THE PROBLEM OF DISTRIBUTION IN INDIA'S DEVELOPMENT

An Empirical Analysis

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C E R T I F I C A T E

THIS DOCTORAL THESIS by M.H. Suryanarayana, entitled, "The Problem of Distribution in India's Development : An Empirical Analysis", is his own research work carried out in the Economic Analysis Unit, Indian Statistical Institute, Bangalore Centre, under my guidance. He satisfies all necessary eligibility requirements for submitting his work for the Ph. D. of the Indian Statistical Institute.

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D E C L A R A T I O N

THE RESEARCH WORK embodied in my present doctoral thesis entitled, "The Problem of Distribution in India's Development:: An Empirical Analysis", has not been submitted elsewhere for a degree or for any other academic award.

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PREFACE AND ACKNOWLEDGEMENTS

This work grew out of a series of studies conducted at the Economic Analysis Unit of the Indian Statistical Institute, Bangalore, during the last four years. It incorporates some of the studies on poverty and income distribution undertaken as part of the Unit's Research Projects.

The main focus of the thesis is on the growth trends and patterns of income distribution in India. Its emphasis is not so much on the methodological problems as on the substantive issues. It seeks to answer questions like: whether the first phase of Kuznets' inverted-U hypothesis about the growth-inequality relationship is operative in India? Is there any systematic relationship between consumption level and its degree of inequality? Is it true that planned economic development is necessarily accompanied by reductions in regional disparities? How realistic are the plan targets regarding poverty-alleviation? And what are their implications for redistributions and plan projections?

These questions are analysed within a dualistic framework for the economy as a whole. Further, they are analyzed at three different levels, viz., rural, non-city urban and metropolitan cities. On the methodological side, the study shows how inappropriate data presentation itself could give rise to illusory findings about relative inequality levels and trends. It examines alternative solutions for this problem and judges their relative merits from economic and statistical points of view. On the substantive side, our findings show that the precise

impact of the distributional changes on poverty will vary from one country to another depending upon the severity of poverty.

The author has drawn upon the works of several earlier authors and scholars on the subject of poverty and income distribution and owes an intellectual debt to all of them. He is particularly grateful to his thesis supervisor, Professor N.S. Iyengar for his inspiring guidance and encouragement throughout. He was generous enough to permit to use some estimates from their joint study on 'Growth and Equity in India'.

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Chapter 0

THE PROBLEM OF DISTRIBUTION IN INDIA'S DEVELOPMENT: A SUMMARY

In welfare economic analysis, the economic performance of a country is often judged in terms of its aggregate economic welfare. Aggregate economic welfare is a function of the individual welfare levels of its citizens which, in turn, is dependent upon their income levels. This would imply that GNP or per capita income of a country is not a comprehensive measure of its aggregate welfare. For, it does not tell us how the total product is distributed among the citizens of that country which is a major determinant of their individual welfare levels. Aggregate welfare is positively related to per capita income and inversely related to inequality in income distribution. Therefore, GNP or per capita income needs to be supplemented by some measure of inequality in distribution like relative inequality and poverty measure. And, aggregate welfare will increase, whenever, other things remaining the same, GNP increases, relative inequality decreases and poverty decreases. These notions underlie the emphasis on growth, reduction of inequality and poverty. They also explain the present day concern about poverty, inequality and growth in different countries.

In India too, with the beginning of planning, consoious efforts have been made to achieve growth with reductions in poverty and income inequality. What are the results of their efforts? How far we have succeeded in achieving these goals? What are the factors that govern the inter-relationship between poverty, inequality and growth? Are the strategies with respect to these three variables

appropriate ? These issues form the main concern of the present thesis. Basically our study is in the nature of a critical review of the structural changes in the Indian economy using standard analytical and statistical tools and largely based on secondary data. It attempts to answer the following questions:

(i) What is the kind of economic growth experienced in India since the fifties?

(ii) What are the income distributional implications of rural urban sectoral differences in economic structure?

(iii) How do the major Indian cities - Bombay, Calcutta, Delhi and Madras pooled together - differ from the rest of the urban sector - called the 'non-city urban sector' - in terms of income levels and distributions?

(iv) Are there any structural changes in these sectors? Given the growth behaviour and structural changes in India, what are the likely changes in income distributions?

(v) What do the data on consumption distributions - the direct measures of levels of living and welfare - show?

(vi) How far is the government successful in redressing inter-regional disparities in consumption?

(vii) Is there any relation between average consumption level and inequality in its distribution?

(viii) How do changes in income consumption and in its distribution behave? What is their impact upon poverty? What are the observed patterns in India?

(ix) How does poverty fluctuate in response to distributional changes?

(x) Are the Sixth Plan target for poverty alleviation, given the strategy and institutional constraints, realistic?

(xi) What are the distortions that plague plan projections?

Answers to these questions form the main subject-matter of this thesis. It is organized along the following lines:

Chapter 1 is devoted to a review of literature of empirical studies on income distribution. It begins with a review of cross-country studies on income distribution. The main focus is on Kuznets' inverted - U hypothesis and on the attempts at its verification and explanation. The remaining part of the Chapter is devoted to a review of studies on income and consumption distributions and poverty in India. The concluding part of the chapter identifies some gaps in the existing studies on India.

Chapter 2 addresses itself to the first three questions mentioned above. It examines economic structural differences across regions and their implications for income distribution. We study the whole problem within a dualistic framework. The economy is divided into rural and urban regions. This is what has generally been done. But we further disaggregate the urban economy into cities (i.e., major metropolitan cities like Bombay, Calcutta, Delhi and Madras pooled together) and its complement called the 'non-city urban' economy. Thus, we examine income levels and

distributions at three levels, viz., the rural, the non-city urban and cities. We find that in the present stage of development of India, income inequality is likely to be positively correlated with the relative size of the formal sector in these three regions. Accordingly, it is felt that income inequality will be higher in cities followed by 'non-city urban' and rural areas. Next, we examine the likely trends in income and in income inequality in these three regions and also in the urban economy as a whole in India. Our analysis of some important variables shows that the extent of change or growth in per capita real income being very small, Kuznets' inverted - U hypothesis cannot be tested for India. Instead, we find that India is likely to be passing through the first phase of Kuznets' hypothesis. Since most of these findings are based on indirect evidences pooled together from various sources, it is felt that there is the need to study some direct evidences like changes in consumption levels and distributions in India.

Accordingly, we carry out further analysis in terms of the consumption data provided by the National Sample Survey Organization (NSSO). The nature, methodology of the NSS data and its implications are studied in Chapter 3. Since there is no way of judging the reliability of the NSS data, we begin, like most other studies, by a comparative study of NSS and Central Statistical Organizations' (CSO) estimates of aggregate consumption. Next, we examine whether such comparisons are valid. We also examine the possible sources of inadequacies in the NSS estimates which

render them incomparable across sectors and over time. Further, we study the NSS method of data valuation and its welfare implications. This is done by studying the different possible ways of data valuation and their impact on the Lorenz ratio measure of inequality. It is found that the Lorenz ratio estimated on the basis of value of consumption distribution will differ from the actual one depending upon the method of valuation and the behaviour of degree of monetization across expenditure groups.

Chapter 4 describes the methodology of the study. The NSS provides data on the size distribution of population and consumption across expenditure groups. Using such data, how to obtain estimates of distribution of per capita consumption expenditure (PCE) across fractile groups of population? What are its usefulness? These issues are discussed in the beginning part. We,next, discuss problems of deflation. It may be noted that particularly when we are studying changes in some economic variables over time, adjustments will have to be made for inflation, if there is any. This problem becomes slightly complicated when the severity of inflation varies across fractile groups. The solutions for this problem and the method of constructing fractile group - specific deflators are discussed in this Chapter. Next, we discuss Lorenz ratio, its properties, methods of estimation and its decomposition by sectors. We also discuss other measures like the standard deviation of logarithms of PCE and Kuznets' index. Further, we discuss estimation of standard errors of estimates when the study is based on data like the NSS which are not strictly

simple random. Finally, we briefly mention the framework of poverty used in the present study.

Chapter 5 is devoted to all-India consumption inequality and to answering question no (iv) mentioned above using NSS data from 17 to 32nd rounds. We begin with a study of relative consumption levels in different regions at the all-India level. Next, we examine relative inequality levels and trends. It is found that, contrary to our expectation, the extent of inequality is not the highest in the cities followed by'non-city urban' and rural areas in all the rounds. Also we find the degree of inequality in the cities to fall sharply during 17 to 25 rounds. On detailed examination, it is found that such a picture has emerged because of the particular method (trapezoidal) of estimating Lorenz ratio and also because of the sub-optimal system of class intervals adopted by the NSSO in presenting its data. It may be noted that distributions differ across regions and over time in terms of both mean and dispersion. So the system of class intervals followed while presenting data on distribution for different regions or time points should vary. But the NSSO has followed the same system of class intervals for all regions for most of the rounds. Further it has given group means of consumption for each class interval which means, while applying the trapezoidal method of estimation or while estimating any other inequality measure, one has to assume equality of

distribution within each class interval and hence, loss of information about dispersion. Over time, when distributions keep shifting, the NSS method would imply loss of information for an increasingly larger proportion of population and hence, an illusive picture of decline in inequality. As a solution to this problem, we consider three alternative methods of estimating Lorenz ratio, viz., (i) Ramakrishnan's (1982) approach (ii) the two-parameter lognormal approach and (iii) Kakwani-Podder (1973) approach. On the basis of a priori information and statistical considerations we consider Ramakrishnan's approach to be better.

Chapter 6 deals with analysis of consumption levels and distributions across 14 states of the Indian union. The analysis is done at three levels. To begin with, we study consumption levels and distributions by state sectors at current prices. Next, we study changes in average PCE and its distribution at constant prices for each state sector separately. In this section, we also study the changes in average PCE and in inequality and their impact upon rural poverty in each state. Finally, we study inter-state disparities in average PCE at all India prices. One important limitation of the studies on inter-state disparities in average PCE levels is that they cannot take into account inter-regional variation in prices for lack of information about the latter for all years. We try to overcome this problem for the rural sector in a slightly different way. We deflate rural average PCEs of each state for different rounds by the state-specific Agricultural Labourer's Consumer Price Index and

express them at their respective state prices prevailing in 1973/74. Next, using indices of inter-regional price variations (Bhattacharya et al, 1980) with rural India as base for the year 1973/74, we express all these state rural average PCEs at the all India rural prices. Next, we construct state specific urban poverty lines corresponding to the all India urban poverty line of Rs56.65 at 1973/74 prices.

In Chapter 7 we discuss the solutions sought to be developed in the Indian plans for poverty and their implications. Since a final version of the Seventh Plan is not available with all its details, we are constrained to limit our study upto the Sixth Plan particularly for those which Technical Notes are available. We begin with a theoretical analysis at the macro level of the solutions considered for poverty alleviation. It is generally believed that a reduction in inequality always reduces poverty. But, we show, using a two-parameter lognormal model, that the precise impact of inequality reduction on poverty depends upon the magnitude of poverty itself. When poverty is more than half of the population, an increase in inequality can even reduce poverty. Next we deal with the redistributional implications of the Sixth Plan targets for poverty reduction and examine whether the set-goals can be realized given the data on past trends in inequality. Next we study plan assumptions and their implications for redistribution and demand projections taking the Fifth Plan as a case study since all the relevant data are available for this plan period.

In the concluding Chapter of the thesis, we group our main findings into economic, statistical and those having policy relevance. We also briefly mention some of the important limitations of the study.

Chapter 1.

REVIEW OF LITERATURE

1.1 Introduction

Empirical studies on income distribution can broadly be divided into the following two groups:

(i) Those based either on distributions for different points in time for an individual country or on cross-country distributions at the same point of time; and

(ii) Those based on data for India, which in turn, can be divided into:

(a) studies based on either direct (based on survey) or indirect estimates of income distribution,

(b) studies based on consu ption distribution data, and

(c) those examining the incidence of poverty in India.

These groups of studies are examined in the same sequence in the following Sections.

1.2 Growth and Income Inequality: International Experience.

Studies on income distributions in different countries have generally been concerned with the following kinds of questions.

(i) How income inequality varies across countries at different stages of development?

(ii) Is there any systematic relationship between inequality and development?

(iii) What are the other economic variables that cause changes in income distribution at different levels of development?

These questions are quite important in so far as they help throw light on the policy instruments that are effective in reducing poverty and inequalities during economic development. To answer these questions quantitatively, one needs to know

(i) the extent of income inequality in each country;

(ii) the economic characteristics like level and rate of growth of national output, its sectoral distribution and allocation of workforce; and

(iii) the relation between (i) and (ii).

Most of the studies in this respect have used cross-section data to infer about the dynamics of development in each country. Kuznets (1955), in his pioneering study on growth and income inequality, measured income inequality by the income shares of various quintiles and carried out an inter-country analysis which included countries like India, Ceylon, Puerto Rico, the United Kingdom and the United States. He put forward his famous inverted-U hypothesis about growth-inequality relationship. The hypothesis states that income inequality which tends to be low at relatively low levels of income, rises in the initial stages of growth and thereafter stabilizes for a while before beginning to narrow at relatively high levels of per capita income.

Kuznets explained this observed inverted-'U' pattern in the growth-inequality relation in terms of changes in economic structures reflected in, among other things, a shift in the sectoral distribution of output and workforce, intra-sectoral inequalities, inter-sectoral disparities and rural-urban migration of workforce. Given the highly skewed savings and asset distributions, these factors accounted for widening income inequality in the early stages of development. But factors "like the dynamism of a growing and free economic society", differential demographic growth rates across income groups which counteracted such tendencies towards increasing inequality could reverse this process, in the later stages of development.

Like Kuznets, Kravis (1960) also found less income inequality in the developed countries than in the less developed countries. Oshima (1962) too found an inverted 'U' pattern while examining income inequality at four different stages of development. The findings of a subsequent study by Kuznets (1963) involving eighteen countries confirmed his earlier hypothesis about greater income inequality in less developed countries. This finding only reinforced the earlier impression that economic development is a major determinant of income inequality.

The Adelman and Morris(1971) study, based on national income statistics for forty-four developing countries, found an inverted 'U' shaped scatter rather than a neat curve as such.

In another study, they reached the conclusion that "development is accompanied by an absolute as well as a relative decline in the average income of the poor" (Adelman and Morris, 1975, P 189). Following Adelman and Morris, Paukert's (1973) study analysed data for fifty-six countries and reconfirmed the inverted 'U' hypothesis. He found the income inequality to rise upto a point where the per capita income varied between $301 to $ 500. Further cross-sectional evidences of the inverted 'U' hypothesis were reported by Chenery and Syrquin (1975), Ahluwalia (1974a, 1976a, 1976b) and Lydall (1977).

Only a few attempts have been made to document historical trends of inequality in individual countries mainly because of lack of reliable and comparable data. Fishlow (1970) for Brazil and Weisskoff (1970) for Mexico, Puerto Rico and Argentina used time series data on income distribution. They found increasing economic concentration in Brazil, Argentina and Puerto Rico; but in Mexico the middle income groups between the bottom fifty per cent and the top five percent were found to have increased their shares between 1950 and 1963.

Ahluwalia's time series study (1976a) based on thirteen developing countries, found no systematic deterioration in the distributions over time. According to him, there is no systematic association between growth rates and trends in the distribution.

In yet another paper (1974b), he argued that economic growth need not necessarily be accompanied by increasing inequality.

Among the studies on correlates of inequality, Adelman and Morris (1973) found the following six variables to be the most important determinants of distribution of income.

(i) Rate of improvement in Human Resources as measured by school enrollment rate.

(ii) Direct Government Economic Activity.

(iii) Socio-economic Dualism.

(iv) Potential for Economic Development.

(v) Percapita GNP. and

(vi) Strength of Labour Movement.

Ahluwalia (1974a, 1976a and 1976b) found the rate of expansion of education, the rate of decline of population growth, and the changing economic structure to be the most important explanatory variables of accompanying the changes in the inequality.

In recent years, significant attempts have been made to explain and study policy questions using macroeconomic models. Frank and Webb (1977) used a dualistic framework to explain increasing inequality and to examine the potential of certain policy instruments in achieving distributive goals. The policy options available to the economy in different fields and their potential influence

on income distribution have also been studied by many researchers (Frank and Webb (eds.)(1977)). Interest has also developed in understanding the growth effects of hypothetical income redistribution by simulation exercises (Balletime and Soligo 1974; Cline 1972; Chinn 1973; Morley and Smith 1973; Soligo 1973; Sunmann 1973; Weisskoff, 1973) and the distributive effects of certain policy instruments (Ahluwalia and Chenery, 1974; Adelman and Robinson, 1973; Morley and Williamson, 1973).

The following are the most important findings of the inter-country studies cited above:

(i) There is relationship between growth and inequality and the general pattern of this relationship is approximately inverted 'U' shaped.

(ii) Income inequality is higher in the less developed countries than in the developed ones.

(iii) The pattern of income distribution is also determined, among other variables, by the specific economic structures of a given country. and

(iv) The dualistic growth process is largely responsible for increasing inequality in the initial stages of development.

1.3 Income Inequality - The Indian Case

Turning to the Indian case, we find that the extent of growth in per capita real income eversince the beginning of development planning in 1951, has been too small to test the Kuznetsian

hypothesis in its entirety. Studies in India, therefore, have been concerned mainly with ascertaining the impact of planned development on the distribution of income and consumption as well as on the incidence of poverty.

Most of the early studies were essentially attempts to examine the extent of and trends in income inequality in India. But they were hampered by the absence of direct estimates of comparable income distributions for different regions and years. Therefore, these studies had to rely on indirect estimates of income distribution obtained by pooling together National Sample Survey (NSS) consumption data with Income Tax Statistics (Mukherji and Ghosh, 1951; Lydall, 1960; Ahmed, 1965; Ahmed and Bhattacharya, 1972) or by pooling NSS consumption data with the Reserve Bank of India (RBI) savings data (Iyengar and Mukherjee, 1961; Ojha and Bhatt, 1974; Ranadive, 1971) or using NSS consumption data with Central Statistical Organizations' (CSO) estimates of consumption and income (Iyengar and Jain, 1974).

Mukherjee and Ghosh (1951) made possibly the first attempt to construct income distribution for the year 1949-1950 by pooling Income Tax Statistics provided by the Central Board of Revenue and the NSS data on household expenditure. Lydall (1960) estimated income distribution for India for 1955-1956 by combining NSS consumption data and Income Tax Statistics under assumptions of lognormal distribution for the former and Pareto for the latter. He found income

inequality in India to be less than that in the UK. Adopting Lydall's methodology, Ahmed and Bhattacharya (1972) estimated distributions of population by per capita pre-tax income at current prices for the years 1956-57, 1960-61 and 1963-64, which showed a clear decline in disparities.

Iyengar and Mukherjee (1961) combined NSS consumption data with RBI savings data under the assumption that savings-consumption ratio of households increases in simple arithmetic progression across expenditure classes. Their estimates for 1951-52, 1953-54 and 1956-57 showed an increase in the income shares of the top ten percent, and the bottom fifty percent of the household population.

Following broadly the same methodology as in their earlier studies in 1962 and 1963, Ojha and Bhatt (1974) used the consumption estimate derived from the CSO national income data by deducting household savings and taxes of unincorporated business and distributed it across sectors and different expenditure classes within each sector using NSS proportions. The consumption distribution so derived is combined with RBI household savings data under the assumption that only the top expenditure bracket does the total net savings and the rest, zero net saving. In this way income distributions were derived for two periods viz. 1953-54, 1954-55, and 1963-64, 1964-65, which showed a decline in inequality in the rural sector and an increase in the urban. But the study suffers from the limitation that it ignores

possible dissavings by the lower expenditure groups and hence, is likely to understate the degree of inequality. Using the same methodology and data base but more realistic assumptions regarding savings behaviours in the light of savings data collected by the National Council of Applied Economic Research (NCAER), Ranadive (1971) also estimated income distributions for the years 1953-54, 1956-57 and 1961-62.

Examining the trends in income distribution between 1953-54 and 1959-60, Ranadive (1968) found:

(i) Income structure in India to be comparable to that in other underdeveloped countries.

(ii) Kuznets hypothesis that income inequality is likely to be greater in the underdeveloped than in the developed countries is "not invalid" in the Indian context; and

(iii) Ten years of planning in India has had little effect in reducing income inequality.

Iyengar and Jain (1974) constructed income distributions directly from the NSS consumption expenditure distribution data by assuming an exact linear relationship between aggregate household consumption and income estimated from the CSO data and a three-parameter log-normal distribution of consumption. The distributions estimated for 1961-62 and 1964-65 showed a decline in Lorenz ratio from 0.40 to 0.33.

Iyengar and Suryanarayana (1984a) estimated Lorenz ratios of income distributions at current prices using Lorenz ratios of NSS consumption distributions and assuming a simple linear consumption function based on the CSO data. Their study for the period 1961-62 to 1973-74 did not find any systematic trend in income inequality in India.

Perhaps, the only direct estimates of income distribution are that of the NCAER which conducted surveys of household income and savings in the urban and rural areas in 1960 and 1962 respectively, followed by the All India Consumer Expenditure Survey in 1964-65. All these surveys (NCEAR, 1962; 1964-65; 1967) showed more income inequality in the urban than in the rural areas. Similar surveys were conducted by the NCAER in 1967-68 and 1975-76. However, nothing much could be said about income distributions and their trends from the NCAER data because of the following reasons:

(i) NCAER sample sizes are inadequate (Bardhan, 1974. P. 106).

(ii) The concepts used differ from survey to survey.

(iii) The data are subject to serious response error since people tend to under-report income.

(iv) The population coverage is rendered inadequate by the exclusion of non-household population and people in inaccessible regions; and

(v) The concept of income used does not include imputed rental income.

In short, it may be said that most of these studies have only methodological value. The income distribution estimates, being made only for a few selected years using different methodologies and data sources are not helpful in indicating any trend in them. Also, none of the studies adjusted the data for the differential changes in prices faced by different income groups; hence, their inability to comment on changes in real variables. Possibly, these are the reasons why no serious attempt has been made to examine the growth inequality relation in the Indian context.

1.4. Consumption Inequality in India

Ever since the NSSO started publishing regularly the results of its consumer expenditure surveys, increasing attention has been paid to studying the trends in consumption expenditure distribution. Besides the fact that the NSS consumption figures are direct estimates, collected in a scientific way, other factors which made it preferable are:

(i) That consumption is a "more direct measure of level of living of people" than income (Dandekar and Rath, 1971. P. 25).

(ii) That "consumption is a better proxy for permanent income distribution" than current income which is subject to more transient factors (Bardhan, 1974. p.113); and

(iii) Further, for income reference period has to be one year at least and it is nearly impossible to use one year reference period for collecting income data. Recall errors would be very large even if people were to cooperate.

Some of early studies used consumption as an indicator of level of living and examined inter-regional and inter-temporal changes in it. Mahalanobis (1960, 1962) developed the Fractile Graphical Analysis (FGA) technique, which is useful in such studies. The technique consists in ranking the population in an ascending order of per capita consumption and then dividing into different equi-frequency groups called fractile groups, like the poorest 10 percent, the next 10 per cent, and so on. Next, the mean total consumption or mean consumption of a specific item corresponding to each fractile group is estimated and plotted on a graph to produce the Fractile Graph. Since mean consumption is used only as a ranking variable, argued Mahalanobis, corresponding fractile groups of different populations are comparable over time or across regions without any price adjustment for consumption.

The Government of India Committee on Distribution of Income and Levels of Living (Planning Commission, 1969) studied changes in levels of living during the first decade of planning. But in the absence of suitable price indices, it could not make any firm inferences regarding changes in real living standards. It examined changes in physical consumption of cereals and found the disparities between the rich and the poor to have increased when the concentration ratios for value of consumption decreased. This showed that the differential price movements were a serious problem. Dutta Roy Chowdhury (1966), using official estimates of consumption at constant prices, found living standards to have risen slowly during 1953-54 to 1960-61.

Most of the later studies based on the NSS data have measured the extent of and trends in inequality of consumption. The commonly used measure of inequality is the Lorenz ratio. Among the early studies of the time series of Lorenz ratios, noteworthy are Bhattacharya and Iyengar (1961), Murti and Pillai (1960), and Roy and Dhar (1960). Most of the studies (See, for example, Chatterjee and Bhattacharya, 1974; Vaidyanatha 1974; and Radhakrishna and Sarma, 1976) have noticed a decline in the degree of inequality in the distribution of nominal consumption in rural India; the study by Ahluwalia (1978), the latest in the series, covering 14 years of the period 1956-57 to 1973-74 found a statistically significant trend decline in rural nominal consumption inequality. The only major study on urban consumption distribution by Radhakrishna and Sarma (1976) has shown a declining trend in urban nominal consumption inequality. But such comparisons of consumption distributions at current prices are not really meaningful particularly when the inter-temporal price movements happened to be different for different fractile groups. Mahalanobis (1962) and later the Income Distribution Committee (Planning Commission, 1969) found that the cereal prices rose sharply more for the poor people than for the rich in rural areas. Iyengar and Bhattacharya (1965) examined this problem from a methodological point of view. They found price adjusted Lorenz ratios to show lesser extent of reduction than the current price data based ones. The Iyengar and Bhattacharya study (1965) was followed by Dutta Roy Chowdhury (1966),

Vaidyanathan (1974), Radhakrishna and Sarma (1976) and Murty (1985), who constructed fractile group specific price indices, taking into account inter-fractile group differences in consumption baskets and changes in relative prices for deflation purposes. Their study of distribution in real terms confirmed the earlier findings of Bhattacharya and Iyengar (1965) Mukherjee and Chatterjee (1967) used expenditure class-wise price index of cereals as the class-specific deflator to derive real distributions. While their estimates of Kuznets index of disparity at current prices showed a decline in both rural and urban sectors and the country as a whole, those based on price adjusted figures remained stable for rural and urban India and increased for the country as a whole. Murty (1985) estimated Atkinson's inequality indices for the rural and urban sectors both in nominal and real terms. The estimates showed a statistically significant trend decline in nominal consumption inequality and no "significant trend" in real consumption inequality in both the rural and urban sectors during 1960-61 to 1970-71.

Swamy (1967) tried to establish that structural changes in the industrial origin distribution of income are intimately connected with the shifts in the size distribution of income. He found that about 85 percent of the increase in inequality in the size distribution of consumption during 1951 to 1960 was due to structural shifts in the economy and the rest due to inter-sectoral changes in inequality. On the other hand, Bhattacharya and Mahalanobis (1967) studied

regional disparities in household consumption in India, using NSS 13th round data. They also attempted to study inequality in consumption at the All-India level in terms of within state and between state inequalities.

