Chapter 6

Trade and Inequality in India*

PRAVIN KRISHNA AND GURU SETHUPATHY

A central aspect of the public debate over the economic policy reforms undertaken in India in the early 1990s[1] was the anxiety that the greater market orientation of the economy and its openness to international trade would widen the inequality between regions, states, urban and rural areas, and households across the country.[2,3]

Basic international trade theory predicts that trade will increase the returns to the abundant factors in an economy. For unskilled-labor-abundant countries, such as India, this could be good news: the implication is that trade will raise the incomes of low-skilled workers, thus generating a reduction in poverty and likely in income inequality as well. However, it is sometimes argued that this outcome may not obtain for a number of practical reasons. First, different regions may have different levels of access to international trade—lagging regions may not benefit from trade because transportation and other trade costs may be too high for these regions to interact with international markets. Second, an important source of the gains from trade comes from the improvement in the allocation of productive resources in the economy. However, this improvement in production efficiency may be diminished if factors of production, such as labor and capital are not mobile across sectors. Specifically, factors of production that are stuck in declining sectors may be hurt by trade liberalization. Third, insights from the literature on economic geography suggest that increases in regional disparities may be a natural feature of the economic

development process. Specifically, if production is subject to economies of scale, market forces may induce production to agglomerate in a few areas. In this case, the economic development process can be a lumpy one—with some regions growing faster than others. Trade itself may affect agglomeration patterns and the location of economic activity. Trade liberalization may lead to an increase in the geographic concentration of economic activity—thus, possibly increasing (or decreasing) the extent of regional differences within a country. Thus, despite the aggregate benefits that openness to international trade and a greater market orientation are expected to bring, there remains the theoretical possibility that inequality is widened as a result.

Nearly two decades after the introduction of market-oriented economic reforms in India, the consequences of these reforms for inequality are being vigorously debated, with different empirical studies reaching different conclusions concerning the evolution of inequality subsequent to the reforms. For instance, Bhalla's (2003) study of inequality trends between 1983 and 1999 concludes that "the claim that inequality has worsened" over this time period is "somewhat erroneous," while Singh et al. (2003) find evidence of modest increases of regional and within-state inequality.[4]

One reason behind these equivocal findings is that the different studies that have examined inequality have analyzed quite different sample aggregates. For instance, Bhalla (2003) examines within-state inequality in rural and urban areas separately, while Singh et al. (2003) study the overall within-state inequality without separately considering the rural and urban components. Comparing inequality measures using data obtained at different levels of aggregation is especially problematic because the inequality measures used in the vast majority of inequality studies, such as the Gini coefficient, are unfortunately not additive across subgroups. For instance, the total Gini coefficient of a society is not equal to the sum of the Gini coefficients for its subgroups.

Our interest is in the evolution of total inequality as well as inequality within and across subgroups (such as states or urban and rural areas within states). It would therefore be desirable to use an inequality index that is additively decomposable (i.e., one that can be neatly expressed as the sum of across-group inequality and within-group inequality). Conceptually, the across-group component would be the value of the inequality index when all within-group inequalities were zero due to the hypothetical assignment of the group average to each member of the same group. Similarly the within-group component would be the value of the inequality index when all the across-group inequalities are suppressed by a hypothetical equalization of group means to the overall mean (by the equiproportionate change for every unit within each of these groups). The particular measure of inequality that we will use is Theil's entropy index, which, as is well known, is characterized by its property of additive decomposability.[5] Furthermore, as we will discuss, the Theil index has less stringent data requirements and is particularly useful when only group data are available rather than individual data or when individual data are subject to random measurement errors (which average out in larger samples). The Theil index enables us to explore in a consistent manner the evolution of inequality over different levels of aggregation.

This chapter measures inequality using Theil's inequality index constructed using Indian household expenditure survey data from 1988 to 2005. Our findings are as follows. The extent of inequality between states or between urban and rural areas is much lower than the inequality across households within these aggregates, which accounts for more than 90 percent of overall inequality and persists in this magnitude throughout the period of our study. Overall inequality shows some variation over the period, falling between 1988 and 1994, rising between 1994 and 2000, but falling again by 2005. A similar

pattern is observed when inequality is measured using other inequality measures, such as the Gini coefficient and the variance of log expenditures. Furthermore, a similar inequality trend is seen within most Indian states. Thus, the evolution of inequality in the postreform period has been a nonmonotonic one. Finally, the change in inequality across households within states is found to be uncorrelated with the change in state-level measures of tariff and nontariff protection.

The rest of the chapter proceeds as follows. The second section describes the data that we use in this chapter. The third section describes the Theil index and its use in inequality measurement. The fourth section presents results on inequality and its association with international trade. The fifth section concludes.

DATA

Consumer Expenditure Surveys

The Indian National Sample Survey (NSS) is the primary source of information on household-level expenditures in India. The NSS provides household-level information on expenditure patterns, occupation, industrial affiliation (at the three-digit NIC level), and various other household and individual characteristics. The surveys cover all Indian states, and urban and rural areas within states are identified separately. Data are collected on about 75,000 rural and 45,000 urban households. Furthermore, within a state, the surveys indicate the region, district, and urban block or rural village within which the surveyed households are located. For our analysis, we use data from the 1987–88, 1993–94, 1999–2000, and 2004–5 rounds of the NSS.

The household expenditure surveys conducted by the NSS contain detailed information on consumption expenditures undertaken by the household. The surveys include information on food consumption,

nonfood consumption on items such as energy and transportation, consumer durables expenditures, and housing.

The monetary estimates of total consumption for a household must be adjusted to reflect the different prices that different households face. The price variations that we are concerned with are less temporal than spatial: people who live in different parts of the country pay different prices for comparable goods. For example, prices tend to be lower in rural than in urban areas, at least for some goods and services. Such spatial differences can be quite large in both absolute and relative prices, so it is important to take them into account. In our analysis, we use household-level price data (obtained from the NSS consumption surveys) on a core set of consumption items (food items and energy) to determine a price index which is then used to deflate household expenditures to make them comparable across households. Specifically, our price index (Paasche) is constructed as a weighted sum of price ratios of different commodities:

where k denotes commodities; p^h denotes the price faced by household h; p^0 denotes the reference price, chosen to be the median price for the commodity in our sample; and w_k^h, the weight, is the

$$P^h = \left[\sum_k w_k^h \left(\frac{p_k^0}{p_k^h} \right) \right]^{-1},$$

share of each household's budget that is devoted to the particular good. Clearly the budget shares vary across households, implying a different weighting of the price ratios for each household. But, as Deaton and Zaidi (2002) argue, this formulation better reflects welfare changes than an index that uses the same weights across households (such as the Laspeyeres index).

