household; state dummies; and a dummy for whether or not the household belongs to a scheduled caste or tribe group. The various dummy categories for the production sector, occupations, and education are as in Tables 4 and 5.

In the second step, the estimated coefficients on the various explanatory terms are used to derive the share of the log variance of per capita expenditures attributable to each of the j household characteristics:

$$s_j(\ln Y) = \frac{\beta_j * \sigma(X_j) * cor(X_j, \ln Y)}{\sigma(\ln Y)} \quad (2)$$

where β_j is the estimated coefficient of the jth household characteristic, and *Xij* is the value taken on by the *j*th household characteristic. For example, a share of 0.1 for gender means that 10% of the log variance of per capita expenditures can be accounted for by gender. For household characteristics that are captured by more than one dummy variable, such as educational attainment of the household head (captured by dummy variables for primary, secondary, and tertiary education, with those with less than a primary education being the excluded category), a consolidated share can be obtained by summing over the shares pertaining to each of the individual educational categories. Thus, continuing with the example of educational attainment, a consolidated share for education can be computed as the sum of the individual shares for the three included educational categories, primary, secondary, and tertiary education (i.e., $S_{\text{EDUC}} = S_{\text{EDUC- PRIMARY}} + S_{\text{EDUC-SECONDARY}} + S_{\text{EDUC-TERTIARY}}$). The same applies to age of the household head, which enters on its own and in terms of its square; i.e., the shares for the age and age squared term can be summed to arrive at a consolidated share for age.

Significantly, under certain conditions—which includes the assumption that the log linear model for per capita expenditures is appropriate—the shares from equation (2) also apply to standard inequality measures such as the Gini coefficient (see Fields 2003 for details). Thus, the shares can also be described more generally as "factor inequality weights."

Answering the second question, i.e., the extent to which the household characteristics considered here account for the change in inequality over time, is then straightforward. Suppose we would like to decompose changes in the Gini coefficient in urban India over 1993 and 2004. Let *S*j93 and *S*j04 represent the shares of the log variance of per capita expenditures for 1993 and 2004, respectively, for the *j*'th household characteristic (or factor inequality weights for *j*). The change in the Gini coefficient across the two years may be computed as:

[*S*j04*Gini04 – *S*j93*Gini93]/ [Gini04 – Gini93]. (3)

The first two data columns of Tables 6 and 7 describe the contribution of various household characteristics to inequality in consumption expenditures from 1993 to 2004 (the last row presents estimates of the Gini coefficient for expositional convenience).[13] For those household characteristics that enter (1) above with nonlinear terms (age) or as a string of dummy variables (e.g., education) the reported share is the consolidated one obtained by summing over the pertinent individual shares.

Table 6
Contribution to Expenditure Inequality and Its Change Over 1993–2004, Rural

	CONTRIBUTION TO INEQUALITY LEVEL		CONTRIBUTION TO CHANGE IN GINI**
VARIABLES	**1993**	**2004**	**1993–2004**
Age*	0.0065	0.0093	0.0899
Gender	0.0004	0.0001	–0.0085
Social group	0.0318	0.0352	0.1330
Production sector*	0.0112	0.0116	0.0231
Occupation*	0.0082	0.0156	0.2285
Level of education*	0.0657	0.0793	0.4706
State*	0.0783	0.0881	0.3700
Residual	0.7977	0.7608	–0.3008
Gini**	0.2851	0.2950	

* The contribution of these variables is cumulative and is obtained by summing the contributions of constituent variables (for example, the total contribution of age is made up of two terms, age, and age squared).

** The Gini coefficients reported and used here are not necessarily identical to those reported in Table 3 because sample observations with missing data on any of the included household characteristics were dropped.

[13] Appendix Tables 6 and 7 provide the results of the regression of the log of real monthly per capita expenditures on the various household characteristics.

Table 7
Contribution to Expenditure Inequality and its Change Over 1993–2004, Urban

	CONTRIBUTION TO INEQUALITY LEVEL		CONTRIBUTION TO CHANGE IN GINI **
VARIABLES	1993	2004	1993–2004
Age*	0.0010	0.0027	0.0224
Gender	–0.0006	–0.0009	–0.0044
Social group	0.0164	0.0186	0.0441
Production sector*	0.0132	0.0244	0.1541
Occupation*	0.0431	0.0524	0.1601
Level of education*	0.2072	0.2266	0.4512
State*	0.0483	0.0601	0.1967
Residual	0.6712	0.6160	–0.0230
Gini**	0.3421	0.3716	

* The contribution of these variables is cumulative and is obtained by summing the contributions of constituent variables (for example, the total contribution of age is made up of two terms, age, and age squared).