The relative behaviour of consumption levels and their distributions have not received much attention so far. The only attempt seems to be that of Chatterjee and Bhattacharya (1972, 1974a), who traced the relative movements in per capita consumption levels in rural and urban sectors for the period 1951-52 to 1967-69. The ratio did not show any trend at all. They also examined the relative rankings of different states based on state-average per capita consumption for the rural and urban sectors and found them to be fairly stable over time. Further, inter-state disparity, measured by the Lorenz ratio and Kuznets index showed a decline between 1957-58 and 1967-68. In another important study (Chatterjee and Bhattacharya, 1974b), they made adjustment for inter-state differences in prices and examined the relative standing of the states. On price adjustment, they found that Madhya Pradesh, which had a consumption level below the national average before adjustment, stood above the national average. Just the reverse was the case with the states of Tamil Nadu and West Bengal. Similar studies were also done by Rath (1973), Bhattacharya et al (1977, 1980) and Bhattacharya et al (1984).

The relative inequality in nominal consumption in different states has been examined by some researchers. One of the first

attempts to study inequalities in consumption across states was by Iyengar (1964) using the NSS 13th round data. Next, Bhattacharya and Mahalanobis (1967) estimated Lorenz ratios, standard deviations of logarithms of PCE's and per cent share of top 10 percent for different states by rural, urban and rural-urban combined sectors using the same data set. Vaidyanathan (1974) estimated state-wise Lorenz ratios for four NSS rounds (1957-58, 1960-61, 1963-64 and 1967-68), and found that the extent of inequality had no strong consistent relation to per capita consumption; nor were the relative levels of inequality stable over time. Examining the trends in rural nominal consumption in equality in 14 states during the period 1956-57 to 1973-74, Ahluwalia (1978) found:

(i) Significant trend decline in the states of Andhra Pradesh, Assam, Karnataka, Madhya Pradesh, Tamil Nadu and Uttar Pradesh.

(ii) Non-significant trend decline in Bihar, Gujarat, Maharashtra, Orissa, Rajasthan and West Bengal; and

(iii) Non-significant trend increase in Kerala.

Attempting to examine inequality determinants, Vaidyanathan (1974) found that among rural households inequality in consumption was less than that in land distribution because

(i) Small holdings were better irrigated and had higher productivity.

(ii) Animal husbandry supplemented the small farmer's income.

(iii) Large holdings generally supported large families; and

(iv) The rate of savings, being a positive function of income, inequality in consumption would be less than that in income.

Eventhough based on incomplete data, the study showed that in explaining inter-state variations in consumption inequalities, the distribution of land holdings and proportion of rural income originating in animal husbandry were not important variables; but the proportion of area under irrigation was. Another study that examined the correlation among size of land holding, living standards and employment is that by Visaria (1981).

Thus, the studies on consumption distributions have shown

(i) A decline in nominal consumption inequality in both the rural and urban sectors at the all-India level and in most of the state rural sectors.

(ii) That the decline in nominal distributions is not real one; with appropriate price adjustment, the data do not show the same degree of decline in real disparities; and

(iii) Thus, there is the need for making the adjustment for the differential impact of inflation on different expenditure groups before arriving at any firm inferences about real changes.

1.5. Incidence of Poverty : India

Recent years have witnessed a great interest in measuring the incidence of poverty, particularly rural poverty rather than in

measuring inequality per se. Absolute poverty, defined as the proportion of population living below a normatively defined poverty line has been estimated by several researches. These studies differ with respect to many such aspects as basis of definition of poverty line, method of its calculation, method of estimation of poverty, data base etc. These details pertaining to a few important studies are given in Table 1.1.

For instance, Minhas (1970) and Vaidyanathan (1974) have tried to reconstruct the distribution of the entire population by levels of real consumption and then estimate the population falling below the poverty line also defined in prices of the same base year. Others like Bardhan(1970a) and Ahluwalia (1978) converted the poverty line into consumption expenditure at current prices and then estimated the proportion of population with consumption levels below the poverty line, using data on distribution in current prices. The other important difference, which is partly responsible for the divergent estimates of trends in poverty, arise from the fact that some (Bardhan, 1970) use the NSS estimates both for average per capita consumption and its distribution, while others (Minhas, 1970) use the NSS pattern of distribution of nominal consumption (along with its rural-urban breakdown) with official national income estimates of real consumption. The problem arises from the divergent behaviour of consumption levels estimated from the two sources. This divergence has been the subject of some but altogether inadequate attention (see for instance, Srinivasan, et al. 1974; Mukherjee and Chatterjee, 1974; Mukherjee and Saha, 1981).

Bardhan (1973) adopted per capita consumption of Rs 15 per month at 1960-61 rural prices as the poverty line for rural India and worked out the corresponding values of poverty lines for the rural sectors of different states using inter-state price differential indices estimated by Chatterjee and Bhattacharya (1974b). Using these state specific rural poverty lines and Agricultural Labour Consumer Price Index (ALCPI) as deflator, he made poverty estimates for the different states for 1960-61 and 1967-68.

In a recent study, Ahluwalia (1978), adopting Bardhan's (1973) methodology, examined the trends in the incidence of rural poverty during the period 1956-57 to 1973-74, for both India as a whole and 14 individual states of the Union. The study showed that there had been fluctuations in incidence of rural poverty with no statistically significant trend except for Assam and West Bengal, where it showed a significant trend increase. Ahluwalia further postulated that if the trickledown mechanism were to operate the incidence of poverty should be expected to be inversely related to agricultural output per head of rural population. He found that the data indeed showed a significant inverse relationship between incidence of rural poverty and real agricultural output per head of rural population for India as a whole. This relationship was found to hold in some states but not in others. At least in some states there were forces at work which tended to increase the incidence of poverty irrespective of variations in agricultural output per head.

Bhatty (1974) studied poverty in rural India using consumption and income data thrown up by a survey of Effectiveness of Employment conducted by the NCAER during 1968-69. He estimated Sen's index of poverty (Sen, 1974) and also the head-count ratio separately for cultivators, agricultural labourers, and non-agricultural workers and by States, using alternative poverty lines. Studies which have made time series estimates of Sen's index for rural India are by Ahluwalia (1978) and Dutta (1980).

In another important study, Minhas (1970) found that out of the 164 million people below the poverty line in 1960-61, around 60 million people belonged rural labour households and of the rest, a major chunk were cultivator households with small operational holdings. Other studies which attempted to identify the characteristics of the poor are those by Dandekar and Rath (1971) and Vaidyanathan (1974).

Mukherjee(1969b) looked at the areal distribution over 50 regions of the poorest 10 per cent of India's rural population. Pal et al (1985) studied the incidence of rural poverty in India and its decomposition among various groups of the population, using NSS 28th round data. They used three indices of poverty, viz., the head-count ratio, Chakravarty's index (1981) and Sen's index. The rural population was divided into groups by (i) states; (ii) social groups; (iii) occupation; (iv) size classes of land possessed; and (v) household size.

Iyengar and Suryanarayana (1984b) adopted a positive concept of poverty line by estimating it as the minimum subsistence consumption level in an assumed three-parameter log-normal distribution. Their study broadly indicated a dip during the mid-sixties and a recovery thereafter in the level of living of the poorest household in both rural and urban sectors.

In recent years the poverty debate has assumed a new dimension with the controversy centering around the determination of the cut-off point, the need to keep the poverty line variant with respect to sex, age and occupation (Dandekar, 1981, 1982; Krishnaji, 1981a, 1981b; Rao, 1981a, 1981b; Sukhatme, 1981a, 1981b). There have also been studies on the effectiveness of various poverty alleviation programmes and on the methodology used in their assessments (Sundaram and Tendulkar, 1984a, 1984b; Gupta and Dutta, 1984). Among other studies Subrahmanyam (1982) investigated the relationship between poverty, unemployment and participation rates and Reddy and Mitra (1982) examined the determinants of poverty.

Broadly, the poverty studies

(i) have arrived at different conclusions because of different methodologies and data sources; and

(ii) based on the NSS data, do not show any particular trend in absolute poverty, but a pattern of fluctuations around 50 per cent.

1.6 Conclusions

This is by no means a comprehensive review of the literature on poverty, inequality and development. The focus is only on a few of the important studies bringing out the broad nature of their methodologies and findings. On the whole, an extensive amount of work has been done on poverty and income distribution in India. Yet there seems to exist a few gaps in the leterature. They are as follows:

(i) There has virtually been no attempt to study the Indian economic structure and distributional implications.

(ii) No attempt has been made to examine income distributions at the metropolitan city level.

(iii) The contribution of inter-sectoral disparity to overall inequality is yet to be examined.

(iv) The regional disparities in consumption levels may also be examined.

(v) The existence or otherwise of any relation between distribution and level of development has to be examined.

(vi) Further, there is the need to analyse poverty and its statistical determinants in a detailed manner taking into account regional differences in levels of development and structures.

(vii) There is also the need for constructing state specific urban poverty lines and urban poverty; and

(viii) No attempt has been made so far to examine the distributional implications of plan strategies for poverty alleviation.

Table 1.1 : Norms, Poverty Lines and Estimates (India).

Author	Norms	Poverty Line in Rupees Per Capita Per Annum	Data Base	Period	Absolute Poverty (%)	
					Rural	Urban
Ahluwalia (1978)	-	180 for Rural India at 1960-61 prices	N.S.S. Consumption Data	1956-57	53.5	-
				1960-61	38.4	-
				1965-66	54.7	-
				1967-68	56.5	-
				1970-71	47.5	-
				1973-74	46.1	-
Bardhan (1970)	2250 calories per head per day	180 for Rural India at 1960-61 prices	N.S.S. Consumption Data	1960-61	38.0	
				1964-65	45.0	
				1967-68	53.0	
				1968-69	54.0	
Dandekar and Rath (1971)	2250 calories per head per day	180 for Rural and 270 for Urban India at 1960-61 prices	N.S.S. Consumption Data	1961-62	40.0	50.0
Minhas (1970)	-	200 for Rural India at 1960-61 prices	Tiwari's estimates of per capita consumption combined with N.S.S. Distributions	1960-61	46.0	
				1964-65	39.3	
				1967-68	37.1	

... Continued

Table 1.1 : (Continued)

Ojha (1971)	518 gms of foodgrains per capita per day to get 80 percent of the calorie requirement of 2250 units in the rural areas and 432 gms of foodgrains to get 66% of 2250 calories in urban areas.	15 to 18 for rural India; and 8 to 11 for urban India at 1960-61 prices	N.S.S. Data combined with official estimates of foodgrains availability.	1960-61 1967-68	52.00 70.00	8.00 -
Rajaraman (1975)	Linear programming approach to minimize cost of living subject to nutritional constraints.	16.36 for rural Punjab at 1960-61 prices	N.S.S. Consumption Data	1960-61 1970-71	18.40 23.28	- -
Study Group, Planning Commission, (1962)	-	20 for all-India at 1960-61 prices	-	-	-	-
Planning Commission (1980)	2400 calories per head per day for rural and 2100 calories for urban India.	49.09 for rural and 56.64 for urban India in 1973-74.	N.S.S. Consumption Data	1972-73 1977-78	50.50 51.50	40.10 38.20

... Continued

Table 1.1 : (Continued)

Vaidyanathan (1974)	-	240 for rural India at 1960-61 prices	N.S.S. Consumption Data	1960-61	59.50	-
				1964-66	60.40	-
				1967-68	67.80	-
				1960-61	58.80	-
				1964-65	56.90	-
				1967-68	57.80	-
Vyas (1972)	-	180 for rural India at 1960-61 prices	-	1954-55	65.60	-
				1960-61	63.20	-
		240 for rural India at 1960-61 prices	-	1954-55	45.50	-
				1960-61	38.50	-

CHAPTER 2

ECONOMIC GROWTH IN INDIA AND ITS IMPLICATIONS

2.1 Introduction

Studies on income distribution (e.g., Kuznets, 1955, Ahluwalia, 1974a, 1976a and 1976b) have identified sectoral differences in productivity, distribution of output and employment as the principal causes of widening inequality in the initial stages of a developing economy. Others (for instance, Frank and Webb, 1977; Fields, 1980) have examined income distributional behaviour in a developing country using a dualistic growth model. In fact, Fields identifies three types of dualistic growth. They are:

i) Modern sector enlargement growth i.e., growth due to an increase in the proportion of workforce employed in the high-paid and more productive modern sector. This type is shown to give rise to inverted-U pattern in the trend behaviour of income inequality.

ii) Modern sector enrichment growth due to productivity or income improvement in the modern sector leading to an increase in relative inequality.

iii) Traditional sector enrichment growth causing more equal distribution of income.

It is believed that the general patterns observed in

developing countries conform to either of the first two mentioned above. In what follows, we examine the growth pattern observed in India during the post-Independence period in general and during the sixties and early seventies in particular.

At the beginning, we may note some of the salient features of the Indian economy and its growth during the post-Independence period:

i) India is a heavily overpopulated agricultural country with as much as 70 per cent of the workforce depending on agriculture.

ii) With the beginning of planning in 1951, it has embarked upon a phase of industrialization and modernization. In consequence, dualism between modern and traditional sectors has emerged.

iii) In spite of the heavy investments made in different sectors,[1] growth continues to be inadequate in relation to population even though it appears impressive in absolute numbers. Between 1950/51 and 1979/80, real NDP increased at the compound growth rate of 3.63 per cent while it is about one per cent for per capita real NDP. Thus, the extent of change in per capita real NDP is not much and hence, the Kuznet's hypothesis cannot be tested for the Indian economy. Instead, what can be done is to examine whether the first phase of the Kuznets' hypothesis is operative in India.

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1 In this Chapter, we use the term sector to refer to the economic sectors viz., primary, secondary and tertiary. In the remaining Chapters, the term sector is used to refer to the geographically classified areas like rural and urban.

iv) Judged by changes in the sectoral distribution of output, there seems to have taken place some structural improvement. The output share of the primary sector decreased from 56.13 per cent in 1950/51 to 35.44 per cent in 1979/80, while that for the secondary sector increased from 17.25 per cent to 25.68 per cent and that for the tertiary sector increased from 26.62 per cent to 38.88 per cent during the same period.

v) However, in occupational terms, there seems to have been a "structural retrogression" (Rao, 1983), with the Census data showing a virtual constancy in the sectoral shares of work force.

vi) Thus, from (iv) and (v), it follows that for bulk of those (about 70 per cent) engaged in the primary sector, per capita real incomes did not increase at the same rate as that for those in the secondary and tertiary sectors, which itself would mean an increasing disparity in incomes.

vii) Further, indirect evidences show Indian growth to be, as distinct from the three cases of Fields (1980), a combination of modern sector enrichment and traditional sector enlargement patterns.

These features and their implications are discussed below.

To be specific, we examine structural differences among the three regions of the economy - rural, non-city urban (i.e. urban excluding cities) and cities (of Bombay, Calcutta, Delhi and Madras) - and also the urban sector (i.e. cities plus non-city urban) as a whole and their implications. Also the analysis is carried out further in terms of the differential growth performances of the three sectors- primary, secondary and tertiary - and their uneven spread across these three regions.

2.2 Structural Differences and their Implications

2.2.1 Relative Incomes and Inequalities in Rural and Urban Areas

Economic structures - defined in terms of the relative importance of the agricultural and non-agricultural sectors - are dissimilar across sectors and uneven in their levels of development. This is the basic cause of sectoral differences in income levels and inequalities. In the early stages of industrialization of an economy, the agricultural sector accounts for a higher proportion of labour force than of total domestic output, which implies a lower product per worker in the agricultural sector. Conversely, the share of the non-agricultural sectors in total output will be higher than their share in labour force, implying thereby a relatively higher product per worker in them. From Table 2.1, it can be seen that the relative product per worker in the

primary sector was about half of that in the secondary sector and nearly one third of that in the tertiary sector. It follows that with a lower product per worker, average per capita income is also likely to be lower in the agricultural than in the non-agricultural sector.

Table 2.1: Relative Sectoral Product Per Worker: All-India (1960/61)

Sector	Productivity
Primary	0.71
Secondary	1.41
Tertiary	2.03
All	1.00

Source: Centre for Development Studies (1977).

The low product per worker in agriculture is due partly to the relatively low land-man ratio in rural India, and, more importantly, to the low level of technique which reflects, in turn, the limited access to modern science and technology and low level of infrastructural development necessary for the use of improved techniques. On the other hand, the non-agricultural sector is spatially concentrated in the urban areas. It is characterized by higher capital intensive and technologically advanced production units. Higher capital per worker in this sector would mean higher average labour productivity and to the extent it uses more skilled and better organised labour, also a higher wage per worker.

Table 2.2 shows a striking dissimilarity between rural and urban economic structures in India. While 82 per cent of the rural work force is employed in the primary sector, more than 85 per cent of the urban work force is employed in the secondary and tertiary sectors put together. In this respect, the contrast between cities (which include Bombay, Calcutta, Delhi and Madras) and rural areas is even sharper. The former, with about 98 per cent of their work-force in the secondary and tertiary sector together, are almost purely non-agricultural in character. While the economic structure of the non-city urban areas is closer to that of cities in terms of sectoral distribution of employment, the dominant mode of production is possibly closer to the rural areas, there being a markedly greater preponderance of own account worker and a relatively low level of capital intensity.

Table 2.2 : Sectoral Distribution of Workforce in India - 1961
(in per cent)

Sector	Primary	Secondary	Tertiary	Total
Rural India	82.00	8.31	9.69	100.00
Urban India	12.55	32.51	54.94	100.00
Non-City Urban India	14.27	33.77	51.96	100.00
Cities	1.52	24.47	74.01	100.00
All-India	72.27	11.70	16.03	100.00

Source: India (1964)

The predominance of non-agricultural activities in the urban and that of agricultural activities in the rural areas, taken together with the differentials in their respective net output per worker, makes for a higher per worker income in the urban than in the rural areas. This difference is only partly offset by differences in dependency ratios and by remittances from urban to rural areas. Since nearly three-fourths of the city workforce is in the tertiary sector compared to less than ten per cent in rural areas and the average product per worker in the tertiary sector is nearly three times as high as that in the primary sector, differentials in average income levels between the cities and the rural areas is likely to be higher than the rural-urban differentials. By the same argument, the average income levels in the cities may be expected to be higher than that in the non-city urban region as well.

The nature of factors influencing the distribution of personal income are also different in rural and urban regions. Broadly, the factors determining personal income distribution are:

i) distribution of wealth (primarily land in rural areas, and possibly other forms of income earning assets in urban areas); and

ii) distribution of income from work.

There is evidence to show that the distribution of wealth is more skewed in the urban than in the rural areas. The results of the NCAER survey (1975/76) on "household income and its disposition" show that the Lorenz ratio for household distribution of wealth — defined to include only physical assets viz. stocks of agricultural assets, livestock, house property, business assets and selected consumer durables — is 0.639 for rural India and 0.757 for urban India (NCAER 1980; p 129). The inclusion of financial assets is likely to accentuate the difference further since such assets are relatively more important in urban areas and that too for the richer classes.

If we examine the second and major determinant of personal income distribution, that is labour income distribution, it is also likely to throw up a similar picture. Decomposition analysis of total inequality by factor income has shown wage income inequality to be the major source of total inequality in developing countries. This has been found to be true in Taiwan (Fei and Ranis, 1974; Fei, Ranis and Kuo, 1978), in Pakistan (Ayub, 1977) and Colombia (Fields, 1979). The results of Fei and Ranis (1974) are reproduced in Table 2.3.

Table 2.3 Decomposition of Inequality in Taiwan, 1972

	Wage	Mixed	Property	Gifts	Other	Total
Factor Gini	0.2518	0.2968	0.4020	0.3965	9.2925	
Factor Share	0.5820	0.2750	0.0930	0.0460	0.0040	1.0000
Factor inequality weight	0.5187	0.2882	0.1322	0.0584	0.0024	1.0000

Source: Fei and Ranis (1974)

Labour earnings distribution is likely to be relatively more equal in the rural areas than in the urban because there is excess labour, and skill and educational differentials are relatively less compared to the urban areas. Further, the rural labour market is largely homogenous and informal in character, while the urban one is characterized by dualism. The dualism is between the formal (or modern) and the informal (or traditional) sector. The term formal sector is used to refer to "that part of the labour market where employment is contractual, regular and protected, entry is restricted, and production is carried on a large scale with capital-intensive techniques, requiring trained labour force" (International Labour Organization, 1972). The informal sector, on the other hand, is characterized by "free entry into the labour market, small scale of operation, labour-intensive techniques, self-employment and unregulated markets" (International Labour Organization, 1972).

It may be pointed out that one of the factors causing dualism in the urban labour market is the skewed asset distribution pattern itself. Access to higher education, skills and capital, all of which have a powerful influence on the level of income which an individual and members of his family can earn, are crucially dependent on the initial income and wealth position of the household. The richer the household, greater are its chances of being able to take advantage of remunerative investment opportunities (by virtue of its easy access to the capital market) and of its younger members to receive higher education. Since entering the formal sector as entrepreneurs would be beyond their means

and entry as skilled workers would be beyond their education and skills, those with little or no property to begin with and/or a relatively low level of income are forced to take up lower-paid occupations or set up small enterprises in the informal sector.

The formal and informal sectors differ in terms of capital - both human and physical — intensity, and hence, labour productivity, wages and earnings. Wage rates are likely to be higher in the formal than in the informal sector not only because labour productivity in the former is higher but also because its labour is effectively unionized and minimum wage rates and working conditions are enforced by law. The informal sector, by contrast, uses lower level of techniques, its labour force is less skilled, and workers do not have legal sanction or union pressure with regard to wages and working conditions.

The disadvantageous position of the informal sector is further aggravated when there are not enough jobs to go around. It is even suggested (Mazumdar, 1976) that differentials in average wage earnings will be higher than the differentials in average wage rates between the two sectors. For, unlike in the formal sector, employment in the informal sector is irregular and hence "is characterized by variable hours of work over a period of time (say, a week)" (Mazumdar, 1976 p 656). Altogether, workers in the informal sector and their families are likely to figure more prominently in the lower end of the urban income distribution because

i) the proportion of total urban asset income accruing to this sector is likely to be small; and

ii) average income is lower than that in the formal sector.

Further, the distribution of incomes within the formal and informal sectors are likely to differ. The asset distribution pattern in the formal sector is likely to be more skewed than in the informal sector, if only because there is so little capital being used in the latter. Moreover, the skill differential in the informal sector is much wider than in the informal sector and consequently, differentials in wages and salaries in the former are also likely to be relatively higher. On the other hand, in the informal sector

i) asset as a source of income inequality is relatively less important (since, as already stated, the proportion of total urban asset income accruing to this sector is likely to be small).

ii) its labour force, consisting mainly two broad groups of workers:
a) Self-employed, and (b) wage labourers, are much less heterogenous in terms of skills; and

iii) bulk of the activities in this sector are conducted on a small scale, involving highly labour-intensive techniques.

The cumulative effect of the above differences would be that disparities in income distribution within the formal sector would be higher than that in the informal one. If this is true, one should expect the relative sizes of the formal and informal sectors to provide a clue to sectoral variations in income distributions, overall income inequality being positively correlated with the relative size of the formal sector (in terms of proportion of labour force employed).

When it comes to measurement, we do not have data comparable to the concepts adopted by the ILO. However, for practical purposes, we define the formal sector to include all those non-agricultural establishments with more than ten workers. The Indian Census (1974) provide data on this. We measure the relative size of the formal sector by the proportion of total workforce employed in non-agricultural establishments with more than 10 workers. From table 2.4 it can be seen that the formal sector is virtually non-existent in rural India, where only 2.4 per cent of the total workforce is employed in the non-agricultural formal sector. On the other hand, 29 per cent of the urban workforce and 45 per cent of the city work force is employed in the non-agricultural formal sector.

Table 2.4 : Percentage of Total Workforce Employed in the Non-agricultural Establishments with more than 10 workers (1971)

Sector	Percentage
Rural India	2.41
Urban India	29.10
Non-City Urban India	26.05
Cities	45.01
All-India	7.14

Source: India (1974a and 1974b)

The rankings of the rural region, non-city urban region and the cities in terms of the relative size of the non-agricultural formal sector will not alter even if we consider all activities (including agriculture) because almost all (99 per cent) the agricultural work force is employed in the informal sector(Planning Commission,1970;p.03). Since the extent of income inequality is expected to be positively correlated with the relative size of the formal sector we would expect income inequality to be higher in the urban and non-city urban than in the rural region and still higher in the cities than in the urban and non-city urban regions.

2.3 Income and Inequality Trends by Regions

A proper step in the analysis of trend behaviour of income levels and inequalities seems to be a study of temporal changes in economic structures, defined in terms of (economic) sectoral distribution of workforce and output. As regards the distribution of workforce, we are hampered in our effort by the fact that the Census definitions of work-force are not strictly comparable over the years. The 1951 census classified the workers, on the basis of the gainful employment approach, into (i) self-supporting persons; (ii) earning dependents; and (iii) non-earning dependents. The 1961 census, on the other hand, adopted the labour force approach and classified a person as 'worker' or non-worker. In terms of the 1951

concepts, the 1961 concept of workers included self-supporting persons, earning dependent and also a part of non-earning dependent who, though did not earn any income, participated in some economic activity. The 1971 census, on the other hand, adopted the same two-fold classification of the 1961 census but used main activity of the person as the basis for classification. Thus, it excluded all those who did not have a main activity even though they had other subsidiary activities. This resulted mainly in the exclusion of a significant subset of the women workforce, who participated in agricultural or household economic activity without a main activity. Because of this, it is held (Rao, 1983) that the estimates of male workforce only are comparable between 1961 and 1971. It may be noted that

Table 2.5 shows almost a retrogression in the economic structure of India, with the primary sector gaining its share and the secondary and tertiary sectors losing their share of labour force.

Table 2.5: Sectoral Distribution of Male Workers
(in per cent)

Sector	Distribution of male workforce in		
	1951	1961	1971
Primary	69.1	68.0	70.4
Secondary	12.6	12.7	11.2
Tertiary	18.3	19.3	18.3
Total	100.00	100.00	100.00

Source: Rao (1983)

The same picture is revealed when we consider the distribution of total workforce across sectors. The CSO has reconstructed census estimates of workforce for 1961 and 1971 on a comparable basis. The CSO's indices of workforce growth for 1971 with 1961 as base are 109.96 for total workers, 109.06 for the primary sector, 107.77 for the secondary and 109.37 for the tertiary sectors. These indices would imply a more or less constancy in the sectoral distribution of workforce.