One final point regarding the data on household consumption merits mention. As Deaton (2003) and others have noted, the design of the NSS survey questionnaire for the year 1999–2000 (the 55th

round) was different from that in earlier rounds, raising questions regarding the comparability of the data from this survey with previous surveys. The comparability problem arises because the 55th round of the NSS required households to report their expenditure levels over different recall periods than the previous rounds.[6]

To account for the effect of the discrepancy in recall periods, we implement the solution suggested by Deaton (2003). Specifically, we exploit the fact that there were a subset of goods (accounting for more than 20 percent of consumer expenditures) for which the survey questionnaire had the same recall period (thirty days) across all rounds of the NSS and the expenditure on which is highly correlated with total expenditure. Assuming that the Engel curve relating the logarithm of expenditures per capita on thirty-day goods to the logarithm of total household expenditures per capita is stable over time, the total expenditures of the households can be backed out of expenditures on the thirty-day goods. While the validity of this assumption cannot be checked, Deaton (2003) confirms the robustness of the adjustment procedure.

Trade Protection

We use Hasan, Mitra, and Ural's (2007) data on state-level measures of trade protection. In particular, industry-level tariff rates and non-tariff barrier (NTB) coverage rates for agricultural, mining, and manufacturing industries are weighted by state- and sector-specific employment shares as follows:

where $\gamma^{j}_{ik,1993}$ is the employment share of industry k in state i derived from the 1993 employment survey. Ind_Tariff_{kt} and Ind_NTB_{kt} are

$$Tariff_{it} = \sum_{k} \gamma_{ik,1993} * Ind\_Tariff_{kt}$$

$$NTB_{it} = \sum_{k} \gamma_{ik,1993} * Ind\_NTB_{kt}$$

industry-specific tariff rates and nontariff coverage rates that are measured at the two-digit level for each year *t*.

MEASURING INEQUALITY

We measure inequality using Theil's *T* statistic, which, when used in the context of individual data, is given by:[7]

where *n* is the number of individuals in the population, c_p is the real consumption of the person indexed by *p*, and μ_c is the population's average consumption. If every individual has exactly the same

$$T = \sum_{p=1}^{n} \left\{ \left(\frac{1}{n} \right) * \left(\frac{c_p}{\mu_c} \right) * \ln \left(\frac{c_p}{\mu_c} \right) \right\}$$

consumption level, *T* will be zero; this represents perfect equality and is the minimum value of Theil's *T*. If one individual has all of the consumption, *T* will equal $\ln(n)$; this is the highest level of inequality and is the maximum value of Theil's *T* statistic.

If members of a population can be divided into mutually exclusive and completely exhaustive groups, then Theil's *T* statistic is made up of two components, the between-group element (T^b_g) and the within-group element (T^w_g).

When aggregated data is available instead of individual data, T^b_g can be used as a lower bound for the population's value of

$$T = T^b_g + T^w_g$$

Theil's *T* statistic. The between-group element of Theil's *T* can be written as:

where *i* indexes the groups, p_i is the population of group *i*, *P* is the total population, c_i is the average consumption in group *i*, and μ is the

$$T_g^b = \sum_{i=1}^{m} \left\{ \left(\frac{p_i}{P} \right) * \left(\frac{c_i}{\mu} \right) * \ln \left(\frac{c_i}{\mu} \right) \right\}$$

average consumption across the entire population. T_g^b is bounded above by the natural logarithm of the total population divided by the size of the smallest group (a value that is attained when the smallest group consumes all the resources).

As Conceição and Ferreira (2000) note, when data are hierarchically nested (e.g., every district is in a state and each state is in a country), Theil's T statistic must increase or stay the same as the level of aggregation becomes smaller (i.e., $T_{population} > T_{state} > T_{district}$). Theil's T statistic for the population equals the limit of the between-group Theil component as the number of groups approaches the size of the population.

The additive decomposability of our inequality index, which allows us to neatly express inequality as the sum of between-group inequality and within-group inequality, enables us to examine inequality at different levels of aggregation in our study. Furthermore, the Theil index has less stringent data requirements and is particularly useful when only group data are available rather than individual data or when individual data are subject to random measurement errors (which average out in larger samples). In our case, inequality measures may be biased by the infrequent household consumption of durable goods or other lumpy expenditures (such as on weddings and funerals). As we will discuss in greater detail, we will sometimes group households into centiles and use consumption levels averaged across different centiles of the sample to construct the Theil index, thus exploiting the advantages of using the Theil index with aggregated data.

Finally, to ensure the robustness of our findings, we also measure inequality using other well-known inequality measures such as the Gini coefficient and the variance of log consumption.

RESULTS

We use household survey data from four NSS rounds—1987–88, 1993–94, 1999–2000, and 2004–5—to construct measures of per capita expenditure inequality that may be compared over time and which, exploiting the decomposability of the Theil index, convey information about the contribution of the different subnational aggregates (states and urban and rural areas within states) to overall inequality. Since the Theil index is sensitive to a changing number of subgroups (and thus a changing number of households in the sample), comparability of inequality over time requires that we work with aggregated groupings of the data while fixing the number of subgroups. Thus, we aggregate household expenditures into percentile groups within each subgroup. For instance, we aggregate households into 20,000 percentile groups to calculate overall inequality. For the decompositions, we aggregate households into 300 percentile groups within each state and 150 percentile groups with each rural or urban area within each state.[8] This also allows us to smooth consumption of durables and other lumpy expenditures and to also smooth out any random measurement error in the survey data. We present here results using only data on expenditures on nondurable goods (food items, energy and transportation, education, medical, and housing). Additional findings, not reported here, for overall consumption expenditures (including durable goods consumption) are very similar to the findings presented below.

Inequality Overall

We compute first the values of overall inequality over time. As mentioned in the previous section, in order to compare the evolution of inequality over time, we must use a fixed number of final elements, thus necessitating the use of percentile groups in our analysis.

Figure 6.1 plots overall Theil inequality levels for the years 1988, 1994, 2000, and 2005. For each of these years, we also obtain bootstrapped estimates of the sampling variances associated with the inequality estimates. This is done using the methodology suggested and implemented in the statistical package STATA by Jollife and Krushelnytskyy (STATA command *ineqerr*). Specifically, the chart indicates the inequality estimate along with a two-standard-deviation height (reflecting a 95 percent confidence interval band) marked above and below this mean estimate. Figure 6.1 reveals an interesting pattern in the data. Inequality rises after the implementation of the economic reforms until 2000 but falls back by 2005 to being slightly above the prereform 1988 level. Figure 6.2 provides a corresponding set of estimates using the Gini inequality measure, and Figure 6.3 provides inequality estimates using the variance of log expenditures as the inequality measure instead. Clearly, the different inequality measures provide a rather similar picture: while inequality rose in the immediate postreform period, there was a drop in inequality between the years 2000 and 2005. Thus, inequality has not risen monotonically since the economic reforms.