** The Gini coefficients reported and used here are not necessarily identical to those reported in Table 3 because sample observations with missing data on any of the included household characteristics were dropped.

The household characteristics included in our analysis are able to account for between 20% and 24% of inequality in rural areas and between 33% and 38% of inequality in urban areas. For both rural and urban areas, these household characteristics are able to account for inequality to a greater degree in 2004 as compared to 1993.

In rural areas in 2004, two factors come close to accounting for nearly 10% of inequality each: the state in which a household resides (9%) and the educational attainment of the household head (8%). Being a member of a scheduled caste or tribe has accounted for between 3% to 3.5% of inequality over the two years. The remaining household characteristics account for even more negligible amounts of inequality. Interestingly, being a member of a scheduled caste or tribe accounts for even less of inequality in urban areas—less than 2% in either 1993 or 2004.

By far the most important factor in driving urban inequality is education, accounting for between 21% and 23% of inequality in 1993 and 2004, respectively. The sum of all other household characteristics do not even come close to matching the amount of inequality accounted for by education.

The impressive role of education notwithstanding, it needs to be noted that all the included household characteristics still leave a majority of inequality levels unaccounted for in both rural and urban sectors and in both 1993 and 2004. However, the included household characteristics seem to do a much better job in accounting for changes in inequality. The last column of Tables 6 and 7 describes how increases in the Gini coefficient between 1993 and 2004 were accounted for by each of the included household characteristics. Taken together, these household characteristics are able to explain a majority of the increases in the Gini—a large majority in the case of the urban sector. Educational attainment has the most dramatic impact on inequality changes, accounting for 47% of the total change in the Gini coefficient between 1993–2004 in the rural sector, and 45% in the urban sector. The second most important factor is state, accounting for 37% of the increase in the

Gini coefficient in the rural sector and 20% in the urban sector. Surprisingly, occupation, which is not an important factor in the levels decomposition, is important in the change decomposition, accounting for almost 23% of the increase in the Gini coefficient in the rural sector, and 16% in the urban sector.

C. The Role of Education

Given the importance of education of the household head in accounting for the increases in inequality between 1993 and 2004, it is worthwhile to further analyze its role in increasing inequality. In particular, we can follow Fields (2003) and ask to what extent education's contribution to increasing inequality has been due to: (i) greater inequality in expenditures between household heads with different educational attainments (presumably reflecting increasing inequality in earnings between heads with different educational attainments); (ii) greater inequality in educational attainments; and/or (iii) an increase in the correlation between educational attainment and per capita expenditures.

Answering this question is easier if we introduce education in equation (1) as a continuous variable rather than a string of dummy variables. This allows us to neatly decompose the change in the share of inequality in per capita expenditures attributable to years of education as:

$$\Delta S_{EDUC\_YRS}(\ln Y) \approx \Delta\beta_{EDUC\_YRS} + \Delta\sigma\left(X_{EDUC\_YRS}\right) + \Delta cor\left(X_{EDUC\_YRS}, \ln Y\right) - \Delta\sigma(\ln Y) \quad (4)$$

where the Δ operator denotes percentage change.

Appendix Tables 8 and 9 provide the results from running the regression equation (1) with educational attainment entering in terms of years of education.[14] Interestingly, while the coefficient on years of education increases between 1993 and 2004 in urban areas, it declines in rural areas. Nevertheless, education contributes to increases in inequality in both cases. This can be seen from Appendix Tables 10 and 11, which describe the contribution of household characteristics to inequality and changes in the Gini coefficient between 1993 and 2004 (analogous to Tables 6 and 7). The overall patterns are similar to those of Tables 6 and 7. Most importantly, education continues to be the single most important factor accounting for increases in the Gini coefficient in urban areas even when it is captured in terms of years of education. Its relative importance in rural areas takes a bit of a hit, though. Nevertheless, it still accounts for a substantial share of increase in the Gini coefficient between 1993 and 2004.

Tables 8 and 9 show the results of the decomposition in (4) above for rural and urban areas, respectively, (with the first row describing the contribution of years of education to inequality levels, or in other words the factor inequality weight of years of education, as reported in Appendix Tables 8 and 9). The first two columns of Tables 8 and 9 show the various terms of equation 3 in levels for 1993 and 2004. The last column shows the four left-hand side terms of equation 3, each divided by the change in the factor inequality weight of years of education. As noted earlier, the coefficient on years of education—often referred to as the Mincerian return to education—decreases in rural areas and increases in urban areas.