The National Accounts Statistics on output, however, produce a different picture. They show an improvement in the output shares of the secondary and tertiary sectors and a deterioration in that of the primary sector. These data are produced in table 2.6. This finding is in line with the experience of the developed countries.

Table 2.6 : Sectoral Share in NDP

Sector	1950/51	1960/61	1970/71
Primary	56.13	51.23	44.67
Secondary	17.25	20.12	22.86
Tertiary	26.62	28.65	32.47
Total	100.00	100.00	100.00

Source: Rao (1983)

The data presented in Tables 2.5 and 2.6 together imply that the productivity level in the primary sector in relation that in the secondary and tertiary sectors has

decreased over the years. This would also imply a relatively faster increase in average incomes in the non-primary sectors. Given the largely non-primary character of the urban areas, this would imply a relatively faster increase in per capita incomes of the urban areas and cities and a widening rural-urban and rural-city and city-non-city urban disparities in income levels.

Coming to the determinants of income inequality, let us look at the rural sector first. The rural land distribution pattern had remained virtually the same during the period 1960/61 to 1971/72. The inequality, as measured by the Lorenz ratio, in the household distribution of operational land holdings in rural India had registered a decline from 0.693 in 1960/61 to 0.610 in 1971/72. The share in total operational holdings of the top decile households had declined slightly from 54 per cent to around 52 per cent during the period.[2] However, there had been a phenomenal growth in the population of wage labourers in rural areas. The Rural Labour Enquiry reports show that between 1964/65 and 1974/75 while total rural households increased from 70.39 million to 82.08 i.e. by 17 per cent, the rural labour households increased from 17.84 million to 24.83 million i.e. by around 39 per cent and the agricultural labour households increased from 15.29 million to 20.74 million i.e. by around 36 per cent. More important of all,

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2 These estimates are from NSSO (1970) and NSSO (1975)

they show an increase in the number of wage earners from 35.32 million to 54.63 million i.e. by around 55 per cent (Planning Commission, 1978). The Rural Labour Enquiry also shows a decline in intensity of employment -- as defined by full days of employment -- in rural areas. It is found that the estimated number of full days of employment of men, women and children in all categories of households have declined from 277 to 250, 199 to 184 and 265 to 254 respectively between 1964/65 & 1974/75 (India, 1979). It has also been found that the benefits of public expenditure on development projects have accrued largely to the affluent classes of the rural society (Gupta, 1978; Rosen, 1967). All these factors, coupled with the fact that about one-third of rural poverty is accounted for by agricultural labourers (Minhas, 1970), would, in the context of slow growth, imply an increasing trend in Indian rural poverty and inequality.

As regards the urban areas, there is ample evidence to suggest that the growth in employment opportunities has not been commensurate with the increase in urban labour force. The investment in the organised sector of the economy seems to have been concentrated in capital intensive forms. During the period 1961 to 1976 in the modern factory sector, while investment and output increased by 139 per cent and 169 per cent respectively, employment increased by 71 per cent only (Planning Commission, 1978, p 82). Of the annual addition to the labour force in the economy as a whole, only 11 per cent is being currently absorbed by the formal sector (Planning Commission, 1978, p 83).

The percentage of unemployed in the total urban workforce has increased from 2.35 in 1960/61 to 6.63 in 1972/73[3]. Altogether, an increasingly larger section of the urban workforce has come to depend on the informal sector for its livelihood.

The National Accounts Statistics also throws up a picture of increasing NDP share for the organised sector (See Table 2.7). On the whole, the organized sector, while increasing its relative share of NDP, seems to have shrunk in terms of proportion of workforce. The unorganized, on the other hand, has enlarged its size in terms of proportion of workforce but accounts for a decreased share of NDP. Thus, the observed growth pattern seems to be a combination of modern sector enrichment and traditional sector enlargement. With a comparatively slower rate of growth of income but faster rate of growth of workforce, average earnings in the informal sector are likely to have fallen. On the other hand, with a relatively faster growth of income but slower rate of growth of work force, average earnings in the formal sector would have increased.

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3. These estimates are from Kapen (1979).

Table 2.7 : Relative Shares of Organized and Unorganized Sectors in India.

Period	Percentage share in NDP	
	Organized	unorganized
1960/61 to 1964/65	28.19	71.81
1965/66 to 1969/70	31.50	68.50
1970/71 to 1974/75	32.60	67.40
1975/76 to 1979/80	35.29	64.71

Source : Rao (1983).

Note:- For the CSO concepts of formal and informal sectors, see Rao (1983, p.11).

Studies, however, have shown that real wages of employees in the formal sector have been "either stagnant or declining" (Venkataramaiah, 1978; p 142) at a time when per capita real income has increased at a rate of one per cent per annum during 1961/1975. It has also been shown that between 1961 and 1975, when per capita real income increased by 18 per cent, the average real earnings of factory employees increased by a mere three per cent (Venkataramaiah, 1978; p 138). That would suggest a situation where much of the increases in output have been appropriated by the non-wage earner classes, especially classes who own or control capital. This would imply a deterioration in income distribution within the formal sector. On the whole, the disproportionate rates of growth of output and employment in the formal and informal sectors point to:

i) a widening of disparities between average real earnings in the two sectors;

ii) the worsening income distribution within the formal sector itself; and

iii) worsening of the distribution of wages and salary incomes in the urban sector.

Since income and wealth are positively correlated and have mutually reinforcing effects on each other, a worsening labour income distribution is likely to accentuate the skewness in the initial asset distribution further and hence, the overall income distribution also.

The fact that population as well as output have grown at a much faster rate in the urban than in the rural sector, then together with the dualism in the urban labour market and its implications for behaviour of income distribution over time, would imply a relatively faster increase in inequality in income distribution in the urban than in the rural sector. Further, we have also seen that dualism in the labour market is more pronounced in the cities, where about half of the labour force is in the formal sector. Therefore, inequalities might have worsened at a still faster rate in the cities than in the urban sector as a whole.

2.4. Summing-up

Thus, our region-wise analysis of differences in economic structure and growth shows that:

i) rural-urban and city-non-city urban disparities in income levels might have increased over time.

ii) income inequalities are likely to have increased relatively faster in the urban than in the rural areas, in the cities than in the non-city urban areas.

iii) hence, overall income inequality might have increased, resulting in the operation of the first phase of the Kuznet's inverted-U Hypothesis.

The preceding analysis, however, is subject to certain qualifications. It may be noted that most of our observations above are not substantiated by direct evidences. Instead, they are in the nature of statements made on the basis of indirect and fragmentary evidences using largely the insights provided by earlier studies into the dynamics of the income distribution behaviour. To that extent, we are on a weak footing and hence the need for a more scientific approach.

Chapter 3

THE NATURE OF DATA BASE

3.1 Introduction

The present study is based mainly on the National Sample Survey (NSS) data on consumption distribution. The NSS enquiries on consumption have provided the data base for much of the applied econometric work in India during the post-independence period. Its suitability for research on various aspects of consumer behaviour has been due partly to the wide coverage of various aspects and partly to the comparability of concepts over time and across space. Accordingly, it has been used to study such various issues as:

i) changing consumption patterns
ii) inter-regional variations in levels of living; and
iii) extent of, and trends in inequality in levels of living, poverty incidence, etc. in rural and urban India.

However, the data came to be questioned whenever the findings based on it disagreed either with one's a priori expectations or with the findings based on official availability figures. For instance, Dandekar and Rath (1971) found it incredible that the NSS consumption estimate should show a decline of 8.1 per cent in 1967-68 over 1960-61. Others have also expressed their doubts about the validity of the NSS estimates on other occasions. But it may be noted that much of the misgivings about the reliability of the NSS estimates has stemmed from their disagreement with the corresponding aggregates derived from the

Central Statistical Organisation's (CSO) National Accounts Statistics. Therefore, it would be pertinent to ask: How far such comparisons between the NSS and CSO estimates are valid? Does there exist any other basis for the kind of doubts generally expressed about the reliability of NSS estimates? In this chapter, we address ourselves to these two specific questions. In Section 3.2, we briefly mention the nature of disagreement observed between the NSS and CSO estimates of certain items of consumption. In Section 3.3, we examine the conceptual and methodological differences underlying these estimates and their comparability. Section 3.4 is devoted to a discussion of the possible sources of bias in NSS estimates. Section 3.5 discusses the welfare implications of NSS method of valuation. The final Section summarises our main conclusions.

3.2 NSS and CSO Estimates

How to make any judgment about the degree of bias, if it exists, in the NSS data? To answer this question, comparative studies of the NSS and CSO estimates of aggregate and item-wise consumption have been made (Kansal, 1965; Mukherjee, 1972; Mukherjee and Chatterji, 1972; Srinivasan, et al, 1974; Mukherjee and Saha, 1981, Chatterjee, 1982; Roy, 1985). Most of these studies are based on comparisons only for a few years and they reveal the following features.

i) Mukherjee (1972) found that the CSO estimates show a larger share of services and a lower share of foodgrains and the NSS estimates show a larger share of foodgrains and a lower share of services.

ii) Srinivasan et al (1974) found agreement between the two estimates at the aggregate level during 1954-55 to 1962-63 but differences thereafter. They found the NSS estimate to be consistently below the CSO estimate. They also found substantial differences with respect to levels and trends between the two estimates when the comparisons are made at the disaggregated level.

iii) Studies like Mukherjee and Chatterjee (1972) and Mukherjee and Saha (1981) found the two estimates to agree fairly well in the case of aggregate expenditure.

iv) Roy (1985) compared the NSS and CSO estimates for the years between 1960-61 and 1973-74 at current prices for the following ten item groups:

i) Cereals and cereal substitutes
ii) Milk and milk products
iii) Edible oils
iv) Meat, egg and fish
v) Sugar
vi) Other food
vii) Clothing
ix) Other non-food
x) All food

Roy found the percentage discrepancies between the two estimates to fluctuate widely for many item groups over the period of study. Contrary to Srinivasan et al (1974), he found that the two series are uniformly closest together in the case of 'milk and milk products'. They are also found to be close for 'meat, fish and eggs' and for other food items. The NSS estimates of sugar and edible oils are found to be far smaller than the CSO estimates and far higher, in the case of

cereals and cereal substitutes. As regards the non-food items, the NSS estimates are higher for fuel and light and lower for clothing and other non-food items.

In order to get a clear picture about the nature of agreement between the two estimates, we reproduce below the comparative study made by Mukherjee and Saha (1981).

Table 3.1: Consistency of Official Estimates of Private Consumption Expenditure

Year	Private consumption at current prices (in 100 crores)		(NSS-Official) as per cent of official	Comments
	NSS combined sample	Official estimate		
1954-55	81.3	81.1	0.25	Home consumption valued at retail prices
1955-56	85.6	82.2	4.26	
1956-57	93.0	95.2	(-) 2.31	
1957-58	99.0	98.4	0.61	
1958-59	109.6	109.5	0.09	
1959-60	113.8	110.2	3.27	
1960-61	121.6	119.5	1.76	
1961-62	128.0	124.8	2.56	
1962-63	134.1	131.3	2.13	
1963-64	142.0	146.3	(-) 2.94	
1964-65	163.0	174.6	(-) 6.53	Integrated schedule
1965-66	175.5	184.4	(-) 4.83	"
1966-67	193.8	216.5	(-)10.48	"
1967-68	219.3	261.5	(-)16.14	"
1968-69	229.2	261.9	(-)12.49	"
1969-70	-	-		"
1970-71	265.5	296.8	(-)10.53	"
1971-72	-	-		
1972-73	343.5	351.9	(-) 2.39	
1973-74	411.2	430.4	(-) 4.47	

Note: Table reproduced from Mukherjee and Saha (1981)

Mukherjee and Saha (1981) estimates are at current prices. It would be of interest to examine the behaviour of the two estimates at constant prices. Accordingly, we compare the NSS and CSO estimates for the period 1961-62 to 1973-74 at 1961-62 prices. The NSS estimates for the all India consumption figures are obtained by using the respective rural and urban populations -- interpolated for the inter-census years -- as weights. The deflater for arriving at NSS estimate at 1961-62 prices is constructed as per the methodology given by Section 4.2 in Chapter 4. The CSO estimates are from CSO (1976) and have been derived using the National Income Deflator. The two estimates are given in Table 3.2.

Table 3.2: NSS and CSO Estimates of Monthly Per Capita Consumption (at 1961-62 prices): India (1961-62 to 1973-74)

Year	CSO	NSS	CSO estimate as per cent of NSS estimate
1961-62	23.70	23.37	101.41
1962-63	23.65	-	-
1963-64	23.80	22.09	107.74
1964-65	25.44	22.43	113.42
1965-66	24.30	22.18	109.56
1966-67	24.56	21.33	115.14
1967-68	25.63	20.39	125.70
1968-69	26.12	21.22	123.09
1969-70	26.39	21.51	122.69
1970-71	27.11	21.47	126.27
1971-72	26.89	-	-
1972-73	25.87	23.05	112.23
1973-74	26.49	23.33	113.54

From the table given above, it can be seen that the NSS estimate of per capita consumption has been consistently below the official estimate. Besides, the two estimates also differ with respect to direction and extent of change in consumption. While, broadly speaking, the NSS shows a decline in consumption during 1961-62 to 1967-68 and a recovery thereafter, the CSO shows a more than 10 per cent increase in consumption during the period (1961-62 to 1973-74) as a whole. The extent of divergence between the two estimates had been increasing till 1968-69. We find closer agreement between the two estimates for the last two years.

3.3 Validity of NSS-CSO Comparison

It is precisely the kind of inferences flowing from exercises of the above type that have led to doubts being cast on the reliability of NSS estimates. However, before investing such findings with any degree of credibility we have to examine the validity of such comparisons. But it appears that there are neither conceptual nor methodological grounds that would validate the kind of exercises carried out in the preceding Section.

The two estimates have one common meeting ground. Both of them are, in some sense, estimates of some unknown parameters. But the population parameters which they seek to estimate are not the same conceptually.

i) The NSS seeks to estimate all expenditure incurred by the household sector exclusively towards non-productive purposes. It includes even consumption out of home-grown produce, gifts, loans, etc.

ii) The CSO estimate, in addition, includes (a) consumption of private non-profit institutions, and (b) imputed values of rentals in owner-occupied houses.

Thus, by definition, NSS attempts to capture only a part of the CSO magnitude.

The two estimates look all the more incomparable when one starts examining the underlying methodological differences.

i) The CSO estimate is what is called the 'Residue Estimate' derived from the national income statistics, while the NSS is a direct estimate. Hence, the way the national income figures are arrived at assumes special significance in this context. A significant part of the national income is estimated in an arbitrary fashion. For any year, only about 60 per cent of the Net Domestic Product is estimated using direct information relating to that year (Mukherjee, 1972; Also see, CSO, 1980). The remainder is based on extrapolation from past values.

The way agricultural production is estimated is of particular relevance in this context since food consumption accounts for more than two-thirds of the average Indian consumption basket. Mukherjee (1972) points out that regular annual data for purposes of output estimation are available only for important crops. About one-third of the total agricultural output is estimated using indirect information. Coming to estimation of value of output, one is not really sure how reliable and representative are the price averages. Finally, net output is arrived at using cost information which again, has a very weak

basis. Estimates of output of milk and milk products are also not done using current information. Much of it is done using some extrapolated figures. The same has been found to be true with many other sectors characterised by the prevalence of the informal sector rendering collection of reliable information quite difficult. For most of these sectors output estimates are based on conjectures rather than on any valid scientific procedure. Further, data for the formal sector may be affected by under-reporting. It is from such a set that the CSO estimate of consumption is derived. Compared to this, the NSS estimates based on scientific data collection procedures, stands way above.

ii) The NSS in fact, uses a different notion of consumption: (a) For it, consumption refers to non-productive expenditure incurred by the household during the reference period of 30 days preceding the date of interview of the household. It excludes expenditure on enterprises and the household livestock, but includes consumption of pet animals. (b) It does not employ a uniform concept with respect to all items. For instance, for food, fuel and light, and intoxicants consumption means not the actual purchases but actual amount consumed. For clothing, on the other hand, consumption means maiden use only. Consumption out of loans, gifts and charities made to the household is taken into account while similar consumable articles given to others are not considered.

iii) The two concepts differ with respect to the way items are classified. In the NSS, food items like cereals, milk, edible oils,

sugar, salt, etc. cover only direct household consumption. Consumption of prepared food items is included under 'other food'. On the other hand, the concept of availability implied in the CSO approach includes both categories. This procedural difference affects item-wise comparison.

iv) Further discrepancies between the two estimates are likely to arise because of the different valuation procedures. While the CSO resorts to uniform valuation of any items of consumption at some weighted average prices, the NSS does broadly dual valuation for the same good with varying weights from household to household. It values consumption out of goods purchased in cash at retail prices, that of home grown stock at ex-farm price, that out of barter and transfers at the average retail price. To be noted here is the fact that these prices are the local ones. Also the valuation varies from household to household since the respective proportions of these three categories varies for the same good across households and for the same household across goods. Also prices vary across seasons and since the NSS uses a moving reference period, this would also affect the value of the aggregate estimate.

v) For the CSO, consumption refers actually to availability in any given year. On the other hand, NSS deals with only actual amount consumed in that year, even though the actual purchase for consumption may be much larger. Further, then, there is always a lag between production and consumption.

vi) Finally, we can also note differences with respect to the period for which these estimates are made. The CSO estimate of national

income pertains to the financial year --- April to March. But it is not really clear how the estimate of total Net Domestic Product is obtained for the financial year by combining the agricultural output, which is generally available for the agricultural year --- July to June, and the non-agricultural one, which can, however, be obtained for the period of one's choice. On the other hand, the NSS has been having varying periods of enquiry as the following table would show.[1]

Table 3.3: NSS Period of Enquiry

NSS Round	Reference period	Period of enquiry	NSS Round	Reference period	Period of enquiry
2	week	April-June 1951	14	month	July 1958-Jany. 1959
3	week	August-Nov. 1951	15	month	July 1959-June 1960
4	week	April-Sept. 1952	16	month	July 1960-Aug. 1961
	month	April-Sept. 1952	17	month	Sept. 1961-July 1962
5	week	Dec. 1951-March 1953	18	month	Feb. 1963-Jany. 1964
	month	Dec. 1951-March 1953	19	month	July 1964-June 1965
6	week	May-Sept. 1953	20	month	July 1965-Jany. 1966
7	month	Oct. 1953-March 1954	21	month	July 1966-June 1967
8	month	July 1954-March 1955	22	month	July 1967-June 1968
8*	month	July 1954-March 1955	23	month	July 1968-June 1969
9	month	May-Nov. 1955	24	month	July 1969-June 1970
10	month	Dec. 1955-May 1956	25	month	July 1970-June 1971
11	month	Aug. 1955-Jany. 1957	27	month	Oct. 1972-Sept. 1973
12	month	March-Aug. 1957	28	month	Oct. 1973-June 1974
13	month	Sept. 1957-May 1958	32	month	July 1977-June 1978

1 However, attempts have been made to overcome this problem of period, by obtaining NSS estimates for financial year using estimates from the successive rounds see, for instance, Mukherjee and Chatterjee, 1968.

On the whole, it appears that the two concepts are not strictly comparable. The results of such comparisons are unlikely to throw any light on the degree of bias and hence, reliability of the NSS data on consumption.

3.4 The NSS Methodology: A Brief Review

There exists a considerable amount of literature (See Dandekar and Rath, 1971; Srinivasan and Bardhan (eds.), 1974; Dandekar and Venkataramaiah (eds.), 1975; and Iyengar and Bhattacharya (eds.), 1978) on the important limitations of NSS methodology and their implications for estimates of consumption aggregates and distributions. Hence, we would highlight essentially some of the issues and their implications that have not received much attention in the literature.

The National Sample Survey is a socio-economic enquiry carried out in the form of successive rounds. There is no uniformity with respect to the period of enquiry among different rounds, and has generally taken a few months to one year. Collection of information on household consumption has been an important aspect of NSS enquiry right from its inception. The data are collected by interview method from the households, covering all items that are considered goods or services in the National Income Estimate of the CSO. But it excludes imputed rent of owner-occupied houses.

Selection of sample households is based on the principle of random sampling. The sample design is stratified and multi-stage for both rural and urban sectors. The first stage units are villages in the rural sector and urban blocks in the urban sector. The households constitute the second stage units in both the sectors.

Thus, the samples are not simple random. Rather the sampling is done according to some complicated designs involving stratification, multistage sampling, etc. Hence, estimation of standard errors of various aggregates is difficult. For this reason, one cannot say much about the sampling errors of the estimates and hence, about their degree of reliability in the conventional sense. With unknown margins of sampling and non-sampling errors it is difficult to judge, for instance, whether two or more estimated consumption distributions are really different. This is because, without an estimate of sampling and non-sampling errors, we cannot really test the statistical significance of the divergence between distributions. Only rough ideas can be formed using the half sample-wise results thrown up by the NSS[2]. There are also possibilities of non-sampling errors mainly due to conscious and unconscious reporting errors. Further, there are very few field studies supporting the current methodology of interviewing.

Another methodological limitation stems from the fact that the households are not stratified by income or living levels before sampling. This is likely to get reflected in the richer households being under-represented in the sample, vitiating estimates of items of conspicuous consumption and of inequalities in living levels. Rudra (1972) and Dandekar and Rath (1971) have also expressed similar doubts about the possible under-estimation of consumption by upper income groups due to such under-representation. This suspicion is not supported by clear evidence. It is possible that NSS is not undersampling the rich

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2. The standard errors of NSS estimates are discussed in Chapter 4.

but the few rich households in the sample are under reporting their consumption appreciably.

Also to be noted is that the NSS defines a household as a group of people living together and taking food from the same kitchen. By this very definition of a household, the NSS excludes from its sample nomadic and homeless people. This is likely to tell upon the estimate of lower tail of the distribution. Its effect is likely to give rise to a lower estimate of poverty, inequality and also aggregate consumption.

Further, the household consumption data pertain to a moving reference period. That is, all the sample households are not interviewed at the same time. Instead, they are interviewed on different dates spread uniformly over the period of enquiry. This may produce a seasonality bias. For the households that are interviewed immediately after the harvest, there is likely to be an upward bias whereas for others, there may exist a downward bias. Therefore, the reported variation in living levels among households is likely to be combined effect of seasonal and genuine variation.[3] Thus, the picture reported by the NSS appears to be a distorted version of the actual distribution of consumption among households. Since the published reports do not provide any information regarding the distribution of households by type and by date of interview, it is difficult to judge the likely impact of such an approach on the estimated consumption aggregate and its distribution.

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3. It may be noted that the average will be free from the effect of seasonality but variability will increase.

The NSS estimates of aggregates and distributions are also affected by the particular method of consumption valuation. As already noted, the NSS values consumption out of cash purchases and that out of barters and transfers usually at market retail price (p_m) and that out of home grown stock at ex-farm price (p_f). The following relations follow:

i) $p_{mj} \neq p_{fj}$, in general, for any good j

ii) For any given k-th household, the value of consumption of the j-th good is given by

$$C_{kj} = q_{kj}(\gamma_{kj}\, p_{mj} + (1 - \gamma_{kj})\, p_{fj}) \quad \ldots \quad (3.1)$$

where C_{kj} = value of consumption of the j-th good by the k-th household

q_{kj} = quantity consumed of the j-th good by the k-th household

γ_{kj} = proportion of cash purchase including barter and transfers in total consumption of the j-th good in the k-th household.

$(1 - \gamma_{kj})$ = proportion of home grown stock in total consumption of the j-th good in the k-th household; and

$0 \leq \gamma_{kj} \leq 1$

Hence, the value of total consumption of 'n' goods of the given k-th household is

$$C_k = \sum_{j=1}^{n} q_{kj} (\gamma_{kj}\, p_{mj} + (1- \gamma_{kj}) p_{fj}) \quad \ldots \quad (3.2)$$

iii) Now, the estimate of aggregate consumption (C*) of 'N' household will be

$$C^* = \sum_{k=1}^{N} \sum_{j=1}^{n} q_{kj} (\gamma_{kj}\, p_{mj} + (1 - \gamma_{kj})\, p_{fj}) \quad \ldots \quad (3.3)$$

iv) For the same household, all the γ_j's are not same. Hence, for the same household one will get different estimates of C depending upon the distribution of γ across goods.

v) The weighting patterns are different across households also. Therefore, depending upon whether the degree of monetization (broadly indicated by γ_{kj}) is an increasing or decreasing function of C_k and assuming $p_{mj} > p_{fj}$, one will get different estimates of C* and Lorenz ratio of C. (In fact, it has been found that behaviour of the degree of monetization across expenditure groups is not the same for all the states. For instance, it followed a u-shaped pattern in rural West Bengal and a linear pattern in rural Kerala (Mukherjee et al, 1981, p.3). (This problem is described in detail in Section 3.5).

vi) Since the prices used are local this would affect the inter-regional comparability of C* also. This is because regions differ with respect to the degree of monetization, etc.

vii) It would also affect the inter-temporal comparability of C* since over time generally the degree of monetization tends to increase towards unity.

Thus, we find that the dual valuation of consumption done by the NSS is likely to vitiate estimates of consumption and its distribution at a point of time and also their inter-temporal and inter-spatial comparability. Further, NSS valued consumption out of home grown stock at local retail prices upto the 8th round, but at ex-farm or ex-factory prices from the 9th round onwards. This would again affect aggregate PCE and its inter-temporal comparability.

There exists some confusion regarding recording of cooked meals received as perquisites or charity. But the instruction given to the field staff is the following:

> "Cooked meals may be (i) purchased from market, ie. hostel, restaurant, canteen, etc. (ii) received as perquisites from employer's household or (iii) received as charity. Only in case (i) entries will be recorded against item "cooked meals". In the case of (ii) no entry will be made in employee's house-hold (ie. the recipient household) against this item. On the contrary, in the employer's household, entries will be made against items of cereals, pulses, vegetables, etc., which constitute "cooked meal". The case (iii) will also be treated in the same manner as (ii), ie. no entry will be made in receiver household and entries against different items will be made in the household which makes the charity." (NSSO, 1977, p. 38).

What would be the implications of such an approach? Theoretically, it would appear to affect only the estimates of inequality and incidence of poverty. This is because the employee households, whose consumption go unrecorded, are likely to figure prominently among the lower rungs of the economic ladder. It may appear that the estimate of aggregate consumption will not get affected since what is not recorded of the employee households is taken care of while recording employer household's consumptions. This would be true if all classes of households are properly represented in the sample. If, however, we have only employer households in the sample, while having a few or no employee households, that would result in over-estimation of aggregate consumption. On the other extreme, having a few or no employer households in the sample would imply under-estimation of the aggregate. Thus, theoretically it is difficult to judge the probable consequences of the present approach on the national level aggregate unless one is

certain about the pattern of household distribution by type also. But it has been felt (Chatterjee and Bhattacharya , 1974) that actually even the employee households might have reported their 'cooked meals received as perquisites' as their own household consumption. In such an event, there would be double counting and over-estimation of the national aggregate.