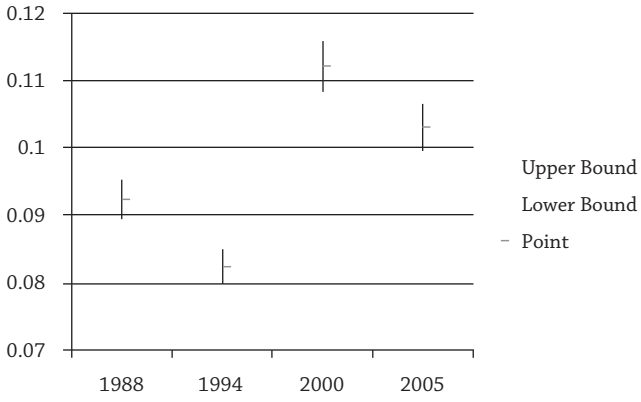

Figure 6.1. Theil Inequality—Adjusted

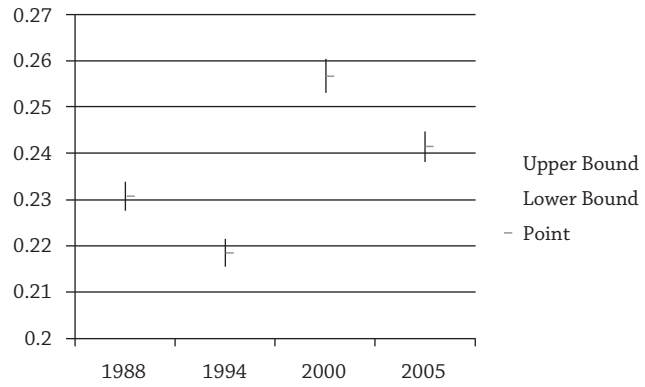

Figure 6.2. Gini Inequality—Adjusted

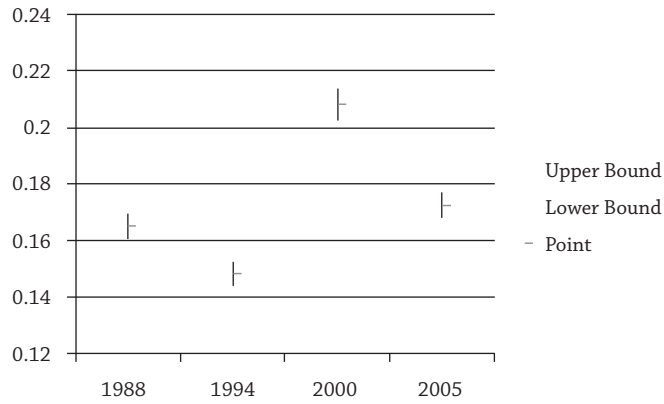

Figure 6.3. Variance of Log Consumption—Adjusted

For the results presented in Figures 6.1, 6.2, and 6.3, we have used the Deaton (2003) "adjusted" measure of income for the year 2000 (see the discussion in second section above). Figures 6.4, 6.5, and 6.6 present the corresponding inequality trends (for the Theil, Gini, and variance of log expenditure measures, respectively) without adjusting the inequality measure for the year 2000. The Deaton (2003) adjustments clearly raise the measured inequality in the year 2000, as

can be seen by comparing Figures 6.1 with 6.4, 6.2 with 6.5, and 6.3 with 6.6. Without the adjustment, the rise in inequality between 1994 and 2000 is therefore smaller. Nevertheless, the overall inequality trend without the adjustment to 2000 consumption seems to be roughly as it was before. The point estimate of inequality falls between 1988 and 1994, then rises between 1994 and 2000 and then falls again by 2005, again implying a nonmonotonic evolution of inequality over time.[9]

Inequality Decomposition

Next, we decompose the Theil index to assess the contribution of various subnational aggregates to overall inequality. We consider several decompositions. We begin by decomposing overall inequality into the sum of inequality across urban and rural areas and inequality across household percentile groups within these urban and rural areas. Also, we consider inequality across states and across household percentile groups within these states. We then consider a more detailed decomposition with overall inequality

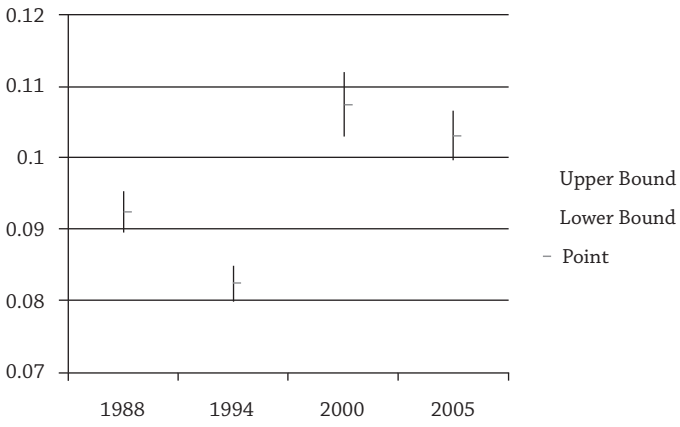

Figure 6.4. Theil—Unadjusted

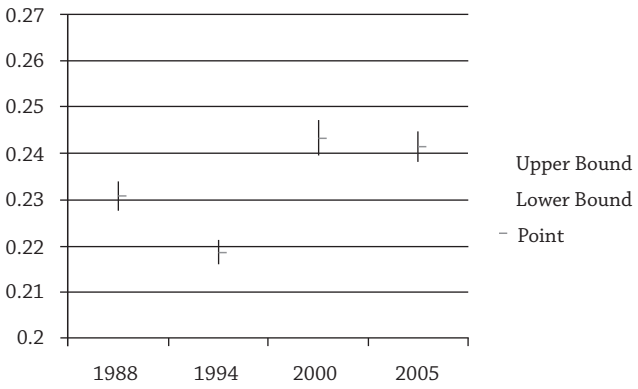

Figure 6.5. Gini—Unadjusted

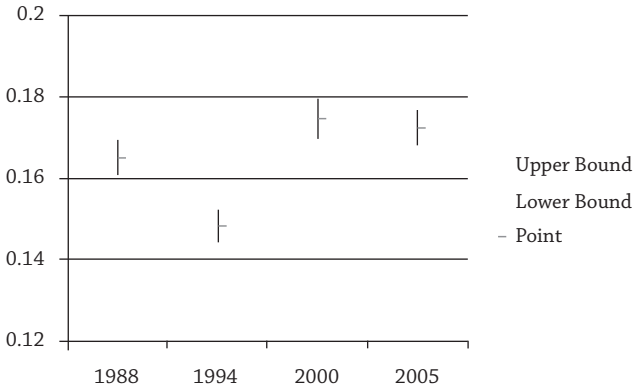

Figure 6.6. Variance of Logs—Unadjusted

split into inequality across states, across rural and urban areas within states and across household percentile groups within these urban and rural aggregates. Finally, in an even more detailed decomposition, inequality within urban and rural aggregates (within states) is now decomposed into inequality across different first-stage units (FSUs) that are either villages or collections of urban blocks and inequality across households within FSUs.