[14] As alluded to earlier, the last two columns of Appendix Table 5 describe how we assign years of education to the various levels of educational attainment.

Table 8
Decomposing the Contribution of Years of Education to Changing Inequality Over 1993–2004, Rural

	Components of Education's Factor Inequality Weight		Percentage of Change in Education's Factor Inequality Weight Explained by Change in:
	1993	2004	1993–2004
Education's factor inequality weight	0.075	0.083	—
Coefficient on years of education	0.031	0.029	–0.585
Standard deviation of years of education	4.069	4.544	1.057
Correlation between per capita expenditures and years of education	0.288	0.307	0.608
Standard deviation of per capita expenditures	0.483	0.485	0.035

Table 9
Decomposing the Contribution of Years of Education to Changing Inequality Over 1993–2004, Urban

	Components of Education's Factor Inequality Weight		Percentage of Change in Education's Factor Inequality Weight Explained by Change in:
	1993	2004	1993–2004
Education's factor inequality weight	0.198	0.213	—
Coefficient on years of education	0.044	0.049	1.299
Standard deviation of years of education	5.367	5.294	–0.157
Correlation between per capita expenditures and years of education	0.492	0.516	0.558
Standard deviation of per capita expenditures	0.586	0.621	0.677

The standard deviation of years of education also behaves differently across rural and urban sectors, increasing in the former and decreasing in the latter. Put differently, inequality in years of schooling in the rural sector has been widening, while in the urban sector it has been declining. Since household heads have become more educated on average in both sectors, the increase in the standard deviation of years of education in rural areas probably reflects the effects of increasing educational attainments in a population with generally low average educational attainments. For example, while the average years of schooling among household heads was only 3 years in rural areas in 1993, it was 7 years in urban areas. By 2004, this had increased to 4 years and 8 years in rural and urban areas, respectively. In contrast to the behavior of the coefficient on and standard deviation of years of education, the correlation between per capita expenditures and years of education increases in both rural and urban areas.

Focusing on rows 2 and 3 in the last column of Tables 8 and 9, it can be seen that the channels through which education has contributed to growing inequality has been different across the rural and urban sectors. In the rural sector, increasing inequality in the years of education among household heads was a key factor putting upward pressure on inequality. Changes in the "returns" to education were, in fact, equalizing. In contrast, inequality in urban areas increased in large part because the returns to education increased. Inequality in the years of schooling actually declined.

It is beyond the scope of this paper to determine why exactly we get the patterns we do. Nevertheless, the patterns are consistent with the following type of story. In the rural sector, the pace of structural transformation, i.e., a transformation of production from traditional/low productivity activities to modern/high productivity activities, has not kept up with an expansion, albeit a slow one, in educational attainment. Thus, while we do see an increase in the average years of education among household heads (from 3 to 4 years between 1993 and 2004) the nature of production in the rural sector remains overwhelmingly traditional and of low productivity. In the first place, agriculture continued to account for a large majority of the main economic activity of rural households in 2004 (67%). Even though this had come down from 75% in 1993, there was a slight increase in the share of low-skill occupations between 1993 and 2004—from 87% in 1993 to 88% in 2004. In other words, even though there was a transition from agriculture to industry and services in the rural sector, it is unlikely that the new jobs generally required much education. Even if some of these did, an expansion in the supply of education seems to have swamped out any upward pressure on returns to education. Otherwise, it is hard to explain the fall in the Mincerian return to education in Appendix Table 8 or the decline in expenditure differentials between the primary or secondary educated and those with less than a primary education (which may be seen by comparing the coefficients on primary and secondary education for 1993 and 2004 in Appendix Table 6).

In the urban sector, on the other hand, an increasing supply of educated household heads between 1993 and 2004 is found to coexist with an increase in the Mincerian returns to education. Thus, it would appear that the demand for educated workers has outstripped an increasing supply, thereby raising the Mincerian return. Moreover, as the coefficients on the various levels of education in Appendix Table 7 suggest, it is increases in the return to tertiary education that have been the main driver of increasing inequality in the urban sector. These patterns seem to be consistent with the nature of economic growth experienced by India, where a booming service sector—especially the

modern subcomponent, which tends to be relatively intensive in employing the highly educated—has kept overall growth rates high despite relatively lackluster performance in manufacturing and, especially, agriculture. Thus as the output of the modern service sector has increased, so has the demand for the highly educated. Since the highly educated are relatively scarce, their earnings and the expenditures of the households they support in particular can be expected to have gone up—something that may be reflected in terms of increasing Mincerian returns to tertiary education and increased inequality.