Further, it may be noted that the NSS did not collect the consumption data only through the'Consumer Expenditure Enquiry'schedules. Besides consumption, it also collected information on income during the 10 to 14 rounds (through the 'Income and Expenditure' schedules) and during the 19 to 25 rounds (through the 'Integrated Household Survey' schedules). It has been felt that part of the reason for the larger discrepancy between the NSS and CSO estimates of aggregates during 1964-65 to 1970-71 (periods of 19 to 25 NSS rounds) is the Integrated Household Surveys (Mukherjee and Saha, 1981). This is because people tend to under-report income and along with it understate consumption also.

The reference period employed varied between rounds in earlier years, but has been a 'month' from the 7th round onwards. Also, the survey period used to be a few months in earlier rounds but it became one year from the 18th round onwards[4]. This would mean the effects of seasonality in consumption would vary between rounds and hence, also affect estimates of Lorenz ratio.

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4. It was 9 months during the 28th round.

It has also been pointed out that, consumption total included expenditure on house construction upto the 18th round (Rajaraman, 1976, p. 229). This would again affect PCE aggregate and its comparability over time.

3.5 NSS Data Valuation and its Welfare Implications

3.5.1 Introduction

Interest in inequality estimates is often generated by normative considerations involving welfare judgements. Underlying such an approach is the notion that given the community income a higher degree of inequality is associated with a lower level of social welfare and vice versa. Further, it is assumed that individual utility functions which form the basis of the aggregate social welfare function are functions of real income only so that in any welfare analysis involving comparisons of alternative income distributions it is the distribution of real goods that is of consequence.

Generally, some measure of inequality in distribution is made use of and alternative states of income distribution are ranked on the basis of information contained in such measures. For instance, given two income distributions, their ranking is sometimes done on the basis of the dominance of their respective Lorenz curves[5]. Implicit in such comparisons is the assumption that the commodity bundles -- representing real incomes -- at the disposal of each and every individual have been valued uniformly, ie. the same price for the same good across all individuals. So long as one is resorting to such a uniform system of

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5. For a discussion on Lorenz curve, see Chapter 4.

valuation, the relation between an inequality measure of distribution of real income, say L (Q), and that of distribution of money income, say L(PQ) will be monotonic and positive and one's conclusion will remain valid whether they are based on L(Q) or L(PQ). However, such a monotonic relation between inequality measures of real income L(Q) and those of money measure L(PQ) breaks down the moment one resorts to differential valuation of real income across individuals. The purpose of this Section is to exemplify such a problem in the specific context of the National Sample Survey data which resorts to what may be called dual valuation of consumption. The problem is examined in the particular context of using the Lorenz measure of inequality since the bulk of the studies of the distribution of levels of living based on the NSS data have made use of such a measure. For analytical simplicity, we assume an one-commodity world. This issue is examined in detail in the Section 3.5.2. The Section 3.5.3 is devoted to conclusion.

3.5.2 Analysis

We begin by postulating that an individual's welfare is a function of real consumption only ie. a function of physical quantity of the good consumed. In other words, we assume an individual utility function of the form

$$U_i = u(q_i) \qquad \ldots \quad (3.4)$$

where q is the physical quantity of the good consumed; and the function U(q) is assumed to be continuous and has continuous first-and second-order partial derivatives. We assume identical, concave utility functions and the Social Welfare to be an unweighted sum of individual

utilities. The Social Welfare function is additive, separable and symmetric. This would imply that aggregate social welfare is inversely related to the degree of inequality. And given two alternative state of consumption distribution -- denoted by Q^A and Q^B -- Q^A will be preferred to Q^B so long as $L(Q^A) < L(Q^B)$ in terms of Lorenz ratios or the Lorenz curve depicting Q^A lies above that of Q^B at all points excepting the extreme points.

Let us now examine the problems involved in using such a frame-work for the analysis of NSS data on distribution of consumption. Strictly speaking in the NSS data we have what may be called dual valuation of consumption. Broadly consumption is conceived to consist of two components: (1) consumption of goods bought at the market; and (2) consumption from home-grown stock. The first component is valued at market prices (P_m) and the second one is valued at ex-farm prices (P_f). We know that in general, $P_f < P_m$ so that $P_f = \delta P_m$ where $0 < \delta < 1$. Further, it is also known that the ratio of cash consumption to total consumption, say γ , what is in other words, called the degree of monetization, is a variable across households. If so, the relation between the Lorenz ratio of distribution of physical consumption $L(Q)$ and that of nominal consumption $L(PQ)$ will not be monotonic and $L(Q)$ will be $\lessgtr$ $L(PQ)$ depending upon whether $\frac{d\gamma}{d(q)} \gtrless 0$. Thus, there can be three limiting possibilities depending on the behaviour of $\frac{d\gamma}{d(q)}$ i.e. $\gamma'(q)$.

Case (i) $\gamma'(q) = 0$, where γ is a constant with respect to consumption, ie. the degree ofmonetization is the same across all expenditure groups.

Case (ii) $\gamma'(q) > 0$, where γ is an increasing function of consumption ie. higher the expenditure group, higher is the degree of monetization.

Case (iii) $\gamma'(q) < 0$, where γ is a decreasing function of consumption, ie. higher the expenditure group, lower is the degree of monetization.

Now, our concern is with the distribution of q and with the implication of dual valuation of q for the Lorenz measure of inequality. Let the distribution of q across N households be denoted by the Vector

$$Q = (q_1, q_2, \ldots\ldots\ldots q_N) \qquad .. \quad (3.5)$$

where q_i = physical consumption of q by the i^{th} household and $q_1 \leq q_2 \leq q_3 \leq \ldots\ldots \leq q_i \leq \ldots\ldots \leq q_N$. Let the Lorenz measure of inequality in the distribution of q be denoted by L(Q).

Consider the case where q_i's are uniformly valued at the same price p. That gives rise to a distribution of nominal consumption denoted by the vector

$$C^* = (pq_1, pq_2, \ldots\ldots\ldots pq_N) \qquad .. \quad (3.6)$$

Thus, we have a new function

$$c^* = g^*(q) = pq \qquad .. \quad (3.7)$$

where $g^{*\prime}(q) = p$ which is positive for all $q \geq 0$; and g(q) is a scalar transformation of q and hence, the elasticity of c^* with respect to q, denoted by $\eta_{g^*}(q)$, is unity.

Hence, by corollary to theorem 8.7 of Kakwani (1980, p.162) which states that

"The concentration curve for $g(x)$ coincides with the Lorenz curve for x if, and only if, $\eta_g(x)$ is unity for all $x \geq 0$".,

the Lorenz curve for C^* coincides with that for Q i.e. $L(C^*) = L(Q)$.

Let us now come to the concrete case of the NSS data where q_is are dually valued. Let that distribution be denoted by the vector

$$C = (c_1, c_2, \ldots\ldots\ldots c_N) \qquad \ldots \qquad (3.8)$$

where $c_i = q_i p/\gamma_i + (1 - \gamma_i)\ \delta$

Consider now the three limiting behavioural possibilities for γ (q).

Case (i) $\gamma'(q) = 0$ ie. γ is a constant across households so that $\gamma_1 = \gamma_2 = \ldots\ldots\ldots = \gamma_N = \bar{\gamma}$ where $\bar{\gamma}$ is the average for the whole population. So we have

$$c_1 = q_1 p/\bar{\gamma} + (1 - \bar{\gamma})\ \delta$$

$$c_2 = q_2 p/\bar{\gamma} + (1 - \bar{\gamma})\ \delta$$

$$\vdots$$

$$c_N = q_N p/\bar{\gamma} + (1 - \bar{\gamma})\delta$$

or in general, $$c_i = q_i p/\bar{\gamma} + (1 - \bar{\gamma})\delta \qquad \ldots \qquad (3.9)$$

Thus, we obtain a function

$$o = g(q) = kq \qquad \ldots \qquad (3.10)$$

where $k = p/\bar{\gamma} + (1 - \bar{\gamma})\delta$

$$g'(q) > 0 \ \forall\ q \geq 0;$$

and $g^*(q)$ is a scalar transformation of q; hence the elasticity of $\bullet$ with respect to q is unity.

Hence, by the above theorem we have

$$L(d) = L(C^*) = L(Q) \qquad \ldots \quad (3.11)$$

Case (ii): $\gamma'(q) > 0$, ie. γ is a variable and is an increasing function of q subject to $0 \leq \gamma \leq 1$.

We have

$$\begin{aligned} 0 &= q_i p[\gamma_i + (1 - \gamma_i)\,\delta] \\ &= g(q) \\ &= k_i\, q_i \end{aligned} \qquad \ldots \quad (3.12)$$

where $k_i = p[\gamma_i + (1 - \gamma_i)\,\delta]$ is a variable,

$$\frac{dk}{dq} = \frac{dk}{d\gamma}\,\frac{d\gamma}{dq} = p(1 - \delta)\,\frac{d\gamma}{dq} > 0$$

since $p(1 - \gamma) > 0$ and $\frac{d\gamma}{dq} > 0$

and $g'(q) > 0 \;\forall\; q \geq 0$

The elasticity of C^* with respect to q is given by

$$\eta_g(q) = 1 + \frac{dk}{dq}\,\frac{q}{k} > 1 \qquad \ldots \quad (3.13)$$

since $\frac{dk}{dq} > 0$.

Hence, by corollary (8.5) of Kakwani (1980, p. 163), which states that

"If the function $g(x)$ has a continuous derivative $g'(x) > 0$ for all x, $g(x)$ is Lorenz superior (inferior) to x if $\eta_g(x)$ is less (greater) than unity for all $x \geq 0$".

We obtain C^* as Lorenz inferior to Q. ie. $L(C^*) > L(Q)$ in terms of Lorenz ratio.

Case (iii): $\gamma'(q) < 0$, ie. γ is a variable and a decreasing function of q subject to $0 \leq \gamma \leq 1$.

We have

$$\sigma_i = q_i\, p \left[\gamma_i + (1 - \gamma_i)\, \delta \right]$$
$$= g(q)$$
$$= k_i q_i \qquad \ldots (3.14)$$

where $k_i = p\left[\gamma_i + (1 - \gamma_i)\, \delta \right]$ is a variable,

$$\frac{d\,k}{d\,q} = \frac{d\,k}{d\,\gamma} \quad \frac{d\,\gamma}{d\,q} = p(1 - \delta)\, \frac{d\,\gamma}{d\,q} < 0$$

since $p\left[1 - \delta\right] > 0$ and $\frac{d\,\gamma}{d\,q} < 0$

and $g'(q) > 0 \qquad q \geq 0$

The elasticity of C with respect to q is given by

$$\eta_g(q) = 1 + \frac{d\,k}{d\,q} \quad \frac{q}{k} < 1 \qquad \ldots (3.15)$$

since $\frac{d\,k}{d\,q} < 0$.

Hence, by the above corollary, we have C as Lorenz superior to Q.

ie. $L(q) < L(Q)$ in terms of Lorenz ratio.

The results derived in the context of the one commodity world cannot be simply extended to the n-commodity case. The latter case is beset with the problems of aggregation of heterogenous units and of a variable γ across commodities and households. However, the problem can be simplified by assuming a framework involving comparisons of the distribution of q, ie. the same set of commodity bundles under conditions of single valuation and dual valuation. Further, γ may be assumed to be the same for all commodities within a household.

3.5.3 Other implications

In this Section, we have tried to show analytically that under conditions of dual valuation of a good q, the Lorenz measure of

inequality is likely to be higher or lower when it is based on the distribution of value of q than on q itself depending upon the pattorn of weighting across different income groups. The conclusions derived within one commodity world framework can be generalized to the n-commodity case also under an assumption of uniform behavioural pattern of γ for all commodities across income groups. Its temporal implication for inequality estimates are slightly complicated. This is because the effect of such a system of dual valuation on the inequality estimates depend not only on the distribution of γ across income groups but also on the temporal distribution of γ for each income group. However, in the development context the value of γ is generally expected to approach unity resulting in C becoming a scalar transformation of Q and hence, L(C) becoming equal to L(Q). At present, the conclusions derived above are quite important, the value of $\bar{\gamma}$ being 0.6 for rural India and 0.9 for urban India. (Mukherjee et al (1981). p. 3). The same study has also found wide inter-state variations in the behaviour of γ across expenditure groups. While γ is found to rise with per capita consumption expenditure in rural India and insome other states, it followed a u-shaped pattern in rural West Bengal and a linear pattern in the context of rural Kerala. As regards the urban sector, γ is found to rise clearly in the case of Uttar Pradesh and to follow a linear path in the case of West Bengal and Kerala. If so, then inter-state comparisons of inequalities in levels of living based on the NSS data are likely to give rise to erroneous conclusions. That would also cast doubt on the currently prevalent practice of pooling inter-state

or inter-sectoral distribution to obtain combined distribution for the economy as a whole.

3.6 Concluding Remarks

The foregoing discussion leads us to the following conclusions:

i) The NSS, based on scientific sampling procedures, provides only an estimate of the population parameter whose true value is unknown. Even computation of the standard errors of the estimates has been rendered difficult by its complicated sampling designs. Therefore, conducting the conventional statistical tests of significance of various estimates is not that easy.

ii) There exists no other alternative estimate of the same parameters which may be used to assess the reliabilityand validity of the NSS estimate. Even the CSO estimates of private consumption does not provide any reference estimate with which to compare the NSS one. There are both conceptual and methodological grounds which render any strict comparison between the CSO and NSS estimates impossible.

iii) There are certain inherent methodological shortcomings of the NSS data which render its estimates less than fully satisfactory. The very nature of these shortcomings is such that it is difficult to assess their precise implications for the NSS estimates of consumption aggregates and their distributions.

Chapter 4

METHODOLOGY

4.1 Estimates for Fractile Groups

The NSS reports on consumption provide data in the form of size distribution of households or population across different classes of per capita nominal consumption expenditure (PCE). The present study is based on the NSS data for the twelve rounds (from 17 to 32) conducted during the years 1961/62 to 1977/78.[1] Of them, for the first nine rounds (i.e. from 17th to 25th) and for the 32nd round, the reports provide data on distribution of persons also while for the 27th and 28th rounds, data are available only on the distribution of households over the per capita expenditure (PCE) classes. But, our objective is to examine personal distribution of consumption. Hence, we convert the 27th and 28th rounds' data on household distribution into personal ones, using information on average household size for each PCE class.

Further, the expenditure classes are defined on a monthly per capita consumption basis. The class intervals are kept invariant with respect to price variations over time or across space.

[1] These data are taken from the following NSS reports: they are report nos: 142, 184, 179, 209, 216, 228, 235, 231, 284, 274 and 311.

For instance, during the 17th to 28th rounds, the NSSO classified the population into 13 expenditure classes: viz., those incurring a monthly per capita consumption expenditure of less than Rs eight, between Rs eight and 11, Rs 11-13, Rs 13-15, Rs 15-18, Rs 18-21, Rs 21-24, Rs 24-28, Rs 28-34, Rs 34-43, Rs 43-55, Rs 55-75, and Rs 75 and above. But the 27th and 28th round survey reports clubbed the first three classes to form one class, 0 to Rs 13, and subdivided the Rs 75 and above PCE class into Rs 75-100, Rs 100-150, Rs 150-200, and Rs 200 and above classes. The 32nd round survey report followed a different classification; it being, 0 to Rs 10, Rs 10-15, Rs 15-20, Rs 20-30, Rs 30-35, Rs 35-40, Rs 40-50, Rs 50-60; Rs 60-70, Rs 70-80, Rs 80-100, Rs 100-150, Rs 150-200 and Rs 200 and above.

The present study cannot be based directly on such distributions. The problem in working with the NSS type distributions of population is that their inter-spatial and inter-temporal comparisons are not at all convenient. This is because population weights of the different expenditure classes vary across space and over time. In order to facilitate spatial and temporal comparisons of the distributions, we derive for each of the twelve NSS rounds under consideration a fractile-group-wise distribution of population with percentage consumption share and PCE corresponding to each fractile group. Such distributions, besides their comparability over time/regions also enable deflation of fractile group-wise PCE by a fractile group specific deflator to arrive at the distribution of real consumption.

It is possible to construct fractile group wise distribution of consumption either (i) by using a statistical distribution model or (ii) by one of interpolation devices. In this study, we have adopted the linear interpolation method because it is simple, and is closely related to the concept of the Lorenz curve. The method is as follows:

Let p_i be the proportion of people belonging to the ith expenditure class and q_i be the proportionate share in the total consumption of this group of population. Let P_i be the cumulative proportion of population with per capita consumption less than the upper limit of the ith class interval and Q_i be the cumulative proportion of consumption corresponding to P_i. The curve obtained by joining the successive points $(P_i, Q_i) = (0, 0), (P_1, Q_1), \ldots (P_n, Q_n)$ is the broken chain Lorenz curve. The ordinates Q are obtained by linear interpolation for the given values of P = 0.05, 0.1, 0.2 ... In the present study, the population is divided into 12 fractile groups; the poorest five per cent, the next poorest five per cent, i.e. five to ten per cent, the next 10 per cent, and so on, the last two groups being the second richest five per cent, i.e. 90 to 95 per cent and the richest five per cent (beteen 95 and 100 per cent).

Such distributions are derived separately for the rural and urban sectors of India and of 14 individual States and also for the major Indian cities (Bombay, Calcutta, Delhi and Madras) pooled

together. The cities themselves are a subset of the all-India urban sector and the consumption distributions are available for both the cities and the urban sector (cities inclusive) as a whole. Since the all India urban sector is the union of two mutually exclusive subsets, viz., the cities and its complement, i.e. the 'non-city urban', it is possible to derive consumption distribution for the 'non-city urban' sector from the given distributions for the cities and the urban sector, using population weights. Accordingly, we derived, first the NSS type distributions for the non-city urban sector as the residual distribution remaining after removing the city distribution embodied in the overall urban distribution, using their respectiye shares in urban population as weights. Next, the fractile groupwise distribution of consumption was obtained for the non-city urban sector.

It may also be noted that among the States, regarding Punjab and Haryana, the NSS reports give separate distributions for the years after 1963/64 (i.e. from the 19th round onwards). As regards the 17th and 18th rounds, the NSS reports give distributions for the rural and urban sectors of pre-partition Punjab, that is, for Punjab and Haryana taken together. Therefore, to make the data comparable for the entire period of the study, the combined Punjab-Haryana distributions for the years following 1963-64 are obtained by pooling the distributions for Punjab and Haryana. While pooling the consumption distributions of rural Punjab and rural Haryana,

their respective rural population shares in their combined rural population as reported in the 1971 census are used as weights. The same procedure is followed while obtaining the consumption distributions for combined urban Punjab-Haryana.

4.2 Problems of Deflation

The problems of deflating the NSS estimates of consumption for changes in prices have been extensively discussed (Iyengar and Bhattacharya., 1975; Bardhan, 1974; Vaidyanathan, 1974; Radhakrishna and Sarma, 1975; Murty and Murty, 1977, Murty, 1985). It is now absolutely clear that the changes in price levels have not been uniform across broad groups of commodities and the commodity composition of consumption varies between classes. Therefore, the impact of price variation has been appreciably unequal for different sections of the population. Hence the differential deflation procedure has been considered to be the appropriate method.

For this purpose, we have constructed fractile group-specific price indices on the basis of the all India wholesale price indices for different commodity groups and using the proportion of expenditure on different commodity groups of each fractile group as weights. Such fractile group-specific price indices are constructed separately for the rural and urban sectors of each State and of all-India and for the cities and the all-India non-city urban sector. Thus, the weights used in the construction of these fractile group-specific

price indices are specific to the group and region. But the price relatives are not. This is because the wholesale price relatives are not available by fractile-groups and by regions and hence, the price-relatives for each of the fractile groups are taken to be the same as those for the country.

It would have been a better procedure to use retail price relatives for the rural and urban areas separately. But since such data are not available for all the relevant commodity groups, and years, we were forced to use wholesale price indices as the best approximation possible with the available information. The weighting diagrams used in the construction of fractile group-specific price indices are from the NSS 17th round data relating to the period September 1961-July 1962. (Report No.184). The report provides information on per capita consumption of each expenditure group of most of the commodities entering the consumption basket. In the present study, we have taken the following broad commodity groups for constructing the price indices:

i) cereals and cereal substitutes;

ii) pulses and pulse products;

iii) milk and milk products;

iv) fish, eggs and meat;

v) edible oils;

vi) sugar;

vii) fruits, vegetables and nuts;

viii) other food items;

ix) clothing;

x) fuel and light; and

xi) other non-food items.

The relevant wholesale price indices for these commodity groups with 1961/62 as base are taken from the Reserve Bank of India (RBI) annual reports on Currency and Finance. They are those of

i) cereals;

ii) pulses;

iii) milk and milk products;

iv) fish, eggs and meat;

v) edible oils;

vi) sugar;

vii) fruits and vegetables;

viii) other food items;

ix) textiles;

x) fuel and light; and

xi) miscellaneous finished manufactured products.

These official price indices for different commodity groups were computed using wholesale price relatives of individual commodities with their respective output shares as weights. For the present purpose, a better procedure would have been to use region-specific and fractile group-specific Engel ratios as weights in constructing group price relatives. But lack of access to detailed commodity-wise price relatives even for all-India forced us to

adopt the simpler procedure outlined below.

We have constructed fractile group-specific price indices for cities, for the rural areas and for the urban areas of India and of 14 individual States separately, using wholesale price relatives with weights drawn from consumption distributions of the respective fractile group, sector and state. It is difficult to judge how far the relative crudeness of the deflator would affect the results. This is particularly true of Kerala, where the effect of the widespread rationing system on the prices paid by the common man were not taken into account.

Given the required data mentioned above, the deflator for the i-th fractile group and for the t-th year of a given sector and state is obtained by using the Laspeyre's formula:

$$D_{it} = \sum_{j=1}^{11} P_{jt} W_{ij} \qquad \ldots \quad (4.1)$$

$i = 1, 2, \ldots, 12$

$j = 1, 2, \ldots, 11$

$t = 1961/62, \ldots, 1973/74, 1977/78$

where:

D_{it} = deflator for the i-th fractile group in the t-th year;

P_{jt} = wholesale price index for the j-th commodity group in the t-th year with 1961/62 as base;

W_{ij} = proportion of expenditure of the i-th fractile group on the j-th commodity group, in the base year 1961/62.

And the mean consumption of the whole population (i.e. average PCE) of a given sector 's' is deflated by the deflator given by

$$D_{st} = \sum_{j=1}^{11} P_{jt} \bar{W}_{ij} \quad \ldots \quad (4.2)$$

$$j = 1, 2, \ldots\ldots 11$$

$$t = 1961/62, \ldots\ldots, 1973/74, 1977/78$$

where:

D_{st} = deflator for the whole population of the given sector 's' in year t;

P_{jt} = wholesale price index for the j-th commodity group in the t-th year with 1961-62 as base;

$\bar{W}_{ij}$ = proportion of mean PCE of sector 's' on j-th commodity group in the base year 1961/62.

As already pointed out, these deflators are not entirely satis-factory since they are based on the all-India wholesale price relatives. However, at least for the rural population as a whole of each state and the country, a more satisfactory analysis can be arrived at by using Agricultural Labourers' consumer Price Indices (ALCPI) compiled and published by the Labour Bureau, Government of India. They are available for each state and are based on state-specific rural retail prices and consumption weights of agricultural labourers. We have carried out analysis of average real PCE using these two deflators, namely, D_{st} mentioned above and ALCPI. For the average PCEs of urban sector and cities at the all India level, we have carried out a similar analysis uging our deflator and the Industrial Workers' Consumer Price Index (IWCPI) and also Working Class Consumer Price Index (WCCPI).

4.3 Measures of Inequality

4.3.1 Lorenz Ratio

A good deal of literature exists on the various measures of inequality[2]. There are both positive and normative measures of inequality. This study, being largely positive in its approach, is based on the Lorenz ratio measure for analytical purposes. This is because of the following considerations:

i) The Lorenz ratio is a 'positive' measure;

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2. See, for instance, Sen (1973), Kakwani (1980), and Anand (1983).

ii) Many important results in inequality measurement and many inequality indices are based on the Lorenz curve for the distribution of the variable concerned (Anand, 1983, p. 303).

iii) The size distribution of population by PCE classes estimated from different rounds of the NSS have been found to be approximately log normal in a large number of studies[3]. But the Lorenz curves of the different members of the log normal family do not intersect and any other measure of disparity is expected to be approximately monotonically related to the Lorenz ratio (Chatterjee and Bhattahcarya, 1974a. p.188). Therefore, Lorenz ratios are expected to summarise sufficiently the inequality aspects of these distributions.

iv) The Lorenz ratio satisfies all the three basic properties that an inequality index is expected to satisfy (Anand, 1983; p.306). They are (1) mean independence, that is, the index remains invariant with respect to scalar transformation of the variable, (2) population size independence, that is, the index should remain unchanged if the number of people at each level of the variable concerned is changed by the same proportion, and (3) the Pigou—Dalton condition, that is, rank preserving transfers from a richer to a poorer person should reduce the value of the index.

3. See, Bhattacharya. (1978) for a survey of these studies.

v) Further, it has been found that, among the various inequality measures, including Theils index and Atkinson's measures, the Lorenz ratio is the least affected by grouping of observations (Prasad and Iyengar, 1984). The NSS data being available only in group form, the Lorenz ratio appeared to be the appropriate measure of inequality

The Lorenz curve, developed by Lorenz (1905), is defined as the curve whose ordinate and abscissa are F_1 and F, defined for the argument Y as

$$F(y) = \int_0^y dF(t) \qquad \ldots (4.3)$$

and

$$F_1(y) = \int_0^y \frac{t}{\mu} \, dF(t) \qquad \ldots (4.4)$$

The graph of the curve is represented in a unit square. The straight line joining the points (0,0) and (1,1) is called the Line of Equal Distribution P. This is because along this line $F = F_1$, which means each unit receives the same amount of the variable. The Lorenz curve L(P) lies below the Line of Equal Distribution. When each unit receives the same amount, the Lorenz curve coincides with the Line of Equal Distribution. The Lorenz curve must satisfy the following conditions:

i) If $F = 0$, $F_1 = 0$.

ii) If $F = 1$, $F_1 = 1$.

iii) $F_1 \leq F$

iv) Slope of the Lorenz curve increases monotonically.