INEQUALITY ACROSS URBAN AND RURAL AREAS

Figure 6.7 presents the evolution of inequality decomposed as the sum of inequality between urban and rural areas and across household percentile groups within these areas. Figure 6.8 is similar but presents the shares of across-group and within-group inequality where the groups are urban and rural. From Figure 6.7, we see that urban-rural inequality has increased from 1994 onward. However, both figures clearly depict that most of the inequality lies at a level below that of the urban/rural aggregate. Indeed, the decomposition in Figure 6.8 tells us that much of the inequality seen here is inequality with in rural or urban areas, which accounts for more than 90 percent of overall inequality.

INEQUALITY ACROSS STATES

Next, we decompose overall inequality into across-state and within-state inequality. Figure 6.9 presents the evolution of this decomposition, and Figure 6.10 presents the decomposition in shares. As Figure 6.9 indicates, inequality across states rose between 1994 and 2000 and again between 2000 and 2005. However, again, most of inequality lies within states. Hence, as wide as is the gap in per capita expenditures

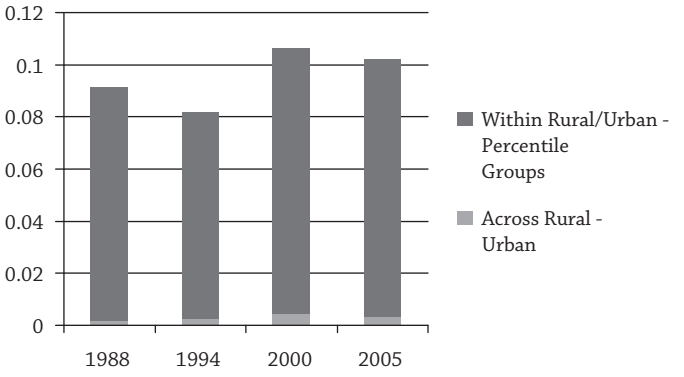

Figure 6.7. Inequality—Rural/Urban

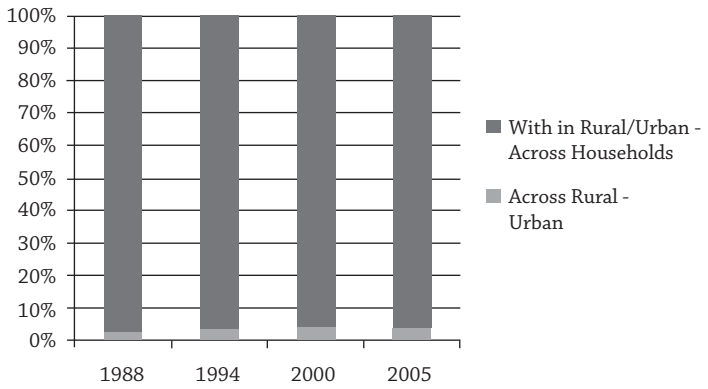

Figure 6.8. Inequality Decomposed—Rural/Urban

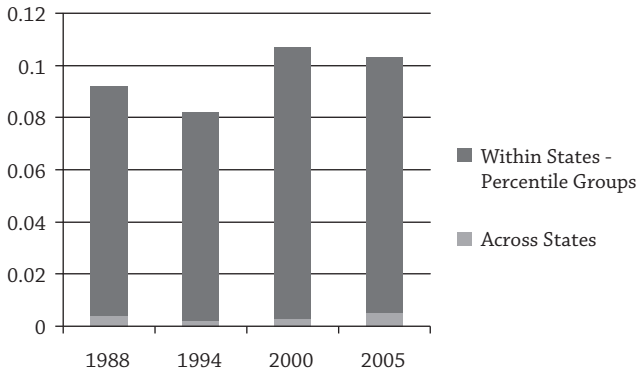

Figure 6.9. Inequality—across and within States

between Indian states, inequality within states is much larger, accounting for more than 90 percent of overall inequality in all years.

Figures 6.11 and 6.12 add one level of disaggregation to Figures 6.9 and 6.10, respectively. Inequality within states is further disaggregated into inequality across urban and rural areas within states and within these urban and rural areas within states. Once again, most of the inequality lies at a level below that of the urban and rural areas within states. An even more detailed decomposition is pre-

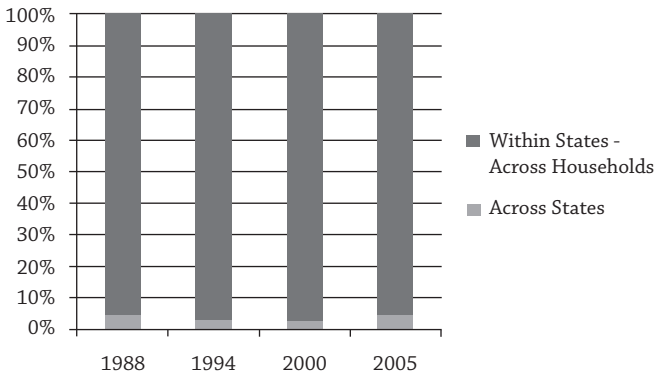

Figure 6.10. Inequality Decomposed—across and within States

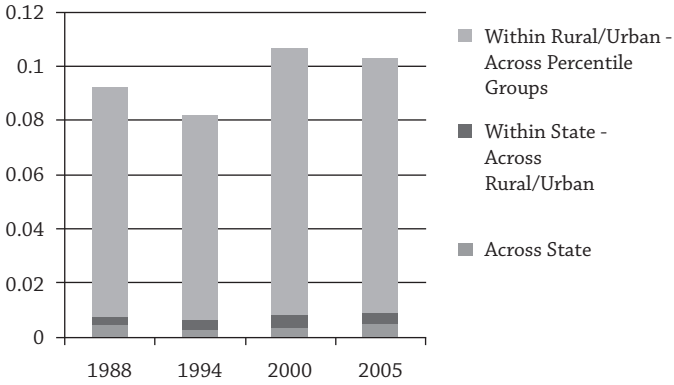

Figure 6.11. Inequality Decomposed

sented in Figure 6.13, where inequality within urban and rural areas (within states) is now decomposed into inequality across different FSUs and inequality across households within FSUs. As Figure 6.13 indicates, more than 60 percent of the overall inequality is accounted for by inequality across households within FSUs, with significant inequality also between FSUs within urban and rural areas within states. Consistent with earlier figures, most of the inequality is observed below urban and rural areas within states.