V. DISCUSSION

It is useful to first summarize the key findings of this paper. First, prior to 1993, there was no clear pattern to changes in inequality. Between 1993 and 2004, however, there has been an increase in inequality in both rural and urban sectors. Second, the increases in rural inequality are fairly marginal. They are more substantial in the urban sector. Third, of various household characteristics considered in this paper, educational attainment of the household head turns out to be the most important proximate factor driving inequality increases (as measured by the Gini coefficient). Finally, in the urban sector, inequality increased primarily because the "returns" to education increased. Inequality in educational attainment in terms of years of schooling actually declined.

An important question that arises is how the increases in inequality should be viewed, i.e., are they a largely benign feature of a growing economy, or do they merit a clear response? Additionally, to the extent that they merit a response, what form should it take?

The following points can be brought up in favor of the more benign view on increasing inequality. First, notwithstanding the increases registered, levels of inequality based on NSS expenditure data are by no means particularly high when considered from an international perspective. For example, in comparison with 22 other Asian economies, the Gini coefficient for India turns out to be right in the middle (ADB 2007).[15] Relatedly, increases in inequality do not preclude reductions in poverty, or more generally, improvements in the standard of living of the population at large—something the data support.

A second and perhaps more forceful argument for the benign view is that increases in inequality may well be a part and parcel of the growth process of a developing economy. As Nobel laureate Arthur Lewis put it:

> Development must be inegalitarian because it does not start in every part of an economy at the same time. Somebody develops a mine, and employs a thousand people. Or farmers in one province start planting cocoa, which grows in only 10% of the country. Or the Green Revolution arrives to benefit those farmers who have plenty of rain or access to irrigation, while offering nothing to the other 50% in the drier regions (Lewis 1954).

While Lewis' view that development is inherently inegalitarian may not be strictly correct in the aggregate (the experience of East Asia's newly industrialized economies is one that that led many economists to believe that growth need not entail a worsening of inequality) there appears to be considerable force behind his point that the process of development is unlikely to start in every part of an economy at the same time.[16]

[15] The comparison of Gini coefficients across 22 Asian economies does not control for spatial variation in prices within countries.

[16] A comparison of inequality trends over the last 20 years would show that inequality in the People's Republic of

But there are some difficulties with the benign view. First, by focusing only on income or expenditure inequalities, we ignore the sharp inequalities in education and health that characterize the Indian landscape (ADB 2006, Bardhan 2007). Arguably, these inequalities represent the most pernicious of inequalities, i.e., those driven by circumstances beyond the control of individuals and which give rise to inequality of opportunities.

Second, even if we were to focus on income or expenditure inequalities, it is difficult to argue that the recent increases in India are simply a byproduct of a still nascent growth process that cannot start everywhere at the same time. The data presented in this paper, combined with recent studies of economic growth in India, suggest that the nature of the growth process under way in India has been skewed toward generating new and better economic opportunities for a narrow minority of the Indian labor force: the best educated in professional and managerial occupations, especially those employed in modern services. As the NSS data described here indicate, the largest increases in per capita expenditures between 1993 and 2004 have taken place in households headed by individuals in professional and managerial occupations; those employed in the modern service sector; and those with college degrees or higher.

Of course, it is possible that the demand for workers of all types has increased (more or less equally), but that the small supply of college-educated professionals has meant rapid increases in earnings for them. But the story of economic growth in India over the last decade or so suggests that this is not what is going on. As Bosworth, Collins, and Virmani (2007) have argued, India's growth over the 1990s and early 2000s has not created enough jobs "for the bulk of the population that is not particularly well-educated." Unlike East Asia's fast-growing economies, India's growth has been driven by services and not manufacturing. Moreover, it is the growth of the modern component of services that stands on firmer ground, statistically speaking. Given that modern services tend to have the highest intensity of college-educated workers, its ability to generate high productivity (and higher-paying) jobs for the typical member of India's labor force is in all probability quite limited even if we can count on this sector to continue growing at a fast pace.[17]

A strategy of expanding the supply of higher-educated individuals is unlikely to be effective in tackling the issue of inequality in a meaningful way—even if we were to assume that the extra college graduates could be obtained without a deterioration in the quality of the new college degrees. To the extent that increasing returns to college education (the factor identified in this paper as the most important proximate cause of increasing urban inequality) are driven by the returns to particular occupations or industries—something that seems to be true not just for India but several other countries as well (see Mehta et al. 2007)—increasing the share of college education in the population per se will not do much to raise incomes generally.