The Lorenz area is the area between the Lorenz curve, L(P) and the egalitarian line, P, and is obtained by

$$LA = \int_0^1 [P - L(P)]\,dP$$

$$= \tfrac{1}{2} - \int_0^1 L(P)\,dP \qquad \ldots (4.5)$$

The most widely used measure of inequality based on the Lorenz curve is the Lorenz ratio (L.R). It is defined in different equivalent ways[4]. The Lorenz ratio is defined as the ratio between the observed Lorenz area and the maximum possible Lorenz area. It is geometrically equal to one minus twice the Lorenz area. The Lorenz ratio is given by

$$LR = \frac{1}{2\mu} \int_0^\infty \int_0^\infty |y - x|\, dF(x)\, dF(y)$$

$$= 2 \int_0^\infty F(y)\, dF_1(y) - 1 \qquad \ldots (4.6)$$

Since the NSS data are available only in group form, we had to estimate the LRs by some approximate rule. So we estimated the LRs employing the trapezoidal formula which is given by

$$LR = 1 - \sum_{i=1}^{k} (P_i - P_{i-1})(Q_i + Q_{i-1}) \qquad \ldots (4.7)$$

where:

P_i = cumulative proportion of population including the i-th group;

4. See, Anand (1983).

Q_i = cumulative proportion of consumption corresponding to P_i.

k = total number of expenditure classes.

We have estimated the LRs both at current and at constant (1961/62 base) prices.

4.3.2 Decomposition of Lorenz Ratio by Sectors

Ramakrishnan (1984) has developed sectoral decomposition formula for the Lorenz ratio. It is based on the following definition of Gini ratio:

$$G = \frac{1}{\mu} \int_0^\infty F(x)\,(1-F(x))\,dx \qquad \ldots (4.8)$$

where:

G = Gini ratio,

F(x) = distribution function of the variable X

$\mu = E[X]$; that is, the mean of X .

If F_i is the distribution function for the i-th sector and p_i the population proportion of that sector, then

$$F(x) = \sum_{i=1}^{m} p_i F_i(x) \qquad \ldots (4.9)$$

where m is the number of sectors. When m = 2 and using (4.9) in (4.8), we get

$$G = \frac{1}{\mu} \int_0^\infty [p_1 F_1(x) + p_2 F_2(x)]\,[p_1 (1 - F_1(x)) + p_2 (1 - F_2(x))]\,dx$$

$$= \sum_{i=1}^{2} p_i q_i G_i + \frac{1}{\mu} p_1 p_2 \int_0^{\infty} (F_1 + F_2 - 2F_1F_2)\, dx \quad . . (4.10)$$

where:

q_1 = consumption share of the i-th sector, and

$\frac{1}{\mu} p_1 p_2 \int_0^{\infty} (F_1+F_2 - 2F_1F_2)dx$ is the measure of intersectoral disparity.

4.3.3 Other Inequality Measures

Another inequality measure estimated for nominal distribution of PCE is the standard deviation of logarithms of PCE. We have estimated this measure using the two-parameter lognormal model and using the estimated LR. Given the LR, the standard deviation for a two-parameter lognormal model is given by

$$\lambda = \sqrt{2}\ t_{(\frac{1 + L}{2})} \quad . . (4.11)$$

where: λ = Standard deviation of two-parameter lognormal model

L = Lorenz ratio; and

t is the standard normal abscisa such that $'t'_{\alpha}$ is

$$\alpha = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{t} \exp\left(-\frac{1}{2} t^2\right) dt \quad . . (4.12)$$

$(0 < \alpha < 1)$

Other measures of inequality used in the study are percentage share in consumption of the bottom 10 per cent, bottom 40 per cent and top 10 per cent of the population. These are the measures used in examining inequality in personal distribution of PCE.

We have also examined disparities in inter-state distribution of consumption. For this purpose, we have used the IR and the Kurznets' Index as measures of inter-regional inequality. The IR is estimated using the same formula as (4.7). The Kuznets' Index is given by :

$$K = \frac{1}{2} \Sigma \quad |p_i - q_i| \qquad \ldots \quad (4.13)$$

where:

k = Kuznets' Index,

p_i = proportion of population in the i-th state,

q_i = proportionate consumption share of the ith state.

4.4 Standard Error of the Estimate

Given the fact that the study is based on sample data, a knowledge of standard error of the estimates would have been useful in the analysis. But the NSS is not based on the principle of simple random sampling. The sample households are selected according to complicated designs of sampling involving stratification, two or three stage sampling, etc. Therefore, the standard errors of Lorenz ratios cannot be easily estimated. For the same reasons, it has also been argued elsewhere (Bhattacharya 1970a, p.182) that standard statistical procedures like t- and F-tests cannot be applied to estimates based on the NSS data.

But it is argued that one can estimate the margin of error associated with the inequality estimate or any other estimate based

on the two half samples of the combined NSS sample. Suppose one is estimating the proportion of population in any PCE class, or for that matter, any population characteristic. If t_1 and t_2 are the two sub-sample estimates and t_c the combined estimate, the difference between t_c and $(t_1 + t_2)/2$ is ignored. Instead, the standard deviations of the two values t_1 and t_2 are considered. This comes out as $\left| \frac{t_1 - t_2}{\sqrt{2}} \right|$. This is the standard error of any one of these estimates. The standard error of $t_c = (t_1 + t_2) / 2$ is then given by :

$$S.E\ (t_c) = \frac{\left| t_1 - t_2 \right|}{\sqrt{2}} / \sqrt{2} = \frac{\left| t_1 - t_2 \right|}{2} \quad \ldots \quad (4.14)$$

This is what one can use. It is rough, since it is based on only one degree of freedom. The confidence intervals for true values are often too wide. If we had more than two subsamples, the estimate of standard error would have been much better. In general, if we have k sub-samples, then

$$SE\ (t_c = \bar{t}\ ) = \left(\frac{1}{K(K-1)} \sum_{i=1}^{k} (t_i - \bar{t}\ )^2 \right)^{\frac{1}{2}} \quad \ldots \quad (4.15)$$

and this is based on k-1 degrees of freedom.

Suppose that we have two sub-sample estimates for each of two states, say, Kerala and Karnataka, called Populations 1 and 2.

	s.s.1 estimate	s.s.2 estimate	Combined estimate
Population 1	t_{11}	t_{12}	t_{1c}
Population 2	t_{21}	t_{22}	t_{2c}

One can test the significance of the difference between t_{1c} and t_{2c} by using the standard errors estimated as above, or better by ANOVA techniques, if one can assume homoscedasticity. This approach is general and can be used for all types of estimates. If sample sizes are very much unequal, the assumption of homoscadisticity may not be valid. Further, if we have k subsamplewise estimates of a population parameter θ, then the interval from the lowest to the highest among the subsample estimates is a confidence interval for θ with confidence coefficient $= 1 - 2\left(\frac{1}{2}\right)^k$ [5].

If we have a series of estimates by subsamples one and two and combined, the position becomes complicated. For example, if we have percentage distribution of population over PCE classes by s.s.1, s.s.2 and combined, we can study subsample divergence as above for each PCE class. There is no standard measure of overall divergence between subsamples considering all PCE classes. If the Lorenz curves are drawn on a transparent paper, a curve for a particular round can be superimposed on the curve for another round. The two curves show the pooled estimate with a band given by the two subsample estimates. Mahalanobis (1960) called the area between the two sub-sample curves the 'error area'. He used the 'error areas' to measure divergence between two sub-samplewise Lorenz curves and to assess in a semi-intuitive manner the significance of separation

5. See, NSS Report No.5: Technical Note on Some Aspects of Sampling Design.

between Lorenz curves of two populations. Only when the error areas for two rounds do not overlap, we say that there has taken place a significant change in the concentration. These are the technical aspects. However, empirically, we have not been able to carry out any solid analysis because the NSS has discontinued the practice of publishing sub-samplewise estimates from the 20th round onwards.

4.5 Poverty Estimates

We have analysed issues relating to poverty using the absolute poverty framework. Here, we are not really concerned with the choice of the appropriate criteria for deciding the poverty line or other issues involved in the poverty debate. (Dandekar, 1981, 1982; Krishnaji 1981a, 1981b, Sukhatone 1981a, 1981b). We have used the poverty lines estimated by Bardhan (1970a, 1970b, 1973) for rural India (Rs 15 per month) for the year 1960/61 and those for the individual states. At the state level, we have carried out the analysis in two different ways. To begin with, while making inter-state comparisons we followed Bardhan's procedure. We adjusted poverty lines for price changes using state-specific ALCPI and estimated the proportion following below the poverty line by the method of linear interpolation. In the second approach, we reconstructed all the consumption distributions at 1961/62 prices and using Bardhan's poverty lines for 1961/62, we estimated poverty. This procedure was followed while making inter-temporal analysis for each state.

It may be noted that so far no attempt has been made to estimate state specific urban poverty lines. In this study, we have made an attempt to estimate state-specific urban poverty lines for the year 1973/74 corresponding to the all-India urban poverty line of Rs 56.64 estimated by the Planning Commission (1984). This we did by adjusting for inter-state price variations using inter-state price indices (with all-India base) constructed by Bhattacharya et al (1980).

CHAPTER 5

CONSUMPTION INEQUALITY : ALL INDIA

5.1 Introduction

Studies on income distribution in India have generally used the NSS data on consumption distribution as proxy and have drawn conclusions on that basis. The use of consumption as proxy for income is justified on the following grounds:

i) In India the average PCE is itself at a very low level, and between 40 and 60 per cent of the population lives below the poverty line. Hence there can hardly be any significant savings for the majority of the population and that one can expect very high positive correlation between consumption and income levels. Thus, it is argued that consumption distributions can, for all practical purposes, be held to reflect changes in income distributions.[1]

ii) Consumption distribution is a better proxy for permanent income distribution than current income distribution which is subject to more transitory factors.[2]

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1 A similar type of argument can be found in Dutta Roy Chowdhury (1966).

2 See Bardhan (1974).

Strictly speaking, whether this argument is tenable or not depends upon relative income increases of the different groups and the shape of the consumption function. Viewed from this angle, it is quite possible that a decrease in consumption inequality may accompany an increase in income inequality. Keeping this limitation in mind, we go on to examine changes in intra-sectoral and inter-sectoral consumption distributions in India.

5.2 Relative Consumption Levels

Table 5.2 presents average PCE at current prices in the rural, urban, non-city urban sectors and the metropolitan cities by sub-samples. They show the margin of error to be small. The estimates for the combined sample in Table 5.2 reveal the following important features:

i) Ignoring the sectoral price differentials urban consumption level is higher than the rural; the non-city urban consumption level is higher than the rural; the city-rural disparity is higher still which also implies a higher average PCE in the cities than in the non-city urban areas.

ii) Ignoring differences in sectoral price movements, the above mentioned inter-sectoral disparities keep fluctuating without showing any definite trend.

Table 5.1 : NSS Sample Size by Sectors (All India) and by NSS Rounds.

NSS Round	NUMBER OF SAMPLE HOUSEHOLDS		
	Rural	Urban	Cities
17	7173	5247	723
18	21776	4296	607
19	14974	9943	1582
20	14619	9277	1372
21	16399	13062	1836
22	16293	8624	914
23	9116	9458	918
24	33258	19262	2364
25	37593	18930	2713
27	72270	52820	6033
28	15467	7881	857
32	99766	58162	NA

NA = Not Available.

Table 5.2 : Estimates of Monthly Average PCE by Sub-samples (Rural, Urban, Non-city urban, Cities)

NSS Round	s.s.1	s.s.2	Combined
		RURAL	
17	20.70	21.42	21.73
18	22.19	22.55	22.37
19	26.66	26.20	26.44
		URBAN	
17	31.79	29.36	30.86
18	32.93	33.00	32.96
19	36.12	35.97	36.03
		NON-CITY URBAN	
17	28.48	26.92	28.04
18	29.81	29.76	29.84
19	32.39	32.40	32.38
		CITIES	
17	51.99	44.27	48.04
18	51.28	52.80	52.03
19	58.88	57.78	58.34

Note: The NSSO discontinued publishing data by sub-samples from the 20th round onwards.

s.s.1 = Sub sample 1
s.s.2 = Sub sample 2

Table 5.3 : Estimates of Monthly Average PCE - India (Rural, Urban, Non-City Urban and Cities)

NSS Round	Period of Survey	Average PCE (at current prices)				Ratio of Average PCEs		
		Rural	Urban	Non-City Urban	Cities	Urban to Rural	Non-City Urban to Rural	City to Rural
17	September 1961-July 1962	21.73	30.86	28.04	48.04	1.42	1.29	2.21
18	February 1963-January 1964	22.37	32.96	29.84	52.03	1.47	1.33	2.33
19	July 1964-June 1965	26.44	36.03	32.38	58.34	1.36	1.22	2.21
20	July 1965-June 1966	28.40	36.65	33.29	57.21	1.29	1.17	2.04
21	July 1966-June 1967	30.90	41.54	38.08	62.76	1.34	1.23	2.03
22	July 1967-June 1968	33.40	44.82	41.37	66.03	1.34	1.24	1.98
23	July 1968-June 1969	33.29	46.04	42.50	67.83	1.38	1.28	2.04
24	July 1969-June 1970	34.70	50.39	45.95	77.80	1.45	1.32	2.24
25	July 1970-June 1971	35.31	52.85	48.42	80.19	1.49	1.37	2.27
27	October 1972-September 1973	42.32	63.33	58.44	93.63	1.49	1.38	2.21
28	October 1973-June 1974	53.01	70.79	66.44	97.81	1.34	1.25	1.85
32	July 1977-June 1978	68.89	96.15	-	-	1.40	-	-

Note: NSS Report No 311 for the 32nd Round does not provide data for the cities

As is customary with trend analysis studies, we adjust the data on sectoral average PCEs for inflation over time. But, as already pointed out, our deflation procedure is slightly crude in nature. We construct the deflators for each sector using common all-India commodity-wise wholesale price indices and sector specific consumption weights. How far this procedure would affect the real magnitudes depends upon the degree of approximation of the all-India wholesale price indices to the sector-specific ones; this cannot be examined for want of the latter. Since it is expected that sectoral price movements would not differ to a considerable extent in an integrated economy like India, these deflators based on all-India wholesale price indices would nearly approximate the actual ones. And the adjusted figures on mean PCE would at least reflect broad trends in real magnitudes. To examine the goodness of our deflators, we compare them for the rural sector with the all India ALCPI, and those for the non-city urban and urban sectors with the all-India Urban Industrial Workers' Consumer Price Index (UIWCPI) and also with all-India Working Class Consumer Price Index (WCCPI). We compare our deflator for the cities with the IWCPI for the cities. On the whole we find the following:

i) Our deflators (columns(2) to (6), Table 5.4) show the severity of inflation to be higher in the rural sector than in the 'non-city urban' and urban sector as a whole and higher in the non-city urban sector than in the cities

ii) Our deflator for the rural sector shows a lower rate of inflation than the ALCPI upto 1973/74;

iii) Our deflator for the non-city urban and urban sectors show almost the same rate of inflation as those by all India UIWCPI and all India WCCPI; and

iv) Broadly, compared with all cities IWCPI our deflator for the cities show a higher rate of inflation upto 1967/68 and a lower rate thereafter.

The deflated figures on average PCE (Table 5.5) show no significant change in real consumption during the period as a whole in all the four regions. This is true even of those figures for the four regions obtained using ALCPI and IWCPI except for some differences in rates of change.

Table 5.4 : Sector-Sepcific Deflators for Average PCE for the Relevant Years

Year	Rural	Urban	Non-City Urban	Cities	All-India ALCPI[1]	All-India UIWCPI[2]	All-India WCCPI[3]	All Cities IWCPI[4]
1961/62	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1963/64	110.15	109.00	109.18	108.24	114.56	105.77	106.35	105.49
1964/65	126.65	122.08	122.93	119.44	137.86	120.19	120.63	116.38
1965/66	136.25	131.37	132.16	128.71	150.49	131.73	131.75	125.15
1966/67	156.17	148.70	149.92	144.56	184.46	145.19	146.03	140.14
1967/68	177.70	165.14	166.88	157.74	200.00	165.38	165.87	155.09
1968/69	170.81	161.08	163.14	155.86	179.61	170.19	170.63	163.01
1969/70	175.83	169.35	171.42	163.76	187.38	168.27	169.05	167.42
1970/71	182.93	175.36	177.45	170.51	186.41	176.92	177.78	177.13
1972/73	205.63	192.17	193.99	184.29	218.45	194.23	194.44	196.34
1973/74	246.39	231.34	234.15	222.34	277.67	226.92	227.78	221.83
1977/78	321.96	314.42	316.28	304.18	313.59	308.65	309.52	314.64

Note: 1 Actually ALCPI is available with base 1960-61 = 100 But for comparative purposes we have shifted the base to 1961/62.

2 The base for UIWCPI is shifted from 1960=100 to 1961. These are approximate figures as this index is available for calendar years only.

3 The actual base year is 1949, but shifted to 1961; this index also pertains to calender years only.

4 This index is obtained as the population weighted average of indices for Bombay, Calcutta, Delhi and Madras.

Source: ALCPI, IWCPI, WCCPI are from various issues of Bulletin on Food Statistics

Table 5.5 : Estimates of Average Real PCE - India (Rural, Urban, Non-City Urban, and Cities)

NSS Round	Average PCE (at 1961/62 prices)				Average Real PCEs Using Different Deflators			
	Rural	Urban	Non-City Urban	Cities	Rural with ALCPI	Urban with UIWCPI	Non-City Urban with UIWCPI	Cities with IWCPI
17	21.73	30.86	28.04	48.04	21.73	30.86	28.04	48.04
18	20.31	30.24	27.32	48.07	19.53	31.16	28.21	49.32
19	20.88	29.51	26.35	48.84	19.18	29.98	26.94	50.13
20	20.84	27.90	25.28	44.45	18.87	27.82	25.27	45.71
21	19.78	27.94	25.42	43.41	16.75	28.61	26.23	44.78
22	18.80	27.14	24.74	41.85	16.70	27.10	25.01	42.58
23	19.49	28.58	26.15	43.52	18.53	27.05	24.97	41.61
24	19.45	29.75	26.87	47.51	18.52	29.95	27.31	46.47
25	19.30	30.14	27.41	47.01	18.94	29.87	27.37	45.27
27	20.58	32.96	30.08	50.81	20.22	32.61	30.09	47.69
28	21.51	30.60	28.14	43.99	19.09	31.20	29.28	44.09
32	21.40	30.58	-	-	21.97	31.15	-	-

5.3 Relative Inequality Levels and Trends

We measure the extent of inequality by the following indexes:

i) Share in consumption of the bottom decile group.

ii) Share in consumption of the bottom 40 per cent.

iii) Share in consumption of the top decile group.

iv) Lorenz ratio.

v) Standard deviation of the logarithms of PCE.

These inequality measures estimated using the NSS data by sub-samples for rural India, urban India, cities and for the data derived for the non-city urban sector are given in Tables 5.6, 5.7, 5.8, and 5.9 respectively. These measures based on the combined sample data are given in Tables 5.10 to 5.13. Broadly, they reveal the following features:

i) They show a general improvement in the distribution of PCE in all the sectors of the economy, the decline in LR being particularly marked between 19 and 25 rounds for the cities.

ii) The last three measures-nos. (iii) to (iv)-exhibit similar movements while the first two show a different pattern fc the cities. Since all these measures are basically derived from the Lorenz curve, we would have expected all of them to exhibit similar changes. But they do not. This is slightly puzzling.

iii) Further, the city LR, contrary to our expectation, is usually less than urban LR and sometimes less than even the non-city urban LR. For the 23rd round, the city LR is less than even the rural one.

On closer analysis, we find that the findings (i) to (iii) are more of a statistical illusion than a fact. This is largely because of the faulty classification procedure adopted by the NSSO. This is explained in detail in the following Section.

5.6 : Estimates of Inequality Measures by Sub-samples- RURAL INDIA

Sample	Per cent Share in Consumption of			Lorenz Ratio	Standard deviation of logarithm of PCE
	Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent		
		NSS Round 17			
s.s.1	3.52	210.63	23.68	0.300	0.545
s.s.2	3.68	21.04	24.44	0.304	0.553
Comb.	3.79	21.53	25.88	0.313	0.564
		NSS Round 18			
s.s.1	3.73	22.09	25.16	0.293	0.532
s.s.2	3.84	22.67	23.98	0.300	0.545
Comb.	3.90	22.29	24.61	0.297	0.540
		NSS Round 19			
s.s.1	3.68	22.06	24.32	0.300	0.545
s.s.2	3.67	22.97	24.06	0.287	0.520
Comb.	3.79	22.39	24.56	0.294	0.533

5.7 : Estimates of Inequality Measures by Sub Samples - URBAN INDIA

Sample	Per cent Share in Consumption of Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent	Lorenz Ratio	Standard deviation of logarithm of PCE
		NSS Round 17			
s.s.1	2.95	18.92	29.44	0.364	0.669
s.s.2	3.13	19.18	28.60	0.348	0.638
Comb.	3.03	19.11	29.04	0.357	0.654
		NSS Round 18			
s.s.1	3.31	19.27	28.56	0.356	0.653
s.s.2	3.30	19.67	28.31	0.364	0.669
Comb.	3.25	19.14	29.09	0.360	0.661
		NSS Round 19			
s.s.1	3.20	18.90	29.01	0.352	0.646
s.s.2	3.42	19.72	28.30	0.347	0.636
Comb.	3.34	19.51	28.38	0.349	0.640

5.8 : Estimates of Inequality Measures by Sub Samples
NON-CITY URBAN INDIA

Sample	Per cent Share in Consumption of Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent	Lorenz Ratio	Standard deviation of logarithm of PCE
		NSS Round 17			
s.s.1	3.01	19.16	28.90	0.358	0.658
s.s.2	3.24	20.32	27.18	0.341	0.624
Comb.	3.20	20.16	27.35	0.339	0.620
		NSS Round 18			
s.s.1	3.20	19.86	28.91	0.352	0.646
s.s.2	3.51	20.71	28.60	0.341	0.624
Comb.	3.49	20.26	28.24	0.339	0.620
		NSS Round 19			
s.s.1	3.68	21.90	26.50	0.308	0.560
s.s.2	3.60	21.12	26.18	0.337	0.616
Comb.	3.64	21.28	26.06	0.317	0.577

Table 5.9 : Estimates of Inequality Measures by Sub Samples - CITIES

Sample	Percent Share in Consumption of Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent	Lorenz Ratio	Standard deviation of logarithm of PCE
		NSS Round 17			
s.s.1	2.95	17.73	22.83	0.379	0.699
s.s.2	3.43	19.10	26.84	0.346	0.634
Comb.	3.18	18.90	24.17	0.345	0.632
		NSS Round 18			
s.s.1	3.54	20.21	20.95	0.311	0.566
s.s.2	2.79	17.13	24.19	0.370	0.681
Comb.	3.00	18.54	22.60	0.341	0.624
		NSS Round 19			
s.s.1	2.80	19.60	20.60	0.317	0.577
s.s.2	2.87	17.00	22.08	0.357	0.656
Comb.	2.95	18.37	21.95	0.347	0.636

Table 5.10 : Estimates of Inequality Measures - RURAL INDIA
(Based on NSS distributions)

NSS Round	Per cent Share in Consumption of Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent	Lorenz Ratio	Standard deviation of logarithm of PCE
17	3.79	21.53	25.88	0.313	0.564
18	3.90	22.29	24.61	0.297	0.540
19	3.79	22.39	24.56	0.294	0.533
20	3.72	22.04	24.56	0.297	0.540
21	3.63	21.98	23.59	0.293	0.532
22	3.71	22.40	23.45	0.291	0.528
23	3.63	21.71	25.49	0.305	0.555
24	3.77	22.31	24.31	0.293	0.531
25	3.91	22.63	23.25	0.283	0.513
27	3.78	22.41	25.40	0.299	0.544
28	4.00	22.23	22.56	0.276	0.499
32	3.46	20.84	28.34	0.336	0.614

Table 5.11 : Estimates of Inequality Measures - URBAN INDIA
(Based on NSS Distributions)

NSS Round	Per cent Share in Consumption of			Lorenz Ratio	Standard deviation of logarithm of PCE
	Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent		
17	3.03	19.11	29.04	0.357	0.654
18	3.25	19.14	29.09	0.360	0.661
19	3.34	19.51	28.38	0.349	0.640
20	3.46	20.06	27.43	0.339	0.619
21	3.38	19.98	28.00	0.337	0.616
22	3.40	20.21	26.11	0.332	0.607
23	3.42	20.15	25.09	0.329	0.601
24	3.32	19.51	24.90	0.340	0.622
25	3.39	20.05	22.87	0.327	0.596
27	3.44	19.91	27.62	0.341	0.624
28	3.83	21.40	25.38	0.301	0.548
32	3.29	19.91	28.11	0.346	0.634

Table 5.12 : Estimates of Inequality Measures - NON-CITY URBAN INDIA
(Based on the derived NSS type distribution)

NSS Round	Per cent Share in Consumption of			Lorenz Ratio	Standard deviation of logarithm of PCE
	Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent		
17	3.20	20.16	27.35	0.339	0.620
18	3.49	20.26	28.24	0.339	0.620
19	3.64	21.28	26.06	0.317	0.577
20	3.68	21.19	26.15	0.316	0.576
21	3.59	21.03	26.59	0.321	0.585
22	3.59	21.08	26.83	0.320	0.583
23	3.57	21.00	26.29	0.316	0.576
24	3.57	20.76	26.67	0.319	0.581
25	3.60	20.95	24.04	0.311	0.566
27	3.67	21.15	26.76	0.320	0.583
28	4.05	22.59	24.06	0.292	0.530

Table 5.13 : Estimates of Inequality Measures - CITIES
(Based on NSS Distributions)

NSS Round	Per cent Share in Consumption of			Lorenz Ratio	Standard deviation of logarithm of PCE
	Bottom 10 per cent	Bottom 40 per cent	Top 10 per cent		
17	3.18	18.90	24.17	0.345	0.632
18	3.00	18.54	22.60	0.341	0.624
19	2.95	18.37	21.95	0.347	0.636
20	2.99	18.82	20.68	0.331	0.604
21	2.99	19.18	18.63	0.311	0.566
22	3.16	19.77	17.69	0.299	0.513
23	3.32	19.53	17.71	0.301	0.546
24	2.97	18.51	16.80	0.302	0.549
25	2.97	18.54	16.18	0.290	0.525
27	2.92	18.77	20.14	0.357	0.656
28	3.33	19.67	27.39	0.346	0.635

5.4 NSS Consumption Data Classification and its Implications for Spatial and Temporal Comparisons of Inequality Estimates

It may be noted that the LR estimates, or for that matter, any other measure of inequality estimate, based on the distribution of a variable in the group form captures only inter-group inequality and not both inter-group and intra-group since, by assumption, intra-group inequality is held to be zero. This is particularly so with the 'trapezoidal' method of LR estimation which involves approximation of Lorenz curve within class intervals by linear lines and hence, under-estimation of the convexity of the Lorenz curve. The underestimation is given by the area between the broken chain and the convex Lorenz curve. Such a method results in substantial underestimation of inequality particularly when the class intervals are wide since a significant amount of information is lost due to the clustering of large number of observations in such wide class intervals. Then, it becomes difficult to compare two distributions differing with respect to location and dispersion but classified in the same way. This is because the relative amounts of information lost by grouping will be different for two distributions which are located at different points. This is precisely what happens with the NSS data on consumption.