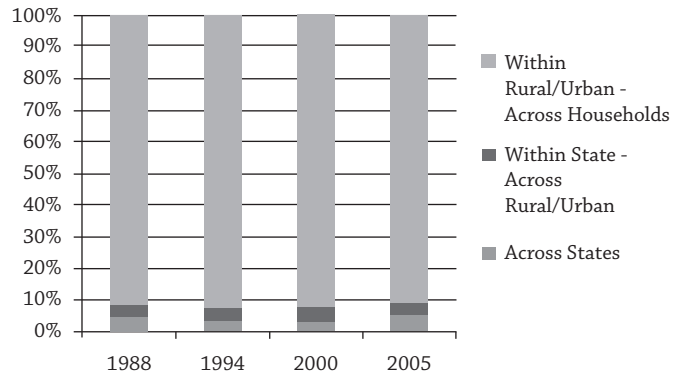

Figure 6.12. Inequality Decomposed

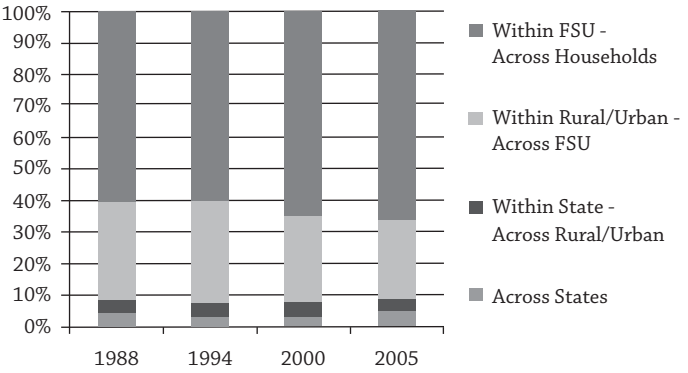

Figure 6.13. Inequality Decomposed

INEQUALITY WITHIN STATES

Table 6.1 presents within-state inequality measures calculated for each state—overall and separately for urban and rural areas. We note first that the inequality ranking of states is quite similar, although not identical, to the inequality rankings (measured using the variance of log expenditures) reported by Deaton and Dreze (2002). From Table 6.1, Kerala, Tamil Nadu, Maharashtra, and Andhra Pradesh appear in the top third of states with the highest rural inequality in 1994. This

is consistent with Deaton and Dreze (2002). Likewise, Assam, Jammu and Kashmir, West Bengal, and Orissa appear in the bottom third, with the lowest levels of rural inequality. For urban areas, again as in Deaton and Dreze (2002), Kerala, Tamil Nadu, Maharashtra, and Himachal Pradesh appear in the top third of the group, while Rajasthan, Jammu and Kashmir, and Assam appear within the bottom third.[10]

Turning to changes in overall inequality, we can see from Table 6.1 that inequality trends within states mirror the national experience. Thus, inequality seems to have risen between 1994 and 2000 in the vast majority of states, but also fallen between 2000 and 2005 in most states. Indeed, between 2000 and 2005, only four states—Mizoram, Maharashtra, Orissa, and Haryana—show significant increases in inequality. The picture is almost exactly the same for rural and urban areas within states, with the majority of states experiencing rising inequality between 1994 and 2000, but falling inequality between 2000 and 2005.

Distribution of Consumption Expenditures

To study in greater detail the evolution of the overall level of inequality reported above, we examine next the distribution of growth in household per capita consumption over the time period 1988–2005. Figures 6.14, 6.15, and 6.16 illustrate the growth in real per capita consumption by centile groups across the years 1988–94, 1994–2000, and 2000–2005, respectively (with the expenditure data from the year 2000 being "unadjusted," as discussed in note 9). Figure 6.14, spanning the initial reform period, clearly indicates a slightly higher per capita consumption growth rate for the lower centiles. This corresponds to the reduced inequality in 1994 relative to 1988 that we have discussed earlier. Figure 6.15 reveals the opposite trend, with a slightly higher per capita consumption growth rate for

upper centiles corresponding to increasing inequality over the 1994–2000 period. Finally, in Figure 6.16, representing the period 2000–2005, we see a higher growth rate for lower-centile households as well as for households in the upper half (above median) of the distribution. This corresponds to the slight fall in inequality from 2000–2005 (indicated in Figure 6.4).

Trade Openness and Inequality

We turn, finally, to the links between exposure to international trade and inequality. Our analysis is conducted at the level of the state. As discussed in the second section, we use measures of tariff and nontariff protection constructed by Hasan, Mitra, and Ural (2007). Specifically, the state-level measures for protection are constructed by using industry-level tariff rates and nontariff barrier (NTB) coverage rates for agricultural, mining, and manufacturing industries, weighted by state- and sector-specific employment shares.

To this end, we would like to compare how trade reforms during the 1988–94 period affected inequality in the subsequent 1994–2005 period. Figure 6.17 plots the changes in inequality within states over the time period 1994–2005 against changes in state-level tariff protection between 1988 and 1994. No pattern can be discerned between the magnitude of tariff reductions and the changes in inequality. Figure 6.18 plots the changes in inequality within states (for the time period 1994–2005) against changes in state-level nontariff protection between 1988 and 1994. Once again, there is no clear pattern that can be discerned in the data.

Nevertheless, to test formally for the presence of a statistically significant association between changes in inequality and trade policy changes, we examine regression estimates from the following econometric specifications:

Table 6.1 EVOLUTION OF THEIL INDEX INEQUALITY WITHIN STATES (1988–2005)

	States	Overall				Rural				Urban			
		1988	1994	2000	2005	1988	1994	2000	2005	1988	1994	2000	2005
1	Andhra Pradesh	0.094	0.087	0.114	0.107	0.087	0.076	0.081	0.097	0.102	0.092	0.127	0.115
2	Arunachal Pradesh	0.135	0.126	0.206	0.134	0.142	0.128	0.186	0.130	0.088	0.102	0.279	0.141
3	Assam	0.065	0.053	0.098	0.068	0.060	0.043	0.073	0.053	0.071	0.077	0.148	0.102
4	Bihar	0.076	0.071	0.087	0.077	0.069	0.059	0.071	0.059	0.092	0.085	0.115	0.106
5	Gujarat	0.084	0.082	0.100	0.101	0.069	0.059	0.094	0.082	0.091	0.091	0.098	0.105
6	Haryana	0.071	0.075	0.082	0.089	0.069	0.071	0.074	0.081	0.076	0.081	0.093	0.101
7	Himachal Pradesh	0.083	0.082	0.113	0.105	0.072	0.070	0.079	0.091	0.103	0.094	0.123	0.110
8	Jammu & Kashmir	0.062	0.061	0.074	0.066	0.059	0.048	0.068	0.060	0.066	0.077	0.080	0.072
9	Karnataka	0.122	0.093	0.118	0.104	0.104	0.071	0.096	0.069	0.121	0.100	0.125	0.118
10	Kerala	0.114	0.115	0.137	0.138	0.103	0.102	0.125	0.128	0.139	0.131	0.147	0.154