China—a country whose rates of economic growth and track record in poverty reduction are something that most (if not all!) developing countries want to emulate—has increased by far more than it has in India (ADB 2007, Chaudhuri and Ravallion 2006). While not all of the increase in inequality can be ascribed to the sort of processes that Lewis described (see Dollar 2007 and Knight 2008), a nontrivial part probably is.

[17] Moreover, even the quantum of jobs that can be generated by this sector in the rosiest of scenarios would not be sufficient for soaking up the large degree of underemployment characterizing the Indian labor force.

For growth to lead to a more rapid rise in standards of living for India's workforce at large, raising productivity in agriculture and expanding the manufacturing sector will be vital. Moreover, insofar as manufacturing is concerned, it is a more dynamic labor-intensive sector in the organized sector that is sorely needed for generating large numbers of jobs that match the skill/education profile of the average Indian worker. As Panagariya (2006) has put it, "the challenge of transformation facing India is that of creating an environment that allows unskilled-labor-intensive manufacturing to grow rapidly and rise as a proportion of the gross domestic product". Efforts to create such an environment and also raise productivity in agriculture may well turn out to be the most effective way to fight inequality.

APPENDIX

Appendix Table 1
Official State Poverty Lines (current rupees)

STATE	1983		1993		2004	
	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
Andhra Pradesh	72.66	106.43	163.02	278.14	292.95	542.89
Assam	98.32	97.51	232.05	212.42	387.64	378.84
Bihar*	97.48	111.80	212.16	238.49	357.18	441.21
Gujarat	83.29	123.22	202.11	297.22	353.93	541.16
Haryana	88.57	103.48	233.79	258.23	414.76	504.49
Himachal Pradesh	88.57	102.26	233.79	253.61	394.28	504.49
Karnataka	83.31	120.19	186.63	302.89	324.17	599.66
Kerala	99.35	122.64	243.84	280.54	430.12	559.39
Madhya Pradesh*	83.59	122.82	193.10	317.16	326.26	568.19
Maharashtra	88.24	126.47	194.94	328.56	362.25	665.90
Orissa	106.28	124.81	194.03	298.22	325.79	528.49
Punjab	88.57	101.03	233.79	253.61	410.38	466.16
Rajasthan	80.24	113.55	215.89	280.85	374.57	559.63
Tamil Nadu	96.15	120.30	196.53	296.63	351.86	547.42
Uttar Pradesh*	83.85	110.23	213.01	258.65	370.69	491.90
West Bengal	105.55	105.91	220.74	247.53	382.82	449.32
Delhi		123.29		309.48		612.91

* The poverty line for Bihar in 2004 is the population-weighted average of its poverty line and that of Jharkhand; the poverty line for Madhya Pradesh in 2004 is the population-weighted average of its poverty line and that of Chattisgarh; the poverty line for Uttar Pradesh in 2004 is the population-weighted average of its poverty line and that of Uttaranchal.

Appendix Table 2
Price Deflators Based on State Poverty Lines (urban Delhi, 2004=1)

STATE	1983		1993		2004	
	RURAL	URBAN	RURAL	URBAN	RURAL	URBAN
Andhra Pradesh	0.119	0.174	0.266	0.454	0.478	0.886
Assam	0.160	0.159	0.379	0.347	0.632	0.618
Bihar	0.159	0.182	0.346	0.389	0.583	0.720
Gujarat	0.136	0.201	0.330	0.485	0.577	0.883
Haryana	0.145	0.169	0.381	0.421	0.677	0.823
Himachal Pradesh	0.145	0.167	0.381	0.414	0.643	0.823
Karnataka	0.136	0.196	0.304	0.494	0.529	0.978
Kerala	0.162	0.200	0.398	0.458	0.702	0.913
Madhya Pradesh	0.136	0.200	0.315	0.517	0.532	0.927
Maharashtra	0.144	0.206	0.318	0.536	0.591	1.086
Orissa	0.173	0.204	0.317	0.487	0.532	0.862
Punjab	0.145	0.165	0.381	0.414	0.670	0.761
Rajasthan	0.131	0.185	0.352	0.458	0.611	0.913
Tamil Nadu	0.157	0.196	0.321	0.484	0.574	0.893
Uttar Pradesh	0.137	0.180	0.348	0.422	0.605	0.803
West Bengal	0.172	0.173	0.360	0.404	0.625	0.733
Delhi		0.201		0.505		1.000