As already pointed out, the NSS reports provide consumption data in the form of size distribution of population across different PCE classes with PCE corresponding to each class. These class intervals are kept invariant even though distributions differ between sectors and rounds with respect to both location and dispersion. Tables 5.14 to 5.17 provide sufficient proof of this. For instance, for the 25th NSS round, the per cent of population falling in the top open ended class interval is 4.10 for rural, 16.99 for urban and 40.99 for the cities. This would mean a higher degree of underestimation of LR for cities than for urban, and for urban than for the rural sector. Over time, because of the high rate of inflation we find general shift of the population towards higher PCE classes and a steady rise in the extent of clustering of the population in the top two or three wider classes. This would imply that over time information about consumption distribution is lost for an increasingly larger proportion of the population and underestimation of LR etc would increase unless class intervals are changed.

Table 5.14 : Percentages of Population Falling in the Upper PCE Intervals - RURAL INDIA

NSS Round	Class Intervals						
	Rs 43-55	Rs 55-75	Rs 75 +	Rs 75-100	Rs 100-150	Rs 150-200	Rs 200 +
17	3.23 (7.18)	1.72 (5.01)	1.33 (7.22)	-	-	-	-
18	3.67 (7.88)	1.73 (4.86)	1.21 (6.12)	-	-	-	-
19	5.24 (9.54)	2.81 (6667)	1.86 (8.22)	-	-	-	-
20	6.64 (11.29)	3.47 (7.66)	2.20 (9.54)	-	-	-	-
21	8.40 (13.26)	5.32 (10.78)	2.98 (10.13)	-	-	-	-
22	10.32 (14.88)	6.92 (13.00)	3.56 (11.35)	-	-	-	-
23	9.74 (14.94)	5.85 (11.03)	3.80 (13.95)	-	-	-	-
24	10.75 (14.94)	6.98 (12.78)	4.24 (13.76)	-	-	-	-
25	11.58 (15.75)	7.83 (13.97)	4.18 (12.88)	-	-	-	-
27	16.20 (17.53)	11.84 (16.96)	-	5.31 (10.34)	2.91 (7.88)	0.57 (2.25)	0.49 (3.09)
28	20.54 (18.80)	10.90 (22.26)	-	9.08 (14.60)	4.78 (10.75)	1.02 (3.26)	0.56 (3.00)

Notes: 1 Figures in brackets are consumption shares of the respective population groups.

2 From the 32nd Round, the NSS followed an altogether different system of class intervals.

Table 5.15 : Percentages of Population Falling with Upper PCE Intervals - URBAN INDIA

NSS Round	Class Intervals						
	43-55 Rs	55-75 Rs	75+ Rs	75-100 Rs	100-150 Rs	150-200 Rs	200+ Rs
17	7.75 (12.25)	5.18 (10.70)	4.93 (18.57)	-	-	-	-
18	7.25 (10.58)	6.75 (12.90)	6.08 (21.60)	-	-	-	-
19	9.26 (12.46)	7.56 (13.32)	6.90 (22.92)	-	-	-	-
20	9.41 (12.39)	7.72 (13.57)	7.29 (22.67)	-	-	-	-
21	11.89 (13.76)	9.43 (14.56)	9.82 (27.72)	-	-	-	-
22	13.32 (14.40)	10.82 (15.37)	11.91 (31.10)	-	-	-	-
23	12.99 (13.74)	11.76 (16.31)	12.72 (31.91)	-	-	-	-
24	14.32 (13.87)	12.48 (15.91)	14.78 (36.84)	-	-	-	-
25	16.24 (14.87)	14.19 (17.08)	16.99 (38.86)	-	-	-	-
27	18.00 (13.79)	17.96 (18.05)	-	10.88 (14.75)	8.27 (15.60)	2.61 (7.03)	2.22 (10.84)
28	19.42 (13.41)	22.89 (20.43)	-	14.47 (17.56)	10.06 (17.16)	3.34 (8.10)	2.51 (10.20)

Note: Figures in brackets are consumption shares of the respective population groups.

Table 5.16: Percentages of Population Falling in the Upper PCE Intervals - NON-CITY URBAN INDIA

NSS round	Class Intervals						
	Rs 43-55	Rs 55-75	Rs 75 +	Rs 75-100	Rs 100-150	Rs 150-200	Rs 200 +
17	6.67 (11.61)	4.01 (9.10)	3.25 (13.48)	-	-	-	-
18	6.51 (10.44)	5.22 (11.02)	4.14 (16.20)	-	-	-	-
19	8.33 (12.46)	6.21 (12.18)	4.54 (15.35)	-	-	-	-
20	8.19 (11.07)	6.41 (12.38)	4.90 (16.30)	-	-	-	-
21	11.30 (14.23)	8.12 (13.45)	7.00 (21.60)	-	-	-	-
22	13.18 (15.45)	9.23 (14.26)	8.88 (25.10)	-	-	-	-
23	12.09 (14.04)	10.70 (15.87)	9.74 (25.90)	-	-	-	-
24	14.26 (15.13)	11.75 (16.43)	10.95 (29.20)	-	-	-	-
25	16.52 (16.50)	13.47 (17.62)	13.10 (31.49)	-	-	-	-
27	18.53 (15.39)	17.79 (19.35)	-	9.93 (14.57)	6.85 (13.95)	1.95 (5.65)	1.43 (7.63)
28	19.88 (14.62)	22.80 (21.97)	-	14.28 (18.52)	8.87 (16.06)	2.55 (6.59)	1.70 (7.16)

Notes: 1 Figures in brackets are consumption shares of the respective population groups.

2 The above estimates are derived from Urban and City Distributions. They are not original NSS distributions.

Table 5.17 : Percentages of Population Falling in the Upper PCE Intervals - CITIES

NSS Round	Class Intervals						
	Rs 43-55	Rs 55-75	Rs 75 +	Rs 75-100	Rs 100-150	Rs 150-200	Rs 200 +
17	14.31 (14.47)	12.30 (16.36)	17.17 (36.67)	-	-	-	-
18	11.77 (11.06)	16.06 (19.43)	17.88 (40.41)	-	-	-	-
19	14.96 (12.48)	15.79 (17.19)	21.30 (46.74)	-	-	-	-
20	16.88 (14.19)	15.75 (17.79)	21.97 (45.45)	-	-	-	-
21	15.52 (12.04)	17.47 (18.33)	27.12 (50.54)	-	-	-	-
22	14.20 (10.39)	20.54 (19.58)	30.56 (54.14)	-	-	-	-
23	13.61 (9.52)	18.27 (17.91)	31.13 (5.15)	-	-	-	-
24	14.66 (9.27)	16.98 (14.03)	38.42 (64.55)	-	-	-	-
25	14.52 (8.82)	18.63 (14.90)	40.99 (66.32)	-	-	-	-
27	14.74 (7.68)	19.02 (13.14)	-	16.77 (15.54)	17.10 (22.10)	6.68 (12.25)	7.09 (22.80)
28	16.57 (8.38)	21.31 (14.03)	-	15.64 (13.57)	17.44 (21.06)	8.24 (14.54)	7.50 (22.98)

Note: Figures in brackets are consumption shares of the respective population groups.

Thus, in all likelihood what could have happened is that inequalities are underestimated to a much more extent in the cities than in the urban areas and in the urban areas than in the non-city urban and rural sectors at a point of time. Over time, the extent of underestimation would have gone up, thereby yielding an illusory picture of decline in the degree of inequality. This is borne out by the LR estimates for the four sectors presented in Table 5.18 and Fig 5.1. It may also be noted that the whole picture about LRs across sectors undergoes a change during the 27th and 28th rounds when the degree of underestimation droreases with the introduction of a new system of class intervals.

Table 5.18 : Lorenz Ratios Estimated by Trapezoidal Method Based on NSS Distributions - India (Rural, Urban, Non-city urban, Cities)

NSS Round	Rural	Urban	Non-City Urban	Cities	Ratio of LRs: Urban to Rural	Non-City Urban to Rural	City to Rural
17	0.313	0.357	0.339	0.345	1.14	1.08	1.10
18	0.297	0.360	0.339	0.341	1.20	1.14	1.15
19	0.294	0.349	0.317	0.347	1.18	1.08	1.18
20	0.297	0.339	0.316	0.331	1.14	1.06	1.11
21	0.293	0.337	0.321	0.311	1.15	1.10	1.06
22	0.291	0.332	0.320	0.299	1.14	1.10	1.03
23	0.305	0.329	0.316	0.301	1.08	1.04	0.99
24	0.293	0.340	0.319	0.302	1.16	1.09	1.03
25	0.283	0.327	0.311	0.290	1.15	1.10	1.02
27	0.299	0.341	0.320	0.357	1.14	1.07	1.19
28	0.276	0.301	0.292	0.346	1.09	1.06	1.25
32	0.340	0.346	NA	NA	1.02	-	-

Note: NA = Not available

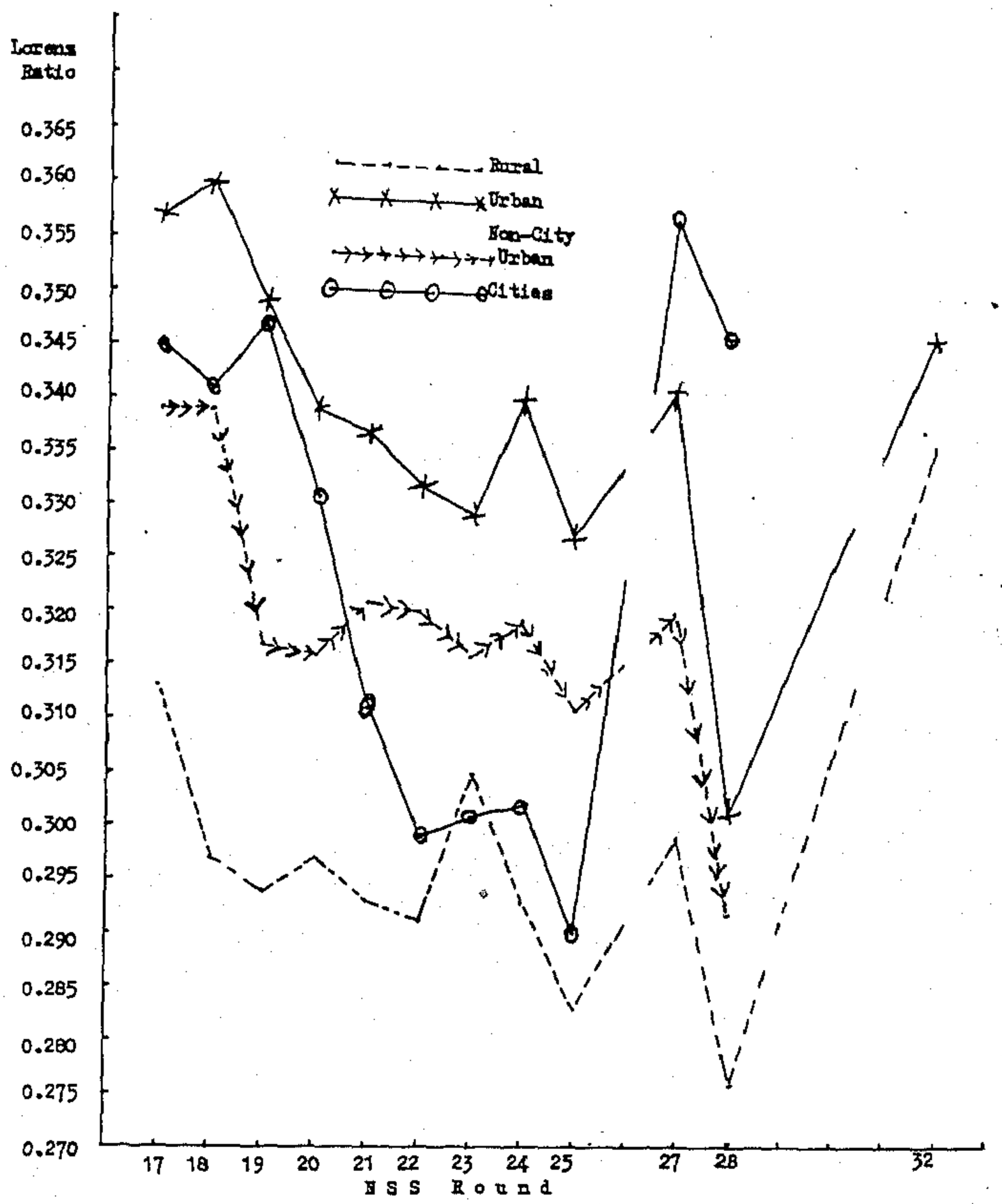

Fig 5.1 : LORENZ RATIO (TRAPEZOIDAL) ESTIMATES AT CURRENT PRICES BY SECTORS, BY N S S ROUNDS

Tables 5.14 to 5.17 also show a progressive increase in the size of the population group in theopen ended class interval (i.e. Rs 75 and above) particularly in the cities and urban sectors between 17 and 25th rounds. The method of linear interpolation used to obtain different fractile group shares in consumption also assumes intra-group inequality to be zero. Hence, the large shares of the top richer groups gets distributed among an increasingly larger population groups overtime with the result that the consumption share of the top decile group gets shown to be on the decline. This is precisely what happens in the city and urban sectors (See tables 5.10 to 5.13).

5.5 Solutions for the Grouping Bias

From the preceding discussions, we find that the LR estimated by the trapezoidal method underestimates the true value and gives only the lower bound for the LR. Gastwirth (1972) has discussed the problems arising from using grouped data for LR estimation. He has developed a method for obtaining the upper bound for the LR by maximizing the spread of observations within a class interval. But we are not really concerned with obtaining the upper bound for the LR. Instead, our concern is with obtaining an approximately correct value of the LR. We may consider three different alternative methods for the trapezoidal approach. They are

i) The Ramakrishnan(1982) approach.

ii) Fitting a log-normal distribution; and

iii) The Kakwani-Podder (1973,1976) approach.

These three approaches are briefly mentioned below:

i) Ramakrishnan approach:Ramakrishan (1982), using the inequality - decomposition framework discussed in Chapter 4 treats total inequality as the sum of between-group inequality (i.e. 'B' given by the trapezoidal method) and within-group inequality (W). To derive intra-group inequality he assumes uniform distribution of consumption within each class interval and derives LR for that class as

$$G_i = \frac{(X_i - X_{i-1})}{3(X_i + X_{i-1})} \quad \ldots \quad (5.1)$$

Where X_i and X_{i-1} are the upper and lower class limits. For the open ended class interval, an improper uniform distribution is assumed and the Lorenz ratio is given by its limiting value 1/3. Then, within-group inequality (W) is given by

$$W = \Sigma\ p_i\ q_i\ G_i \quad \ldots \quad (5.2)$$

Where p_i is the population share, q_i the consumption share and G_i is the Lorenz ratio of the ith PCE class. The method tested by Ramakrishna on Australian data as well as on a hypothetical data set has given almost correct results.

ii) Fitting a log-normal distribution: It is possible to fit directly a log-normal distribution to the data set and derive the LR from the estimated parameters of the distribution (Aitchison and Brown, 1957). One can fit either a two-parameter of a three-parameter log-normal model to the NSS data. Both the models have been used in Indian studies using NSS data,[3] even though the three-parameter model is found to provide a better fit.

Among the different methods available to estimate the two-parameter model, the method of quantiles and the double-probit approach are the two important ones used in Indian Studies. Aitchison and Brown (1957) have found quantiles of the order of 7 and 93 per cent to be the pair which give at least 65 per cent efficiency for the variance parameter of the two-parameter log-normal model. But we cannot find out the PCE values corresponding to this pair of quantiles as their estimation from the given NSS data for the urban sector and cities is difficult. So we use the quantiles of the order of 33.33 and 66.67 per cent.. But the inequality parameter (i.e. standard deviation of the logarithm of PCE) of the

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3. See Bhattacharya (1978) and Iyengar (1978).

model is found to be very low falling in the range 0.205 to 0.225 for the rural, 0.228 to 0.255 for the urban, 0.225 to 0.240 for the non-city urban sector and 0.278 to 0.310 for the cities.

Similarly, we find it difficult to estimate the PCE values for the quantiles located at different points of the PCE distribution for purposes of three-parameter model estimation particularly for the cities.

Therefore, considering that the method[4] should be uniformly applicable to all the sectors and also should be comparable between them, we use the two-parameter model and estimate it using the relation:

$$t_q = t_p - \lambda \quad \text{at } p = \tfrac{1}{2} \qquad \ldots \qquad (5.3)$$

Where 't' is such that

$$P = \frac{1}{\sqrt{2\pi}} \int_{\alpha}^{t} \exp\left(-\tfrac{1}{2} t^2\right) dt$$

P = Proportion of population

q = Consumption share corresponding to 'p'

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4. One can also try standard methods, like the method of maximum likelihood, to estimate the parameter of the log-normal models (two parameter or three-parameter). But the problem is due to the fact that the NSS samples are not simple random and the NSS grouped data provide the estimated numbers of persons (or households) in the population lying in the various PCE classes. Therefore, it becomes difficult to obtain the sampling distribution of the Joint random variables no of persons (or households), given the distribution of the underlying variable and the sampling design. Hence, rigorous analyses using of the maximum likelihood method is difficult. Yet, attempts (Jain, 1977) have been made to use this method to estimate the log-normal models using NSS data.

iii) Kakwani-Podder Method: Instead of fitting a density function and deriving the Lorenz curve, Kakwani and Podder (1973)(1976) directly specify the functional form of the Lorenz curve and derive the inequality parameters from the estimated curve. The equation of the Kakwani-Podder Lorenz curve is given by (in their own notations)

$$\eta = g(\pi) \qquad \ldots \quad (5.4)$$

Where $$\pi = \frac{1}{\sqrt{2}} (F + F_1)$$

$$\eta = \frac{1}{\sqrt{2}} (F - F_1)$$

Where $$F = \int_0^x f(x)\, dx$$

$$F_1 = \frac{1}{\mu} \int_0^x Xf(x)\, dx.$$

$f(x)$ is the probability density function of X

One paraticular form of the Curve is given by

$$\eta = a\pi^{\alpha} (\sqrt{2} - \pi)^{\beta} \qquad \ldots \quad (5.5)$$

Now, the LR is given by,

$$G = 2 \int_0^{\sqrt{2}} g(\pi)\, d\pi \qquad \ldots \quad (5.6)$$

i.e.
$$G = 2 \int_0^{\sqrt{2}} a\,\pi^{\alpha}(\sqrt{2} - \pi)^{\beta}\, d\pi$$

$$= 2a\,(\sqrt{2})^{1+\alpha+\beta} B(1+\alpha,\ 1+\beta) \qquad \ldots \quad (5.7)$$

Where $B(1+\alpha, 1+\beta)$ is the Beta function.

The equation (5.5) has other important properties as well. The parameters α and β indicate the nature of assymmetry of the curve. If $(\alpha/\beta - 1)$ is positive the LC is skewed toward (0,0); if it is negative, the LC is skewed toward (1,1) and if it is zero, the LC is symmetric.

In our study, we use the present method. We estimate equation (5.5) by the OLS method.. The estimated parameters of the Kakwani-Podder curve are given in Tables 5.19 to 5.22 for the four sectors. The parameters α and β indicate that the Lorenz curves are nearly symmetrical about the diagonal through the mid-point of the egalitarian line. in all the sectors for almost all the rounds. An important property of the LC derived from the two-parameter log-normal model is that it is symmetric. Thus, our finding lends further support to the Indian studies based on the assumption of two-parameter log-normal model for the PCE distribution.

Table 5.19 : Estimated Parameters of the Kakwani-Podder Lorenz Curve - RURAL INDIA

NSS Round	a	α	β	$(\alpha/\beta - 1)$
17	0.331	0.972	0.922	0.05
18	0.310	0.954	0.905	0.05
19	0.299	0.924	0.901	0.02
20	0.303	0.925	0.903	0.03
21	0.291	0.908	0.901	0.01
22	0.288	0.906	0.901	0.01
23	0.304	0.908	0.905	0.00
24	0.291	0.905	0.901	0.00
25	0.284	0.930	0.900	0.02
27	0.305	0.942	0.924	0.02
28	0.286	0.910	0.892	0.02
32	0.343	0.919	0.908	0.01

Table 5.20 : Estimated Parameters of the Kakwani-Podder Lorenz Curve
URBAN INDIA

NSS Round	a	α	β	$(\alpha/\beta-1)$
17	0.359	0.930	0.924	0.01
18	0.364	0.956	0.926	0.03
19	0.348	0.938	0.920	0.02
20	0.338	0.939	0.918	0.02
21	0.334	0.928	0.917	0.01
22	0.325	0.914	0.914	0.00
23	0.331	0.930	0.917	0.01
24	0.338	0.925	0.918	0.01
25	0.332	0.932	0.918	0.02
27	0.351	0.935	0.917	0.02
28	0.324	0.940	0.910	0.03
32	0.344	0.915	0.913	0.00

Table 5.21 : Estimated Parameters of the Kakwani-Podder Lorenz Curve - NON-CITY URBAN INDIA

NSS Round	a	α	β	$(\alpha/\beta-1)$
17	0.342	0.926	0.917	0.01
18	0.346	0.955	0.920	0.04
19	0.316	0.926	0.910	0.02
20	0.316	0.931	0.910	0.02
21	0.318	0.922	0.911	0.01
22	0.315	0.920	0.911	0.01
23	0.314	0.920	0.911	0.01
24	0.323	0.930	0.915	0.02
25	0.309	0.921	0.910	0.01
27	0.332	0.931	0.910	0.02
28	0.304	0.936	0.904	0.04

Table 5.22 : Estimated Parameters of the Kakwani-Podder Lorenz Curve - CITIES

NSS Round	a	α	β	(α/β-1)
17	0.350	0.936	0.923	0.01
18	0.359	0.951	0.928	0.03
19	0.353	0.919	0.924	0.00
20	0.350	0.930	0.924	0.01
21	0.340	0.930	0.922	0.01
22	0.318	0.893	0.912	(-) 0.02
23	0.328	0.925	0.917	0.01
24	0.343	0.907	0.921	0.01
25	0.345	0.917	0.922	(-) 0.01
27	0.359	0.920	0.924	0.00
28	0.363	0.949	0.928	0.02

5.6 Comparison of Alternative Methods.

The LRs obtained by the four different methods for the four all India sectors are presented in Tables 5.23 to 5.26 and depicted graphically in Figures 5.2 to 5.5 . They reveal the following features:

i) In all the four sectors the LRs obtained by the Ramakrishna method show a higher degree of inequality than those by the log-normal. The LRs by the log-normal method are even less than those by the trapezoidal in all the sectors except the cities[5]. The Kakwani-Podder LRs show the highest degree of inequality than the other methods for all the rounds in the rural sector; but not so, for other sectors.

ii) For the rural sector, the LRs by the four methods exhibit similar movements over time. They show, broadly speaking, a tendency for improvement in the distribution of nominal PCE up to the 28th round. This appears to hold good for the urban and 'non-city urban' sectors as well.

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5 The 25th round for the urban sector is also an exception.

iii) For the cities, the LRs by Ramakrishna, Kakwani-Podder and log-normal methods show a decline up to 22nd round and an increase thereafter. This pattern is different from that revealed by the trapezoidal LRs which show a more or less continuous decline up to the 25th round.

iv) Interestingly, we find that for the cities the Kakwani-Podder and the log-normal methods show almost similar levels of LR and similar patterns of change in LR over time.

v) All the four methods show similar movements for the rural, non-city urban and urban sectors. But they differ for the cities. Thus, it appears, that where the grouping bias is minimum, it does not matter which method we choose so long as we are interested in trends in inequality rather than inequality at a point of time.