11	Madhya Pradesh	0.094	0.072	0.111	0.095	0.078	0.058	0.095	0.080	0.113	0.081	0.119	0.107
12	Maharashtra	0.110	0.102	0.102	0.113	0.081	0.081	0.080	0.088	0.115	0.098	0.104	0.119
13	Manipur	0.043	0.047	0.124	0.083	0.044	0.050	0.107	0.073	0.041	0.043	0.137	0.098
14	Meghalaya	0.076	0.063	0.087	0.059	0.047	0.052	0.065	0.045	0.102	0.060	0.086	0.069
15	Mizoram	0.052	0.063	0.103	0.132	0.043	0.056	0.090	0.123	0.050	0.058	0.105	0.128
16	Orissa	0.078	0.066	0.084	0.094	0.071	0.054	0.062	0.084	0.081	0.082	0.116	0.108
17	Punjab	0.080	0.082	0.101	0.096	0.073	0.070	0.095	0.084	0.092	0.096	0.107	0.110
18	Rajasthan	0.085	0.068	0.092	0.084	0.079	0.061	0.083	0.077	0.095	0.077	0.103	0.091
19	Sikkim	0.062	0.068	0.148	0.090	0.054	0.050	0.139	0.083	0.056	0.072	0.108	0.086
20	Tamil Nadu	0.123	0.102	0.139	0.125	0.119	0.085	0.112	0.098	0.119	0.109	0.143	0.130
21	Tripura	0.056	0.077	0.102	0.090	0.051	0.062	0.092	0.068	0.076	0.098	0.102	0.110
22	Uttar Pradesh	0.083	0.075	0.089	0.091	0.075	0.065	0.078	0.079	0.099	0.092	0.111	0.117
23	West Bengal	0.078	0.065	0.096	0.092	0.067	0.050	0.076	0.073	0.094	0.085	0.115	0.115