Appendix Table 3A
Headcount Ratios: Levels and Changes, Rural

STATES	HEADCOUNT RATIOS (PERCENT)			ANNUAL CHANGE (PERCENT)		ANNUAL PERCENTAGE POINT CHANGE	
	1983	1993	2004	1983–1993	1993–2004	1983–1993	1993–2004
Andhra Pradesh	26.7	16.0	10.5	–4.8	–3.8	–1.0	–0.5
Assam	43.1	45.3	22.1	0.5	–6.3	0.2	–2.1
Bihar	64.9	58.1	43.7	–1.1	–2.6	–0.7	–1.3
Gujarat	28.9	22.0	18.9	–2.6	–1.4	–0.7	–0.3
Haryana	21.8	28.3	13.2	2.5	–6.7	0.6	–1.4
Himachal Pradesh	16.8	30.3	10.5	5.8	–9.2	1.3	–1.8
Karnataka	36.2	30.1	20.7	–1.7	–3.4	–0.6	–0.9
Kerala	39.5	25.5	13.2	–4.1	–5.8	–1.3	–1.1
Madhya Pradesh	49.4	40.7	36.6	–1.8	–1.0	–0.8	–0.4
Maharashtra	45.9	37.9	29.6	–1.8	–2.2	–0.8	–0.8
Orissa	68.4	49.8	46.9	–3.0	–0.5	–1.8	–0.3
Punjab	14.1	11.7	9.0	–1.8	–2.3	–0.2	–0.2
Rajasthan	33.1	26.4	18.3	–2.1	–3.3	–0.6	–0.7
Tamil Nadu	52.5	33.0	23.0	–4.3	–3.2	–1.9	–0.9
Uttar Pradesh	47.1	42.4	34.1	–1.0	–2.0	–0.5	–0.8
West Bengal	63.6	41.1	28.4	–4.1	–3.3	–2.1	–1.2

Appendix Table 3B
Headcount Ratios: Levels and Changes, Urban

STATES	HEADCOUNT RATIOS (PERCENT)			COMPOUND ANNUAL CHANGE (PERCENT)		AVERAGE PERCENTAGE POINT CHANGE	
	1983	1993	2004	1983–1993	1993–2004	1983–1993	1993–2004
Andhra Pradesh	37.4	38.8	27.4	0.3	–3.1	0.1	–1.0
Assam	22.0	7.9	3.6	–9.3	–6.8	–1.3	–0.4
Bihar	48.9	34.7	38.1	–3.2	0.9	–1.4	0.3
Gujarat	40.9	28.2	13.3	–3.5	–6.6	–1.2	–1.4
Haryana	28.1	16.5	14.5	–5.0	–1.2	–1.1	–0.2
Himachal Pradesh	12.6	9.3	3.2	–2.9	–9.2	–0.3	–0.6
Karnataka	42.8	39.9	32.6	–0.6	–1.8	–0.3	–0.7
Kerala	45.4	24.4	20.0	–5.8	–1.8	–2.0	–0.4
Madhya Pradesh	53.6	48.0	42.5	–1.0	–1.1	–0.5	–0.5
Maharashtra	40.7	35.0	32.1	–1.4	–0.8	–0.5	–0.3
Orissa	49.7	40.5	44.7	–1.9	0.9	–0.9	0.4
Punjab	23.2	11.0	6.3	–6.9	–4.9	–1.2	–0.4
Rajasthan	38.1	31.0	32.3	–1.9	0.4	–0.7	0.1
Tamil Nadu	49.7	39.9	22.5	–2.1	–5.1	–0.9	–1.6
Uttar Pradesh	51.0	35.0	31.9	–3.5	–0.8	–1.5	–0.3
West Bengal	32.6	22.8	13.5	–3.4	–4.6	–0.9	–0.8
Delhi	28.6	16.0	16.3	–5.4	0.2	–1.2	0.0

APPENDIX TABLE 4
OFFICIAL POVERTY HEADCOUNT RATIOS (PERCENT)