Table 5.23 : Estimates of Lorenz Ratio by Different Methods -

RURAL INDIA

NSS Round	Trapezoidel	Ramakrishnan	Kakwani-Podder	Lognormal
17	0.313	0.316	0.328	0.303
18	0.297	0.300	0.313	0.288
19	0.294	0.297	0.308	0.283
20	0.297	0.301	0.311	0.296
21	0.293	0.298	0.301	0.287
22	0.291	0.296	0.298	0.282
23	0.305	0.310	0.314	0.297
24	0.293	0.298	0.302	0.285
25	0.283	0.289	0.292	0.275
27	0.299	0.304	0.307	0.283
28	0.276	0.282	0.298	0.270
32	0.336	0.340	0.352	0.314

Table 5.24 : Estimates of Lorenz Ratio by Different Methods-

URBAN INDIA

NSS Round	Trapezoidal	Ramakrishnan	Kakwani-Podder	Lognormal
17	0.357	0.362	0.363	0.347
18	0.360	0.366	0.364	0.348
19	0.349	0.357	0.352	0.339
20	0.339	0.347	0.342	0.331
21	0.337	0.349	0.340	0.329
22	0.332	0.348	0.333	0.330
23	0.329	0.346	0.336	0.326
24	0.340	0.362	0.344	0.335
25	0.327	0.352	0.337	0.330
27	0.341	0.348	0.357	0.327
28	0.301	0.310	0.329	0.301
32	0.346	0.352	0.353	0.332

Table 5.25 : Estimates of Lorenz Ratio by Different Methods--

NON-CITY URBAN INDIA

NSS Round	Trapezoidal	Ramakrishnan	Kakwani-Podder	Lognormal
17	0.339	0.343	0.348	0.326
18	0.339	0.344	0.347	0.326
19	0.317	0.323	0.323	0.304
20	0.316	0.321	0.321	0.306
21	0.321	0.328	0.324	0.308
22	0.320	0.331	0.325	0.312
23	0.316	0.328	0.322	0.315
24	0.319	0.333	0.329	0.314
25	0.311	0.329	0.317	0.306
27	0.320	0.327	0.338	0.306
28	0.292	0.300	0.311	0.290

Table 5.26: Estimates of Lorenz Ratio by Different Method-CITIES

NSS Round	Trapezoidal	Ramakrishnan	Kakwani-Podder	Lognormal
17	0.345	0.367	0.354	0.351
18	0.341	0.368	0.358	0.352
19	0.347	0.383	0.359	0.362
20	0.331	0.368	0.354	0.344
21	0.311	0.360	0.345	0.336
22	0.299	0.357	0.330	0.330
23	0.301	0.361	0.334	0.342
24	0.302	0.387	0.351	0.353
25	0.290	0.383	0.351	0.343
27	0.357	0.374	0.366	0.356
28	0.346	0.366	0.364	0.347

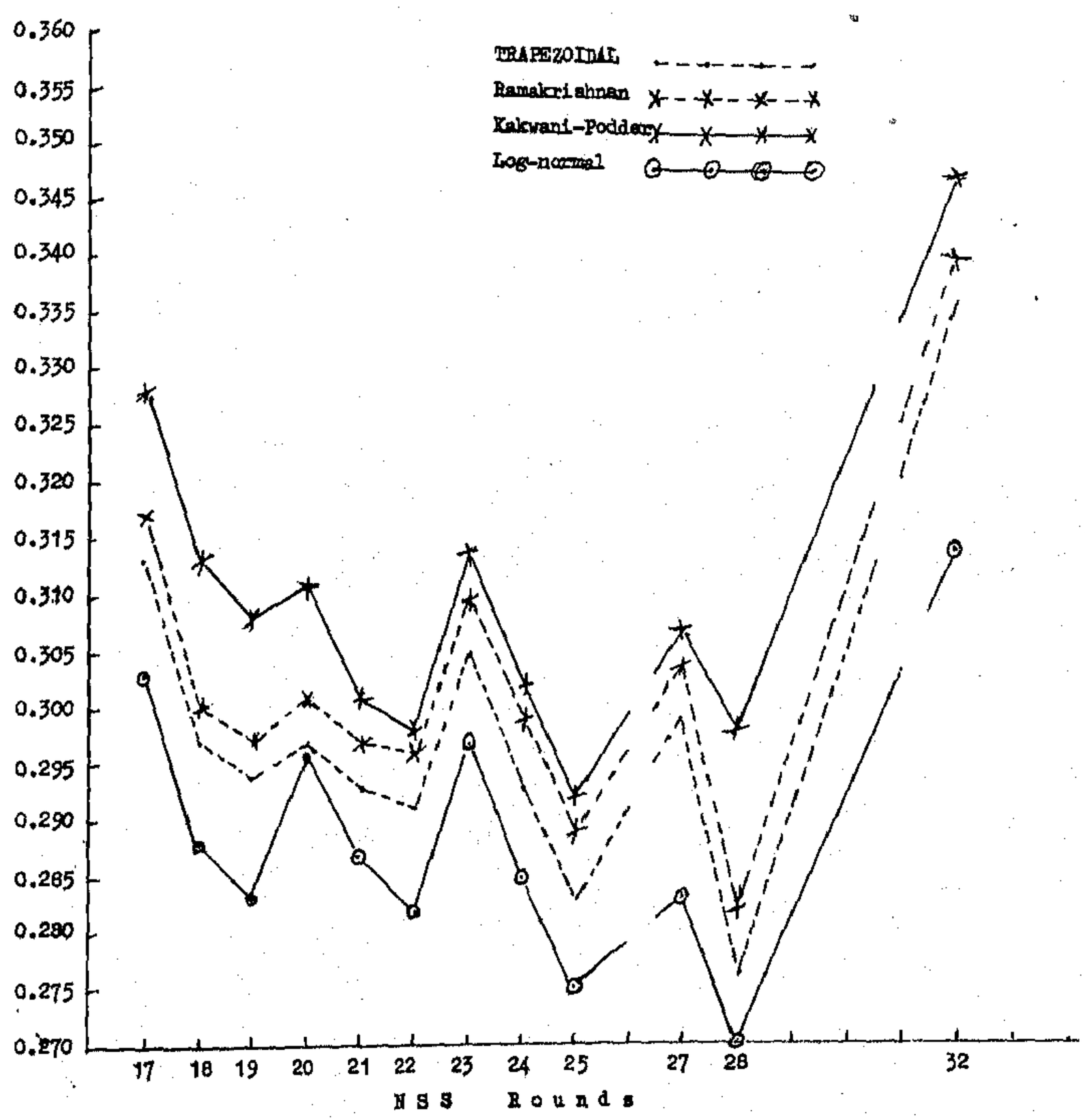

Fig 5.2 : LORENZ RATIO (RURAL) ESTIMATES AT CURRENT PRICES BY DIFFERENT METHODS, BY N S S ROUNDS

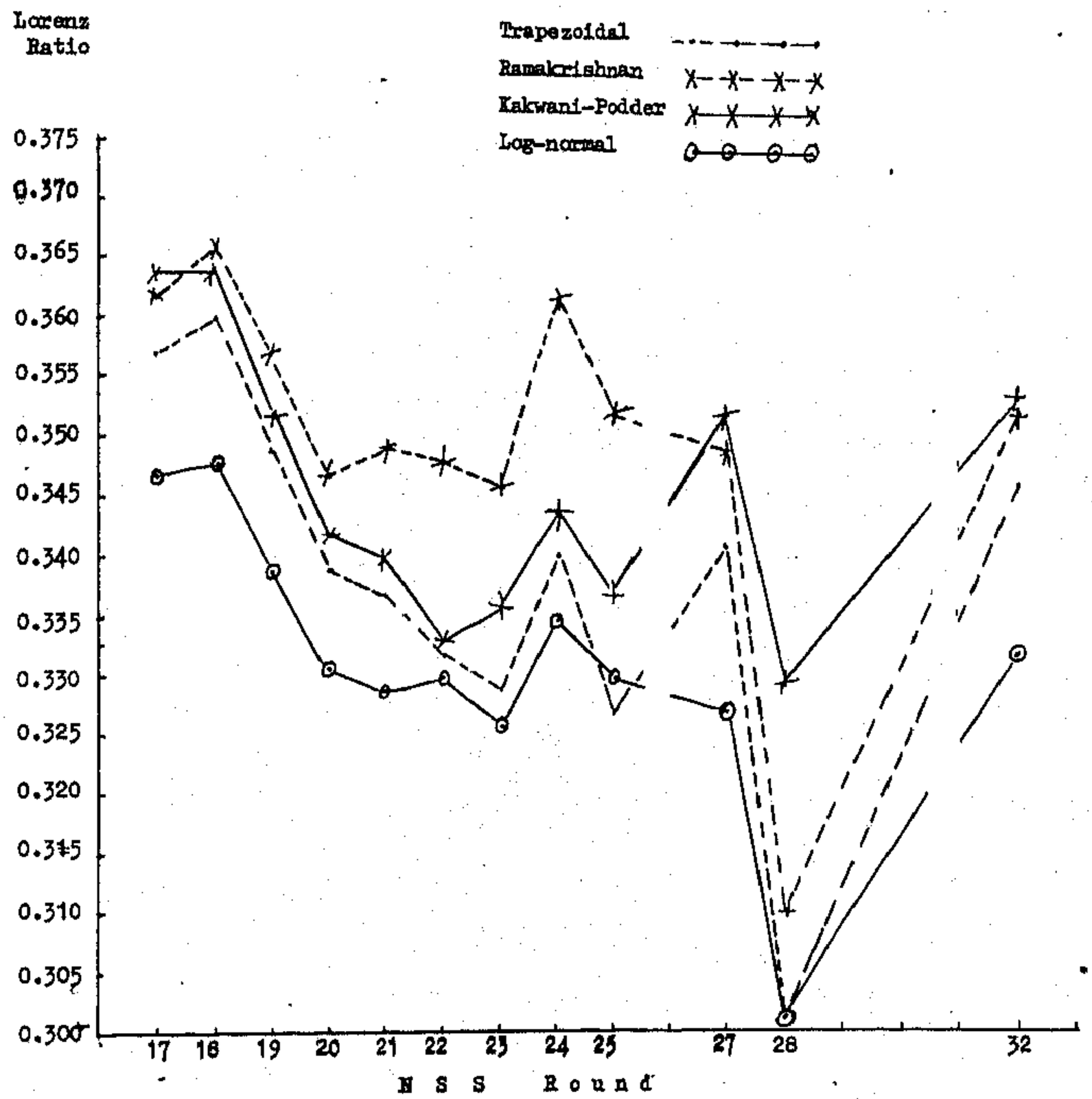

Fig 5.3 : LORENZ RATIO (URBAN) ESTIMATES AT CURRENT PRICES BY DIFFERENT METHODS, BY N S S ROUNDS

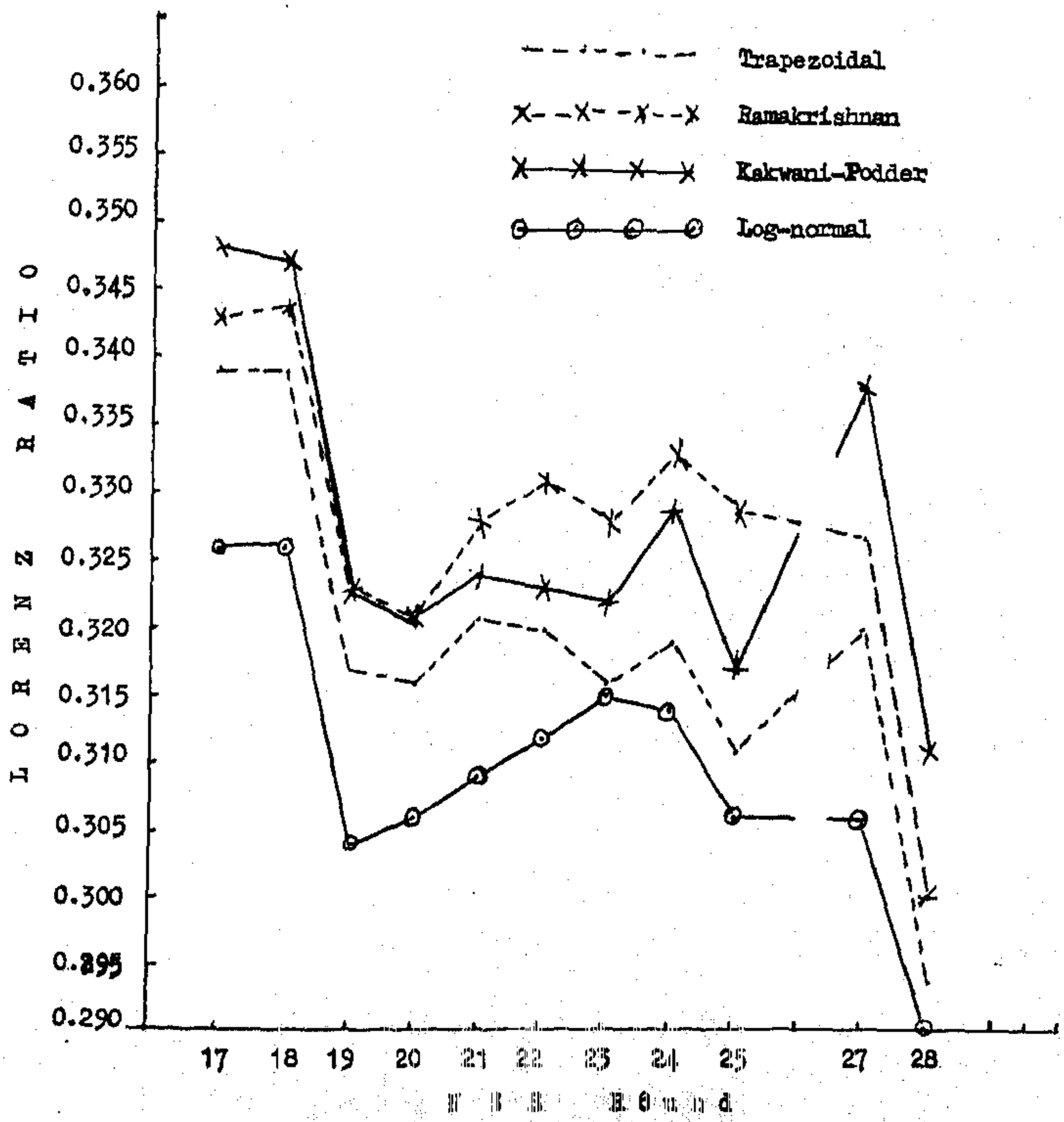

Fig 5.4 : LORENZ RATIO (NON-CITY URBAN) ESTIMATES AT CURRENT PRICES BY VARIOUS METHODS FOR 17 TO 28 ROUNDS

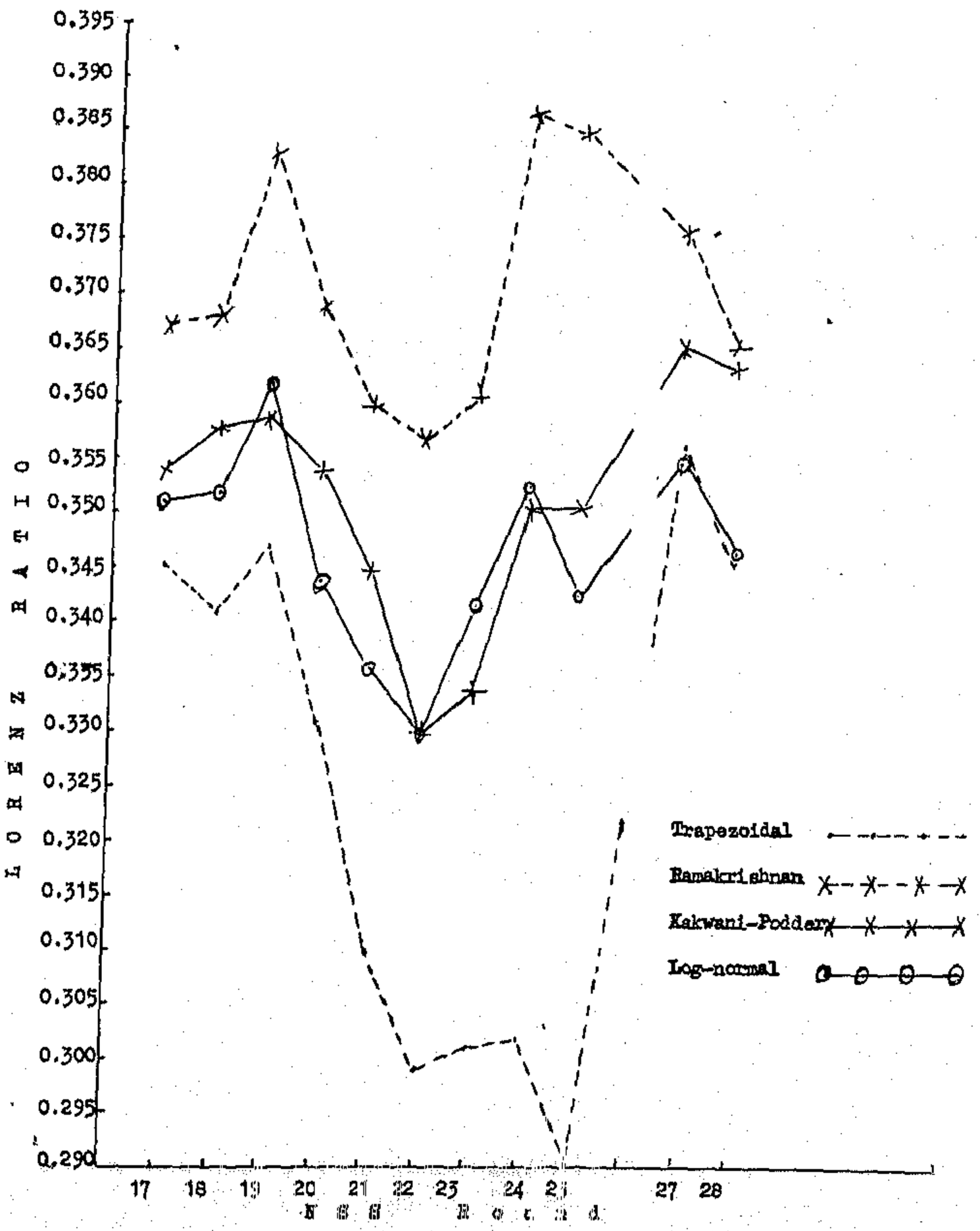

Fig 5.5 : LORENZ RATIO (GINIS) ESTIMATES AT CURRENT PRICES BY DIFFERENT METHODS BY N S S ROUNDS

Of the four methods, which one are we to choose now? This is really a difficult question to decide. Obviously, the trapezoidal method cannot be chosen at all. Out of the other three methods, one will have to be chosen in the light of a priori information and also statistical considerations. On an a priori basis,[6] we would expect inequality to be the highest in the cities followed by the urban, 'noncity urban ' and rural sectors in the same order. From Figures 5.1 and 5.6 to 5.8 , it can be seen that only the Ramakrishna and log-normal methods rank the four sectors in the order we expect. The Kakwani-Podder method ranks the urban sector and cities differently in different rounds. Thus, an an a priori basis, we find the Ramakrishna and log-normal methods to be better and yield results which conform to theoretical expectations. Between these two methods, the log-normal method will have to be dropped. This is because statistically speaking the trapezoidal method gives the lower bound for LR; but the log-normal LRs are less than even the trapezoidal ones for the rural, urban and 'non-city urban' sectors

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6 See Chapter 2

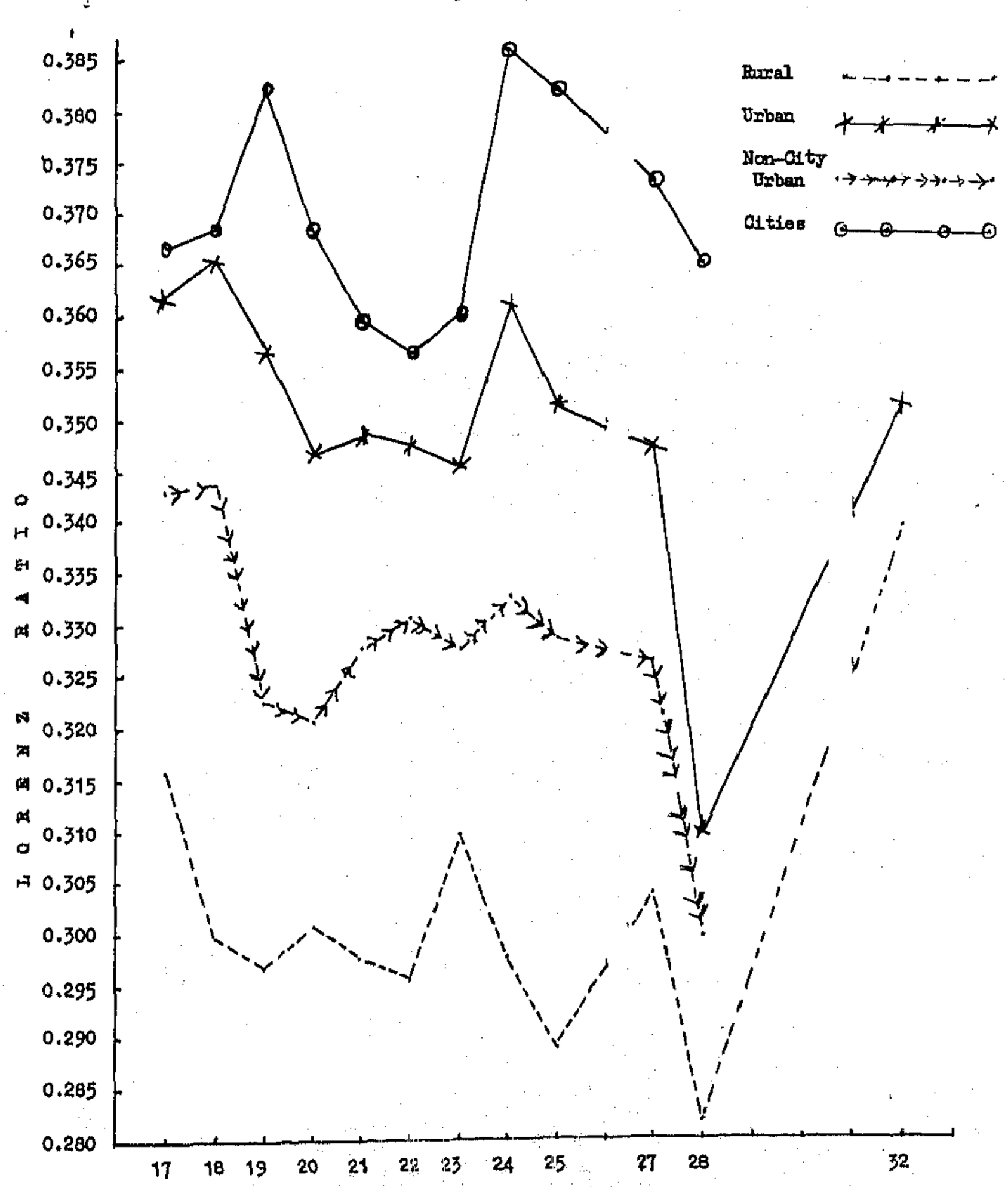

Fig 5.6 : LORENZ RATIO (RAMAKRISHNAN) ESTIMATES AT CURRENT PRICES BY SECTORS BY N S S ROUNDS

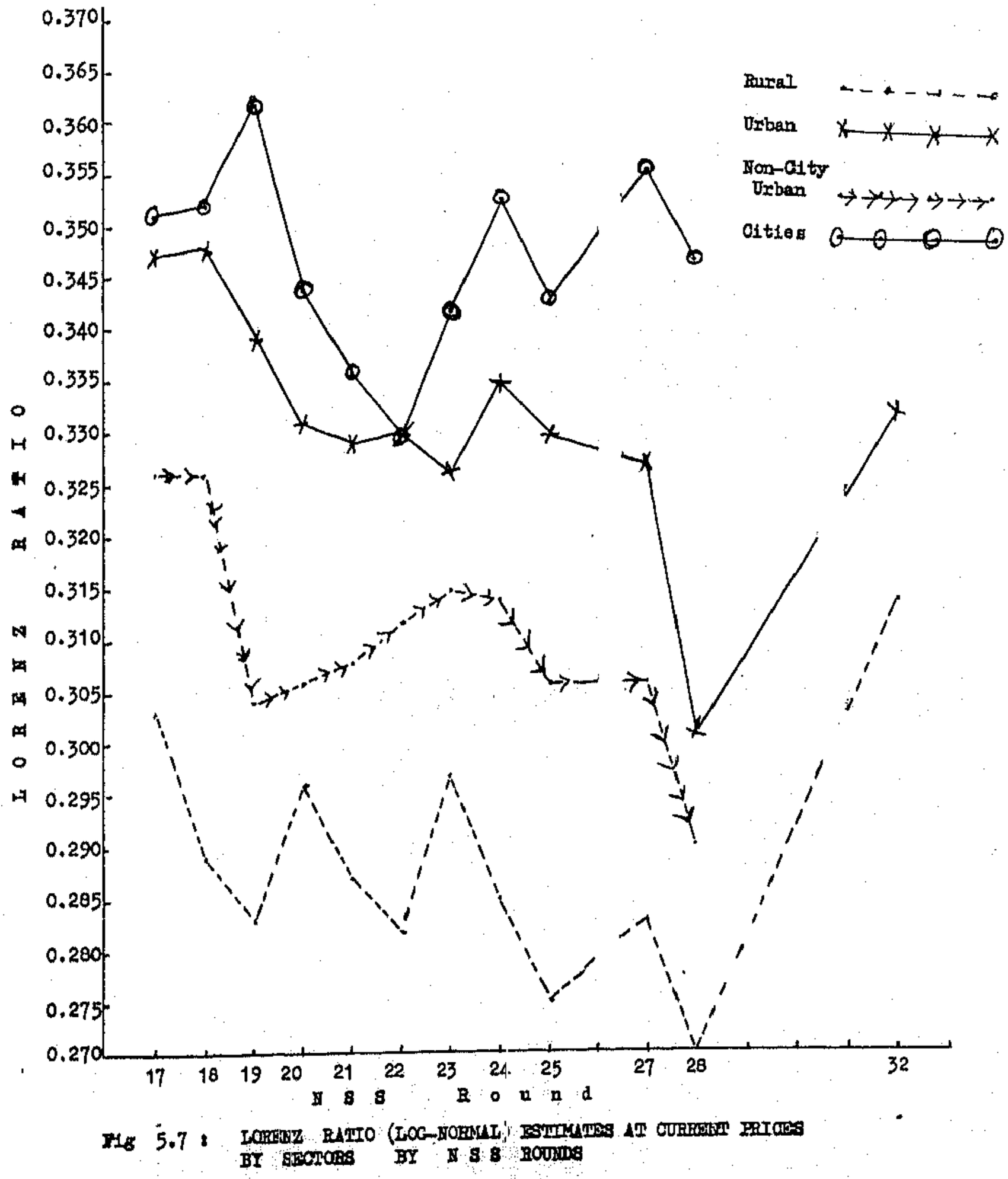

Fig 5.7 : LORENZ RATIO (LOG-NORMAL) ESTIMATES AT CURRENT PRICES BY SECTORS BY N S S ROUNDS

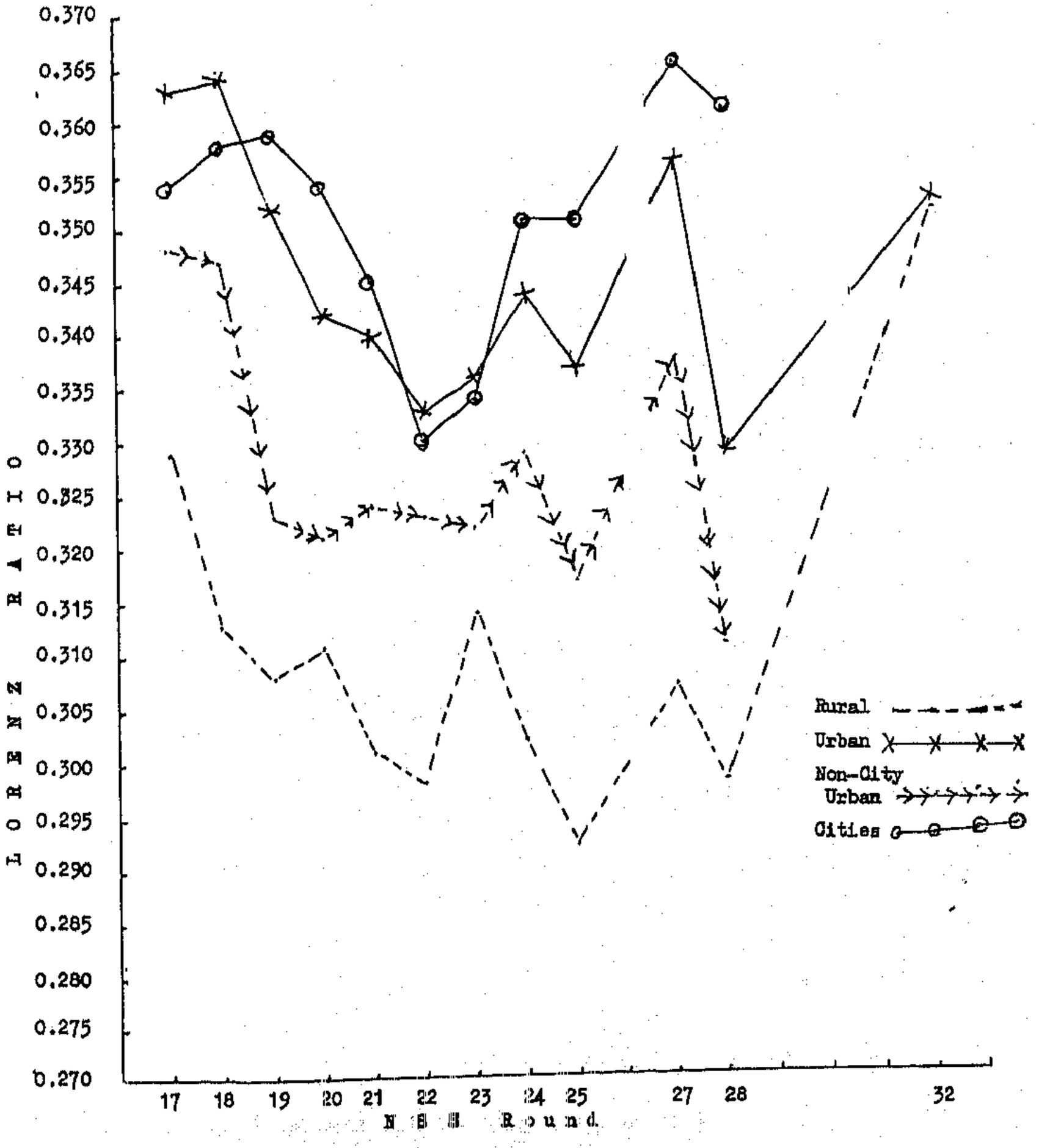

Fig 5.8 : LORENZ RATIO (KAKWANI--PODDER) ESTIMATES AT CURRENT PRICES BY SECTORS BY N S S ROUND

We carry out the test further. We have a sample of 3484 persons from the NSS 28th round data for rural Karnataka. On the basis of this raw data, we compute the LR. Next we group this data in the same way as the NSS did for the 28th round. We apply the four methods to this grouped data to estimate the LRs and compare the results (Table 5.27). It can be seen that the Ramakrishna method gives correct estimates of actual LR than the other methods.