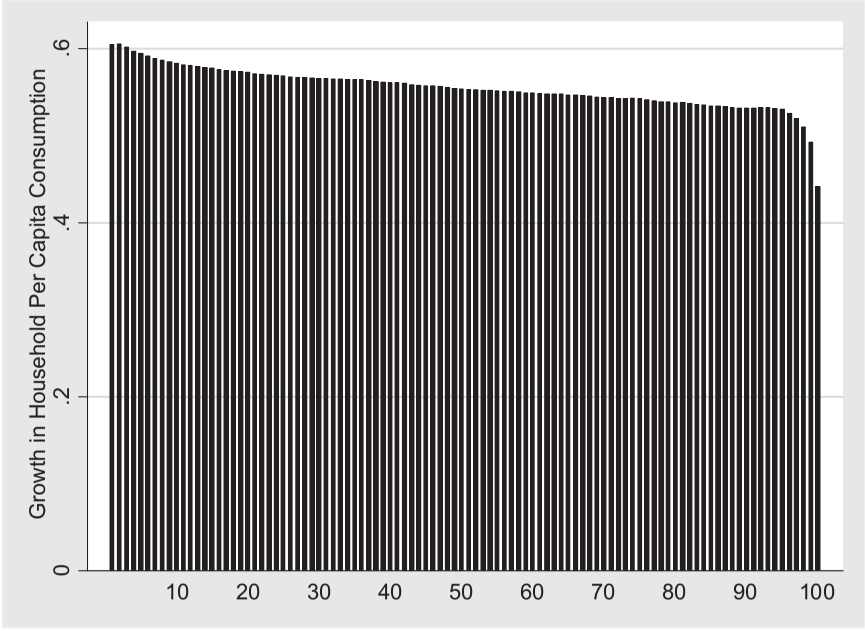

Figure 6.14. Per Capita Consumption Growth by Decile: 1988–1994

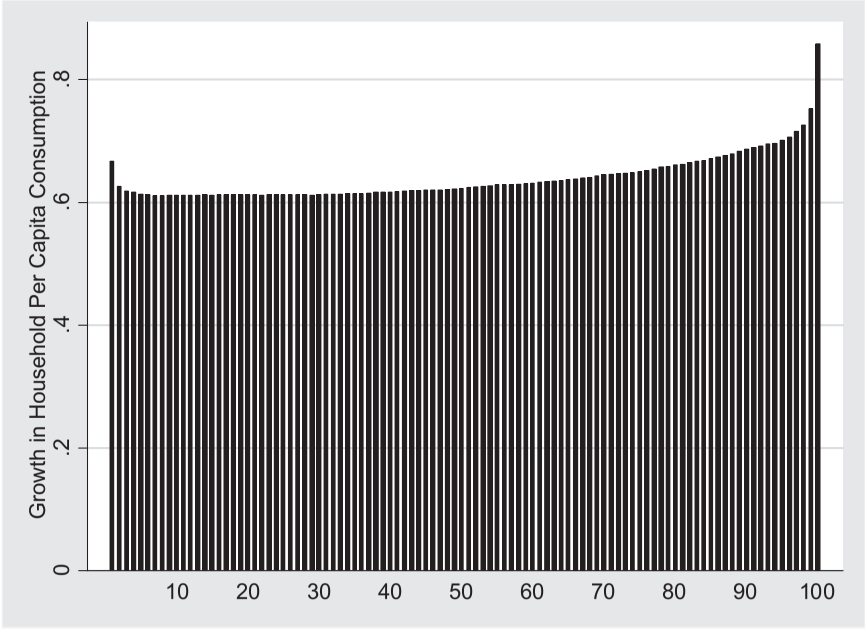

Figure 6.15. Per Capita Consumption Growth by Decile: 1994–2000

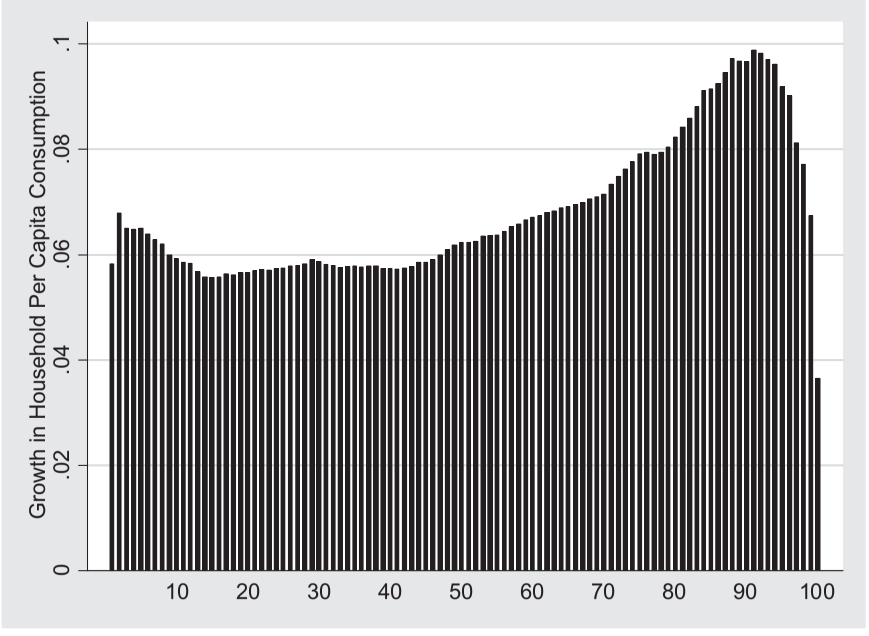

Figure 6.16. Per Capita Consumption Growth by Decile: 2000–2005

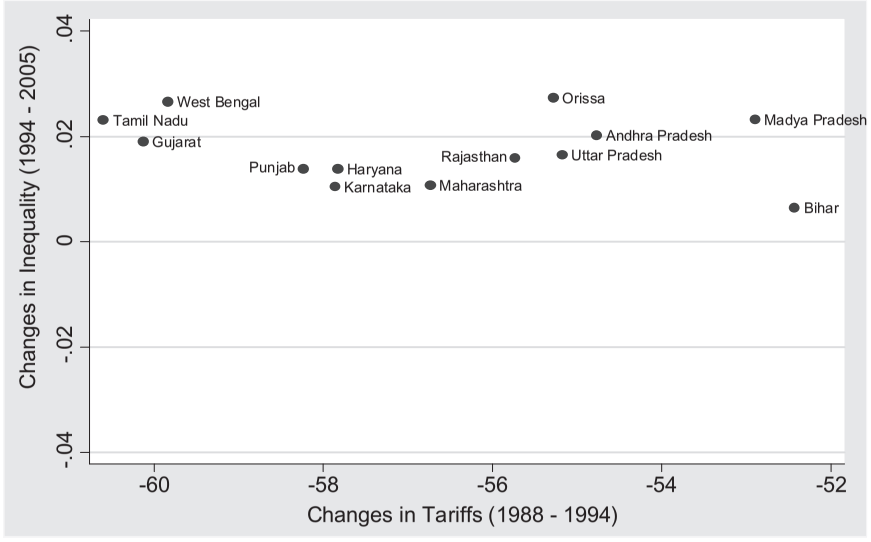

Figure 6.17. Changes in Inequality and Tariff Protection

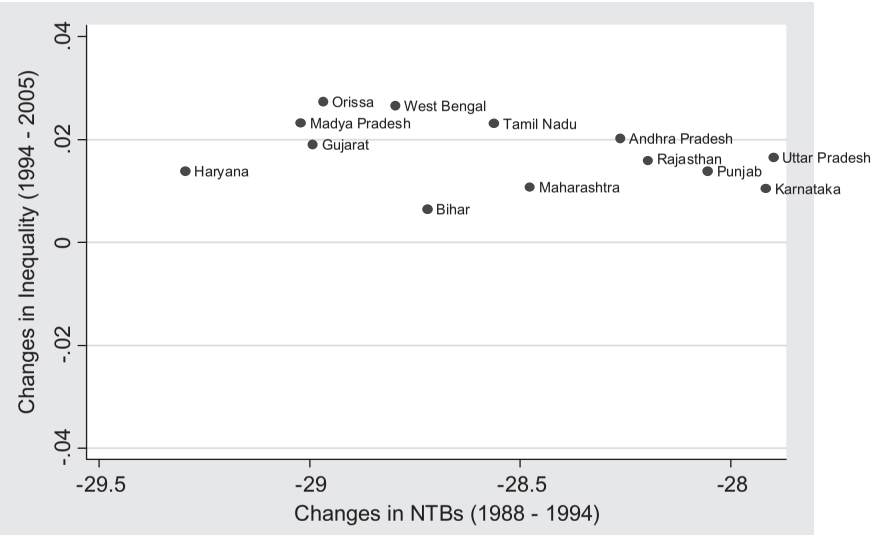

Figure 6.18. Changes in Inequality and Nontariff Protection

and

$$\Delta Inequality_{2005-1994} = \alpha + \beta(\Delta Tariff_{1994-1988}) + \varepsilon$$

Table 6.2 presents the results from ordinary least squares (OLS)

$$\Delta Inequality_{2005-1994} = \alpha + \beta(\Delta NTB_{1994-1988}) + \varepsilon$$

estimation of the specifications above. As suggested by the scatter plots in Figures 6.17 and 6.18, OLS estimates of the parameter β measuring the association between changes in inequality and trade policy changes are insignificantly different from zero.[11]

The finding of the lack of any significant association between trade openness and inequality is robust to many changes to the econometric specification we have considered above. Specifications involving levels rather than differences of the dependent and independent variables and the use of different lag structures all

Table 6.2 INEQUALITY AND TRADE PROTECTION

Inequality Change (2005–1994)	*Tariffs*	*NTBs*
Change in trade protection (1994–1988)	–0.00056	–0.00489
	(0.00076)	(0.00337)
Constant	–0.01453	–0.12222
	(0.04390)	(0.09522)
N	13	13
R^2	0.05	0.12

yield essentially the same outcome: a statistically insignificant association between trade openness and inequality. Furthermore, considering income inequality changes over different time periods rather than the 1994–2005 period and focusing separately on urban and rural inequality do not materially alter the results. Thus, the hypothesis of an association between trade and inequality does not find support in our analysis of the data.

CONCLUSIONS

The consequences of the economic reforms in India for inequality have been vigorously debated. To study the evolution of inequality subsequent to the economic reforms, we have used the Theil inequality index and other inequality measures using household expenditure data from the Indian National Sample Survey. As we have discussed in this chapter, the Theil index is additively decomposable: it can be expressed as the sum of across-group inequality and within-group inequality, thereby enabling a consistent examination of inequality at different levels of aggregation.