	RURAL			URBAN		
STATES	1983	1993	2004	1983	1993	2004
Andhra Pradesh	26.5	15.9	11.2	36.3	38.3	28.0
Assam	42.6	45.0	22.3	21.7	7.7	3.3
Bihar*	64.4	58.2	42.1	47.3	34.5	34.6
Gujarat	29.8	22.2	19.1	39.1	27.9	13.0
Haryana	20.6	28.0	13.6	24.2	16.4	15.1
Himachal Pradesh	17.0	30.3	10.7	9.4	9.2	3.4
Karnataka	36.3	29.9	20.8	42.8	40.1	32.6
Kerala	39.0	25.8	13.2	45.7	24.6	20.2
Madhya Pradesh*	48.9	40.6	36.9	53.1	48.4	42.1
Maharashtra	45.2	37.9	29.6	40.3	35.2	32.2
Orissa	67.5	49.7	46.8	49.2	41.6	44.3
Punjab	13.2	12.0	9.1	23.8	11.4	7.1
Rajasthan	33.5	26.5	18.7	37.9	30.5	32.9
Tamil Nadu	54.0	32.5	22.8	47.0	39.8	22.2
Uttar Pradesh*	46.5	42.3	33.4	49.8	35.4	30.6
West Bengal	63.1	40.8	28.6	32.3	22.4	14.8
Delhi	—	—	—	27.9	16.0	15.2

* For 2004, these states do not include regions that have separated to form the three new states of Chattisgarh (from Madhya Pradesh), Jharkhand (from Bihar), and Uttaranchal (from Uttar Pradesh).

Source: Taken from Poverty Estimates (Planning Commission, various years).

Appendix Table 5
Concordance of Education Categories Across NSS Rounds and Years of Education

ROUND 38	ROUND 50	ROUND 61	HARMONIZED EDUCATION LEVELS	PRICE AND QUANTITY DECOMPOSITION, 1993–2004	
				EDUCATION LEVEL	YEARS
Not literate	Not literate	Not literate	Below primary	Not literate	0
Nonformal education	NFEC/AEC, TLC, and other nonformal schooling	Nonformal education	Below primary	Nonformal education	1
Below primary	Below primary	Below primary	Below primary	Below primary	2.5
Primary	Primary	Primary	Primary	Primary	5
Middle	Middle	Middle	Primary	Middle	8
Secondary	Secondary, higher secondary	Secondary, secondary, diploma/certificate courses	Secondary	Secondary	12
Graduate in agriculture, engineering, medicine, others	Graduate in agriculture, engineering, medicine, others	Graduate, postgraduate, and above	Tertiary and above	Graduate and above	15

NSS = National Sample Survey; NFEC = Nonformal Education Courses; AEC = Adult Education Centres; TLC = Total Literacy Campaign.

APPENDIX TABLE 6
EXPENDITURE EQUATIONS FOR 1993 AND 2004, RURAL

VARIABLES	CATEGORY	1993	2004
Age of household head		0.003***	0.002***
Age-squared of household head		0.000***	0.000***
Gender of household head	Male	–0.054***	–0.034***
Social group	Scheduled tribe/caste	0.159***	0.166***
Production sector	Manufacturing industry	0.033***	0.026***
(agriculture sector omitted)	Nonmanufacturing industry	–0.007***	–0.023***
	Traditional services	0.01***	0.024***
	Modern services	0.146***	0.127***
Occupation	High-skilled	0.083***	0.16***
(low-skilled occupation omitted)	Medium-skilled	0.067***	0.064***
Level of education	Primary	0.167***	0.166***
(below primary education omitted)	Secondary	0.326***	0.302***
	Tertiary and above	0.47***	0.5***
Constant		6.446***	6.57***
R-squared		0.2***	0.24***

* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Dependent variable: logarithm of monthly per capita expenditure (education measured in categories). Also included but not reported are 16 state dummy variables (Haryana is the omitted state).

APPENDIX TABLE 7
EXPENDITURE EQUATIONS FOR 1993 AND 2004, URBAN

VARIABLES	CATEGORY	1993	2004
Age of household head		–0.001***	0.001***
Age-squared of household head		0.000***	0.000***
Gender of household head	Male	–0.04***	–0.06***
Social group	Scheduled tribe/caste	0.136***	0.156***
Production sector	Manufacturing industry	0.152***	0.098***
(agriculture sector omitted)	Nonmanufacturing industry	0.117***	0.014***
	Traditional services	0.092***	0.05***
	Modern services	0.138***	0.167***
Occupation	High-skilled	0.209***	0.232***
(low-skilled occupation omitted)	Medium-skilled	0.043***	0.075***
Level of education	Primary	0.164***	0.195***
(below primary education omitted)	Secondary	0.427***	0.461***
	Tertiary and above	0.706***	0.785***
Constant		6.387***	6.411***
R-squared		0.33	0.38

* significant at 10%; ** significant at 5%; *** significant at 1%.

Note: Dependent variable: logarithm of monthly per capita expenditure (education measured in categories). Also included but not reported are 17 state dummy variables (Haryana is the omitted state).

Appendix Table 8
Expenditure equations for 1993 and 2004, Rural

VARIABLES	CATEGORY	1993	2004
Age of household head		0.003***	0.002***
Age-squared of household head		0.000***	0.000***
Gender of household head	Male	–0.067***	–0.043***
Social group	Scheduled tribe/caste	0.151***	0.161***
Production sector	Manufacturing industry	0.029***	0.023***
(agriculture sector omitted)	Nonmanufacturing industry	–0.009***	–0.025***
	Traditional services	0.006***	0.018***
	Modern services	0.138***	0.13***
Occupation	High-skilled	0.082***	0.17***
(low-skilled occupation omitted)	Medium-skilled	0.061***	0.065***
Years of education		0.031***	0.029***
Constant		6.442***	6.558***
R-squared		0.21	0.24

* significant at 10%; ** significant at 5%; *** significant at 1%.
Note: Dependent variable: logarithm of monthly per capita expenditure (education measured in years of schooling). Also included but not reported are 16 state dummy variables (Haryana is the omitted state).

Appendix Table 9
Expenditure equations for 1993 and 2004, Urban

VARIABLES	CATEGORY	1993	2004
Age of household head		0.001***	0.002***
Age-squared of household head		0.000***	0.000***
Gender of household head	Male	–0.058***	–0.089***
Social group	Scheduled tribe/caste	0.128***	0.153***
Production sector	Manufacturing industry	0.144***	0.069***
(agriculture sector omitted)	Nonmanufacturing industry	0.124***	0.002***
	Traditional services	0.083***	0.019***
	Modern services	0.148***	0.163***
Occupation	High-skilled	0.229***	0.267***
(low-skilled occupation omitted)	Medium-skilled	0.042***	0.082***
Years of education		0.044***	0.049***
Constant		6.307***	6.352***
R-squared		0.32	0.38

* significant at 10%; ** significant at 5%; *** significant at 1%.
Note: Dependent variable: logarithm of monthly per capita expenditure (education measured in years of schooling). Also included but not reported are 17 state dummy variables (Haryana is the omitted state).

APPENDIX TABLE 10
CONTRIBUTION TO EXPENDITURE INEQUALITY AND ITS CHANGE OVER 1993-2004, RURAL

	CONTRIBUTION TO INEQUALITY LEVEL		CONTRIBUTION TO CHANGE IN GINI**
VARIABLES	1993	2004	1993-2004
Age*	0.0068	0.0097	0.0931
Gender	0.0005	0.0002	–0.0084
Social group	0.0301	0.0342	0.1522
Production sector*	0.0106	0.0116	0.0404
Occupation*	0.0078	0.0163	0.2608
Years of education	0.0745	0.0828	0.3216
State*	0.0790	0.0883	0.3559
Residual	0.7907	0.7568	–0.2185
Gini**	0.2851	0.2950	

* The contribution of these variables is cumulative and is obtained by summing the contributions of constituent variables (for example, the total contribution of age is made up of two terms, age, and age squared).

** The Gini coefficients reported and used here are not necessarily identical to those reported in Table 3 because sample observations with missing data on any of the included household characteristics were dropped.

APPENDIX TABLE 11
CONTRIBUTION TO EXPENDITURE INEQUALITY AND ITS CHANGE OVER 1993–2004, URBAN

	CONTRIBUTION TO INEQUALITY LEVEL		CONTRIBUTION TO CHANGE IN GINI**
VARIABLES	1993	2004	1993-2004
Age*	0.0013	0.0031	0.0239
Gender	–0.0008	–0.0014	–0.0083
Social group	0.0154	0.0181	0.0494
Production sector*	0.0151	0.0264	0.1572
Occupation*	0.0469	0.0606	0.2192
Years of education	0.1975	0.2133	0.3962
State*	0.0493	0.0588	0.1688
Residual	0.6755	0.6213	–0.0061
Gini**	0.3421	0.3716	

* The contribution of these variables is cumulative and is obtained by summing the contributions of constituent variables (for example, the total contribution of age is made up of two terms, age, and age squared).

** The Gini coefficients reported and used here are not necessarily identical to those reported in Table 3 because sample observations with missing data on any of the included household characteristics were dropped.

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