Our main findings are that overall inequality varied modestly over the period of our study, falling between 1988 and 1994, rising between 1994 and 2000, but falling again by 2005. Hence, the evolution of inequality since 1994 has been nonmonotonic. Furthermore, a similar nonmonotonic inequality trend has been seen within most states. While rural-urban inequality and across state inequality have risen slightly from 1994 to 2005, they constitute an extremely small portion of overall inequality. More than 60 percent of overall inequality is found at the micro level within urban blocks and rural villages. The change in inequality across households within states is found to uncorrelated with the change in state-level measures of tariff and nontariff protection. Considered alongside

the evidence concerning the reduction in poverty in this time period, our findings should allay concerns regarding the adverse impact on equity of the economic reforms undertaken in India.

NOTES

* Prepared for the Columbia-NCAER Conference on Trade, Poverty, Inequality and Democracy, held in New Delhi, March 31–April 1, 2011. Work on this chapter was supported by Columbia University's Program on Indian Economic Policies, funded by a generous grant from the John Templeton Foundation. For many helpful comments and suggestions, we are grateful to our discussants, Jagdish Bhagwati, Rana Hasan, and Amartya Lahiri. The opinions expressed in the chapter are those of the author(s) and do not necessarily reflect the views of the John Templeton Foundation.

1. For detailed discussion of the post-Independence history of the Indian economy and the context in which these reforms were eventually undertaken, see Bhagwati 1993 and Panagariya 2008.
2. Income inequality here refers simply to differences in incomes. As Kuznets (1953) stated, this is "without regard to their desirability as a system of reward or undesirability as a scheme running counter to some type of equality." It is important to note, as Atkinson (1983, pp. 1–10) does, that "in order to assess the implications of differences in income, we need to first establish that the people involved are comparable in other relevant respects" and that "once we have established that people have comparable circumstances, the inferences depend upon the underlying principles of social justice." Different ideas about social justice can lead to quite different views regarding inequality. Separately, the question of whether trade liberalization (or economic globalization more generally) has benign or malign effects on the distribution of income has been widely debated. See Bhagwati 2005 for a comprehensive discussion.
3. It is, of course, possible that openness to a global economy alters the patterns of income mobility in society as well, a question that we do not study in this chapter. See, however, recent work on this interesting topic by Hnatkovska, Lahiri, and Paul (2010), Jalan and Murgai (2009), and Munshi and Rosenzweig (2009).
4. For comparative discussions of the evolution of inequality subsequent to the reforms and prior to the 1999–2000 period survey of household incomes by the Indian National Sample Survey, see Pal and Ghosh 2007 and Panagariya 2008 (chap. 8).
5. See Conceição and Ferreira (2000) for a detailed exposition of the theoretical and practical merits of the Theil index over other indices measuring income inequality.

6. More specifically, as Deaton (2003) notes, the issue is as follows: the 55th round differed both from earlier rounds and from either of the schedules in the experimental rounds. For the high-frequency items, households were asked to report their expenditures for both recall periods. The questionnaires were printed with the list of goods down the leftmost column, with the next four columns requesting quantities and expenditures over the last seven days and over the last thirty days, respectively. Such multiple reporting periods are often used in household expenditure surveys, and may well produce excellent estimates in their own right. But the results are unlikely to be comparable with those from a questionnaire in which only the thirty-day questions are used. For example, when they are asked both questions, respondents are effectively being prompted to reconcile the rates of consumption across the two periods. Indeed, there is some evidence that is consistent with this sort of reconciliation.
7. Our discussion in this section of Theil index methodology is based on the more detailed description of the Theil index and its use provided by Conceição and Ferreira (2000).
8. Changing the number of subgroups has no material effect on the results. We want to maximize the number of subgroups to get a more accurate estimate of household inequality while at the same time maintaining the same number of subgroups over time to make comparisons.
9. Having noted the similarity in inequality trends with and without the Deaton (2003) adjustment to the data for the year 2000, we used unadjusted data for the remainder of the analysis.
10. We should note that the study by Deaton and Dreze (2002) reported inequality estimates for fifteen states, in contrast to the twenty-three reported on in Table 6.1. Our comparison of inequality rankings with those reported in Deaton and Dreze 2002 is therefore just an indicative one. We should also note that a major exception is Punjab, which indicates reasonably high levels of urban inequality in our study while appearing at the bottom of the list in Deaton and Dreze 2002.
11. Kerala and Assam, outlier states due to the magnitude of the change in their trade barriers, have been dropped from these figures and the regression results. However, our results are robust to adding Kerala and Assam to the regression; β is still statistically insignificant from zero.

REFERENCES

Atkinson, A. B. (1983). *The Economics of Inequality*. 2nd ed. New York: Oxford University Press.

Bhagwati, J. (1993). *India in Transition: Freeing the Economy*. New York: Oxford University Press.

——— (2005). *In Defense of Globalization*. New York: Oxford University Press.

Bhalla, S. (2003). "Recounting the Poor: Poverty in India, 1983–1999." *Economic and Political Weekly* 38(4), January 25, 338–49.

Conceição, P., and P. Ferreira (2000). "The Young Person's Guide to the Theil Index: Suggesting Intuitive Interpretations and Exploring Analytical Applications." University of Texas Inequality Project (UTIP), Working Paper no. 14.

Deaton, A. (2003). "Adjusted Poverty Estimates for India for 1999–2000." *Economic and Political Weekly* 38(4), January 25, 322–26.

Deaton, A., and J. Dreze (2002). "Poverty and Inequality in India: A Re-Examination, Center for Economic Development." Working Paper no. 107, Princeton University, Princeton, NJ.

Deaton, A., and S. Zaidi (2002). "Guidelines for Constructing Consumption Aggregates for Welfare Analysis." Living Standards Measurement Study, Working Paper no. 135, World Bank, Washington, DC.

Hasan, R., D. Mitra, and B. Ural (2007). "Trade Liberalization, Market Institutions and Poverty Reduction, India Policy Forum." *Brookings Institution* 3, 71–110.

Hnatkovska, V., A. Lahiri, and S. Paul (2010). "Castes and Labor Mobility." Working Paper, University of British Columbia, Vancouver.

Jalan, J., and R. Murgai (2009). "Intergenerational Mobility in Education in India." Working Paper, Indian Statistical Institute, Delhi.

Kuznets, S. (1953). *Share of Upper Income Groups in Income and Savings*. New York: National Bureau of Economic Research.

Munshi, K., and M. Rosenzweig (2009). "Why Is Mobility in India So Low? Social Insurance, Inequality, and Growth." Working Paper, Department of Economics, Brown University, Providence, RI.

Pal, P., and J. Ghosh (2007). "Inequality in India: A Survey of Recent Trends." United Nations, Department of Economic and Social Affairs, Working Paper no. 45, New York, NY.

Panagariya, A. (2008). *India: The Emerging Giant*. New York: Oxford University Press.

Singh, N., L. Bhandari, A. Chen, and A. Khare (2003). "Regional Inequality in India: A Fresh Look." *Economic and Political Weekly* 38(11), March 15, 1069–73.