Table 5.27 : Lorenz Ratio Estimates Based on Different Methods of Estimation - Rural Karnataka (28th NSS round)

(Sample Size: 3404)

Actual LR based on longrouped data	0.286
Trapezoidal LR based on NSS grouped data	0.281
Ramakrishna LR based on NSS grouped data	0.286
Kakwani-Podder LR based on NSS grouped data	0.300
Log-normal LR based on NSS grouped data	0.276

Thus, it appears that the Ramakrishnan method is better than the other methods. But still a question remains. Can we approximate PCE distribution within a class interval by a uniform distribution particularly when the per cent of population falling in a class interval is sometimes, for instance as it happens for cities for the 25th round, as high as 41 per cent. But a similar question applies

to the Kakwani-Podder method also. For such class intervals, one can assume different Lorenz curves with different degrees of convexity. Which one does the Kakwani-Podder curve approximate. In the absence of an answer for the question, it is difficult to judge the relative merits of the different methods.

5.7 : Degree of underestimation by the Trapezoidal Method.

For all practical purposes, we take the Ramakrishna method's LRs to be the true ones and then, measure the degree of underestimation involved in the application of the trapezoidal method. The extent of underestimation is given by $\left(1 - \frac{\text{trapezoidal LR}}{\text{Ramakrishna LR}}\right) 100$.

It can be seen from Table 5.28 that the degree of underesti-mation is higher in the non-city urban (1.17 per cent) than in the rural areas (0.95 per cent), higher in the urban (1.38 per cent) than in the non-city urban one as, higher still in the Cities (5.99 per cent) than in the urban areas for the 17th round. This pattern remains throughout. The degree of underestimation increases at a much faster pace for the Cities up to 24.28 per cent in the 25th round while it is 7.10 per cent for the urban and 2.08 per cent for the rural areas for that round. This corroborates our earlier hunch about the loss of information in using the same system of class intervals across sectors and over time.

Table 5.28: Extent of Underestimation in the Trapezoidal Lorenz Ratio - INDIA (Rural, Urban, Non-city-urban, and Cities)

(in per cent)

NSS Round	Rural	Urban	Non-city urban	Cities
17	0.95	1.38	1.17	5.99
18	1.00	1.64	1.45	7.34
19	1.01	2.24	1.86	9.40
20	1.33	2.31	1.56	10.05
21	1.68	3.44	2.13	13.85
22	1.69	4.60	3.32	16.25
23	1.61	4.91	3.66	16.62
24	1.68	6.08	4.20	21.96
25	2.08	7.10	5.47	24.28
27	1.64	2.01	2.14	4.54
28	2.13	2.90	2.67	5.46
32	1.18	1.70	-	-

5.0 : Relative Inequality at Constant Prices.

In order to reconstrant the distributions at 1961/62 prices, fractile group-wise estimates of PCE will have to be made first. But the Ramakrishna method does not permit this easily. Even the Kakwani-Podder method is quite difficult. But our finding that the Lorenz curves are nearly symmetric permits us to employ the two-parameter log-normal model to derive fractile groupwise shares in PCE and the corresponding PCE estimates. Therefore, we derive the standard deviation of the logarithoms of PCE corresponding to the LRs of Ramakrishna method and then derive the PCE shares of various groups.

For purposes of deflation, we construct fractile group-specific price indices separately for the rural, urban, 'non-city urban' sector and cities (Tables 5.29 to 5.32). They show:

i) That the intensity of inflation is more severe on the bottoms than on the top groups in all the sectors.

ii) The severity is more in the rural than in the non-city urban and urban sectors, more in the non-city urban and urban sectors than in the cities.

Table 5.29 : Fractile - Group - Specific Price Indices For the Relevant Years - RURAL INDIA

Fractile Group \ Year	1961-1962	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1972-1973	1973-1974	1977-1978
0-5	100.00	111.83	131.54	141.24	164.84	191.22	181.02	189.30	191.60	217.27	261.01	336.15
5-10	100.00	111.75	131.06	141.55	165.03	192.06	181.21	189.55	192.08	218.47	262.38	336.20
10-20	100.00	111.59	131.58	141.12	164.44	191.06	180.37	188.55	191.30	217.30	261.11	335.49
20-30	100.00	111.46	131.17	140.76	163.77	189.98	179.71	187.93	190.97	216.70	260.47	335.03
30-40	100.00	111.33	130.70	140.56	163.11	188.74	178.89	186.94	190.47	216.09	260.36	334.12
40-50	100.00	111.15	129.97	139.66	161.60	186.44	177.12	185.05	188.78	214.25	257.62	332.18
50-60	100.00	111.11	129.86	139.61	161.45	186.20	177.10	185.05	188.93	214.25	257.79	332.34
60-70	100.00	110.80	128.68	138.27	159.27	182.80	174.28	182.16	186.40	210.95	253.40	329.04
70-80	100.00	110.31	127.01	136.95	157.00	178.62	171.28	179.32	184.21	207.67	249.66	324.54
80-90	100.00	109.75	125.23	134.83	153.69	173.84	168.00	175.50	180.70	202.32	242.35	318.99
90-95	100.00	109.17	123.62	133.04	150.81	169.37	164.23	171.63	177.29	197.87	236.35	313.48
95-100	100.00	108.44	120.14	129.00	144.61	159.91	156.54	163.13	168.60	186.34	220.31	299.48
0-100	100.00	110.15	126.65	136.25	156.17	177.70	170.81	175.83	182.93	205.63	246.39	321.96

Table 5.30 : Fractile Group Specific Price Indices For the Relevant Years - URBAN INDIA

Year / Fractile Group	1961-1962	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1972-1973	1973-1974	1977-1978
0-5	100.00	111.17	129.73	139.27	161.78	185.57	176.53	185.14	188.71	211.98	256.13	335.03
5-10	100.00	111.24	130.19	139.65	162.10	186.60	176.91	185.56	189.22	213.29	257.74	336.26
10-20	100.00	110.68	128.39	138.09	159.51	182.15	174.56	183.13	187.53	210.03	253.85	332.55
20-30	100.00	110.30	127.32	137.05	158.00	179.20	172.17	181.36	186.34	207.31	251.37	332.26
30-40	100.00	110.46	126.99	136.69	156.87	177.92	171.38	179.60	184.67	206.64	249.85	329.85
40-50	100.00	110.21	126.18	135.91	155.63	175.84	169.79	178.40	183.88	204.54	247.71	329.39
50-60	100.00	109.80	125.33	135.09	154.52	173.66	167.68	176.48	182.25	201.89	244.91	326.62
60-70	100.00	109.41	123.90	133.45	151.95	169.74	165.47	173.59	179.63	198.05	239.43	321.59
70-80	100.00	109.02	122.76	132.25	149.94	166.72	163.03	171.00	177.34	194.79	235.22	317.48
80-90	100.00	108.67	121.30	130.55	147.28	162.54	159.58	167.72	174.38	190.40	229.59	314.50
90-95	100.00	108.12	118.65	127.59	142.69	155.71	154.67	162.83	169.43	182.86	218.84	306.48
95-100	100.00	106.90	114.29	122.23	134.73	144.11	144.74	151.78	157.97	167.14	196.52	286.31
0-100	100.00	109.00	122.08	131.37	148.70	165.14	161.08	169.35	175.36	192.17	231.34	315.51

Fractile Group \ Year	1961–1962	1963–1964	1964–1965	1965–1966	1966–1967	1967–1968	1968–1969	1969–1970	1970–1971	1972–1973	1973–1974
0–5	100.00	111.17	129.73	139.27	161.73	185.57	176.53	185.14	198.71	211.98	256.13
5–10	100.00	111.24	130.19	139.65	162.13	186.63	176.91	185.56	199.22	213.29	257.74
10–20	100.00	111.84	129.26	138.93	160.91	184.19	175.14	184.17	198.60	211.65	256.67
20–30	100.00	110.34	127.44	137.09	158.15	179.43	172.17	181.35	196.19	207.31	251.20
30–40	100.00	110.46	126.99	136.69	156.87	177.92	171.38	179.60	194.67	206.64	249.85
40–50	100.00	110.32	126.59	136.34	156.21	176.85	170.72	178.97	194.33	206.03	249.22
50–60	100.00	110.07	125.88	135.52	155.01	175.02	169.13	177.60	193.04	203.78	246.36
60–70	100.00	109.71	125.02	134.58	153.46	172.56	167.04	175.00	190.92	200.74	242.90
70–80	100.00	109.15	123.42	132.82	151.08	168.63	164.69	173.01	177.86	196.90	237.47
80–90	100.00	108.89	121.86	131.34	148.45	164.40	161.17	169.53	175.93	192.61	232.24
90–95	100.00	108.25	120.19	129.19	145.39	159.97	157.29	165.93	172.38	187.11	224.49
95–100	100.00	107.20	114.76	122.84	135.65	145.44	146.06	153.73	159.79	169.29	199.29
0–100	100.00	109.18	122.93	132.16	149.92	166.88	163.14	171.42	177.45	193.98	234.15

Table 5.32 : Fractile Group Specific Price Indices For the Relevant Years - CITIES

Fractile Group \ Year	1961-1962	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1972-1973	1973-1974
0-5	100.00	110.30	126.70	136.49	157.45	177.67	170.92	179.99	184.64	204.45	248.13
5-10	100.00	110.38	126.86	136.46	156.87	177.85	170.94	179.72	184.51	205.13	248.31
10-20	100.00	110.02	125.28	135.48	155.17	173.64	168.04	176.71	182.47	201.68	245.95
20-30	100.00	109.88	124.62	134.54	153.59	171.16	166.36	174.81	181.04	199.85	243.74
30-40	100.00	109.37	124.21	134.21	153.29	170.22	165.17	173.38	179.92	198.21	242.29
40-50	100.00	109.22	122.71	132.47	150.25	166.19	162.13	170.25	176.81	193.91	235.95
50-60	100.00	108.79	121.20	131.00	148.06	162.29	159.89	168.22	175.17	190.63	231.87
60-70	100.00	108.67	120.30	129.92	146.16	159.85	158.24	166.52	173.62	188.31	228.40
70-80	100.00	108.41	119.59	129.07	144.82	157.89	156.47	164.53	171.66	185.66	224.84
80-90	100.00	107.55	116.61	125.56	139.52	150.30	150.47	157.48	164.44	175.80	210.43
90-95	100.00	107.24	115.28	123.52	136.44	146.44	147.00	153.57	160.13	170.44	201.80
95-100	100.00	107.24	115.28	123.52	136.44	146.44	147.00	153.57	160.13	170.44	201.80
0-100	100.00	108.24	119.44	128.71	144.56	157.74	155.86	163.76	170.57	184.29	222.34

The LRs based on real distribution are presented in Table 5.33 and depicted in Fig. 6.9. They show a clear rising trend particularly for the cities.

Table 5.33 : Lorenz Ratios at 1961/62 Prices-INDIA

(Rural, Urban, Non-City Urban and Cities)

NSS Round	Rural	Urban	Non-City Urban	Cities
17	0.316	0.362	0.343	0.367
18	0.302	0.369	0.345	0.369
19	0.309	0.371	0.331	0.399
20	0.312	0.362	0.335	0.380
21	0.314	0.371	0.350	0.379
22	0.320	0.380	0.361	0.384
23	0.329	0.366	0.351	0.381
24	0.318	0.385	0.354	0.407
25	0.304	0.373	0.348	0.401
27	0.324	0.378	0.355	0.400
28	0.305	0.344	0.331	0.397
32	0.352	0.360	-	-

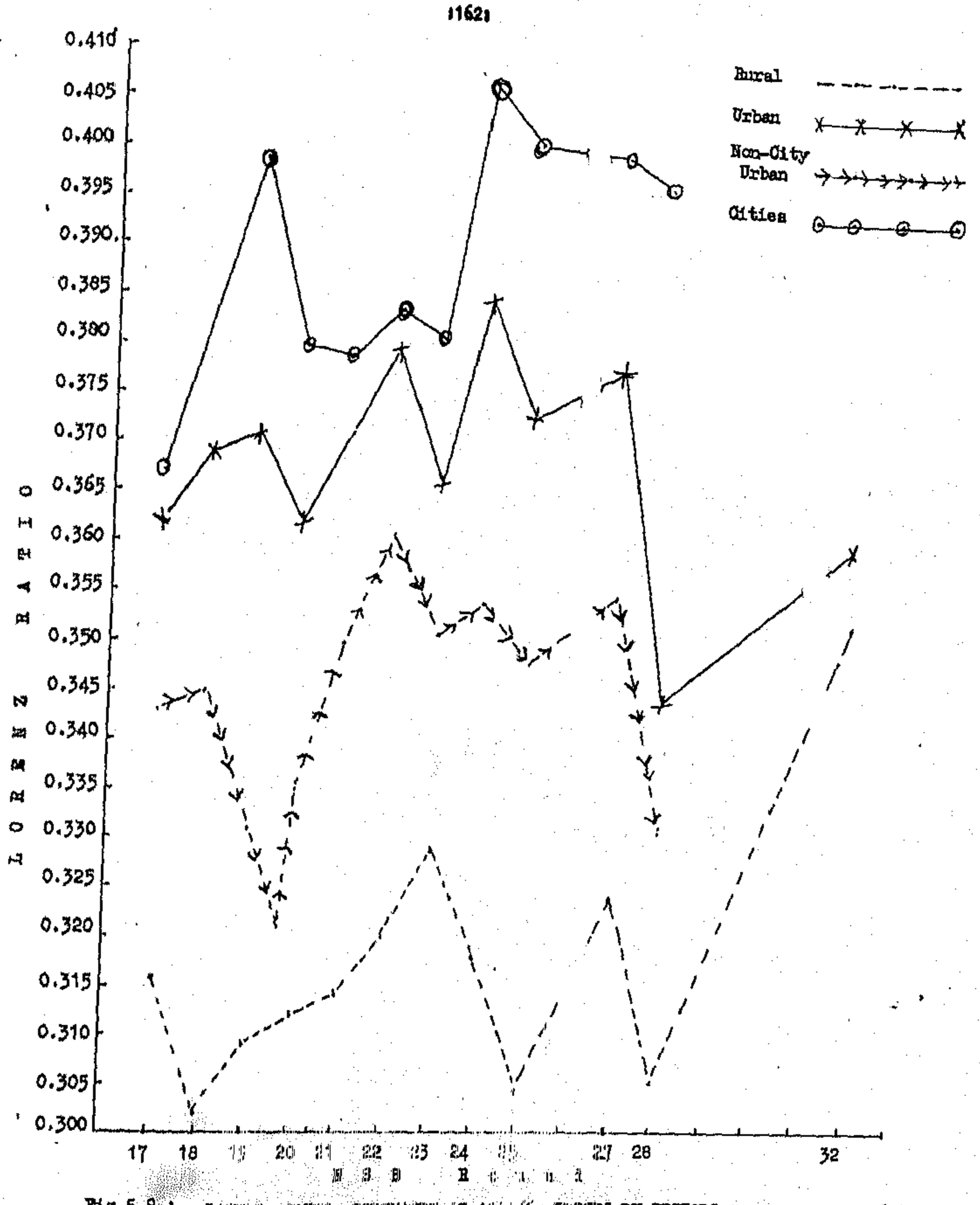

Fig 5.9 : LORENZ RATIO ESTIMATES AT 1961/62 PRICES BY SECTORS

5.9: All India Consumption Inequality and its Sectoral Decomposition

It would be of interest to examine inequality at the all India level, that is, rural and urban sectors combined. The LRs for pooled rural and urban PCE distributions, ignoring rural-urban price differences, are presented in Table 5.34. In general, they show an improvement in distribution over time. This is expected since in both sectors LRs decline over time and the rural-urban disparities in average PCE show no trend.

Table 5.34 : Estimates of Lorenz Ratio - ALL INDIA

(at current prices)

NSS Round	Trapezoidal Lorenz Ratio	Ramakrishnan Lorenz Ratio
17	0.332	0.335
18	0.322	0.325
19	0.307	0.312
20	0.311	0.315
21	0.309	0.315
22	0.304	0.310
23	0.320	0.327
24	0.314	0.321
25	0.306	0.314
27	0.312	0.317
28	0.290	0.297
32	0.350	0.355

Next, we go on to examine all India consumption inequality by its sectoral decomposition. These results are presented in Table 5.35. The results show that inter-sectoral disparity contribution in general to about 40 per cent of over all inequality at the national level. This picture does not seem to have changed to a significant extent during the period of the study.

Table 5.35 : Inequality Decomposition - All India

(at current prices)

NSS Round	All-India Lorenz Ratio	Intra-Sectoral Component	Inter-Sectoral Disparity	Percentage contribution of inter-sectoral disparity
17	0.335	0.213	0.122	36.33
18	0.325	0.201	0.124	38.15
19	0.312	0.201	0.111	35.60
20	0.315	0.203	0.112	35.44
21	0.315	0.199	0.115	36.62
22	0.310	0.198	0.113	36.34
23	0.327	0.205	0.122	37.34
24	0.321	0.196	0.125	39.00
25	0.314	0.188	0.126	40.14
27	0.317	0.197	0.120	37.74
28	0.297	0.184	0.113	38.01
32	0.355	0.210	0.145	40.85

We would have got a much clearer insight into the structure of inequality at the all India level if the analysis were in real terms. But this we are not in a position to do for lack of sector specific prices. Strictly speaking, the *real LRs for the rural and urban sectors* estimated in Section 5.8 cannot be combined to obtain the intra-sectoral component as they are based on all India prices.

5.10 : Summing up.

The analysis in the preceding Sections have brought out the following.

Distributions across space and over time vary with respect to both location and dispersion. Hence, a differential classification procedure has to be adopted while presenting the different distributions in the form of frequency distributions across class intervels so as to make them comparable. But the NSSO has been following the same system of PCE class intervals for different regions without any regard for the above principles. This has resulted in considerable loss of information about the PCE distribution both absolutely and relatively across regions.

There is also the need for continuous changing of class intervals over time to take into account the locational shifts in distribution caused by both inflation and growth in real magnitudes. Otherwise, one would get a deceptive picture of decreasing trend

in the degree of inequality as is found with respect to the NSS distributions for the cities.

It may be noted, these problems probably would not have arisen if the NSSO had followed the Fractile Graphical method of data presentation developed by Mahalanobis (1960) in all its tabulations.

Among other things, we find the followihg:

i) Real consumption levels remained virtually stagnant from the 17th round onwards in all the sectors.

ii) The usual trapezoidal LRs underestimate inequality both absolutely and relatively across sectors. Hence, we tried three alternative methods of estimating LR. We found that different methods give different estimates of LR. On a priori as well as on statistical grounds, we preferred the Ramakrishna method of estimating LR, which showed an altogether different trend behaviour in the LR than the trapezoidal one. The LRs derived by Ramakrishnan method and by deflation for differential price movements across fractile groups, showed a higher extent of increase in LR.

Chapter 6

CONSUMPTION LEVELS AND DISTRIBUTIONS: STATE LEVEL ANALYSIS

6.1 Introduction

Developmental experiences differ between the planned and free market economies. In the former case, there is a conscious effort at achieving certain predetermined goals, which are considered socially desirable. For instance, regarding the spatial aspect of development, strategies are evolved with a view to reducing regional imbalances in the levels of development. This aspect has received substantial attention in Indian planning also. But to what extent success has been achieved in the realization of this goal is yet to be evaluated in all its aspects. One important way of examining this issue would be to analyse consumption levels and distributions across states. This is because whatever may be the success achieved, it should finally get reflected in changes in the levels of living of the people, which in any case, would be their first priority because most of them have been living at or around the subsistence level. Accordingly, this chapter aims at examining the following issues:

i) Inter-state disparities in consumption levels, by sectors

ii) Have these disparities increased or decreased over time?

iii) Trend behaviour of consumption levels by sectors and by states

iv) Inter-state differences in consumption distributions and their relation to levels of development, as measured by mean PCE.

We deal with the issues mentioned above at three different levels. To begin with, in Section 6.2, we shall examine the above issues using NSS data on PCE distributions without making any adjustment for inter-state and inter-temporal price variations. Next, we examine the temporal changes in PCE levels and distributions after making necessary price adjustments, that is, in real terms for each state. This is done in Section 6.3. Section 6.4 examines some of the issues after making the necessary adjustments in the mean PCEs for interstate price variations. Section 6.5 concludes the Chapter.

6.2 Inter-State Disparities in Consumption Levels and Distributions

6.2.1 Introduction

For the analysis at the state level, we consider 14 states of the Indian Union, for which data are available, right from 1961/62. The analysis is done both for the rural and urban sectors of these States. The 14 states are the following:

i. Andhra Pradesh
ii. Assam
iii. Bihar
iv. Gujarat
v. Karnataka
vi. Kerala
vii. Madhya Pradesh
viii. Maharashtra
ix. Orissa
x. Punjab-Haryana
xi. Rajasthan
xii. Tamil Nadu
xiii. Uttar Pradesh,
xiv. West Bengal.

The sample size, that is, the number of sample households, in each of the NSS rounds (during 17th to 32nd, for the rural and urban sectors of these States are given in Tables 6.1 and 6.2.

Table 6.1 : Number of Sample Households Selected in Different NSS Rounds by State Rural Sector

States \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	659	1710	1132	1101	1089	1115	623	2524	2815	5887	1236	8014
Assam	221	732	610	538	559	565	417	1370	1343	2591	600	4961
Bihar	639	2334	1416	1178	1575	1530	763	2717	2711	5739	1300	9115
Gujarat	284	1015	644	674	764	598	315	908	1952	3381	530	3731
Karnataka	310	984	700	678	687	715	337	1429	1498	3333	621	4217
Kerala	213	1070	626	614	713	729	391	1380	1573	3789	645	4320
Madhya Pradesh	575	1766	1335	1371	1269	1355	752	2878	4033	5739	1320	8523
Maharashtra	526	1600	1205	1202	1252	1003	519	2550	4072	5249	1135	7451
Orissa	300	801	641	632	757	791	422	1503	1879	3312	672	4286
Punjab-Haryana	224	934	577	596	656	710	386	1335	1214	5298	1273	5438
Rajastan	302	1197	729	672	671	656	401	1317	1225	2285	613	4184
Tamil Nadu	728	1590	1090	1073	1213	1210	724	2609	2121	5984	911	6318
Uttar Pradesh	881	2966	1894	1869	1845	1849	1022	3857	4132	7985	1784	12538
West Bengal	431	1324	889	859	988	989	631	2085	2682	4895	1030	6587

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Table 6.2 Number of Sample Households Selected in Different NSS Rounds by States:Urban Sector

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	483	357	739	718	1165	791	824	2030	1593	4654	664	4575
Assam	81	100	351	392	346	227	226	503	538	1500	229	1728
Bihar	298	264	702	638	834	565	601	1162	1201	3693	491	3690
Gujarat	331	176	352	378	606	324	339	494	746	1990	357	2868
Karnataka	237	211	408	387	624	465	545	908	843	2466	369	2526
Kerala	198	113	291	260	411	302	273	517	519	1407	245	1728
Madhya Pradesh	260	307	665	594	841	546	600	1090	1205	3213	451	3375
Maharashtra	678	542	1392	1270	1658	1077	1033	2125	2652	6181	953	7152
Orissa	114	132	406	359	489	352	375	814	682	1861	217	1708
Punjab-Haryana	132	175	360	318	447	233	347	657	629	3373	502	2519
Rajastan	275	205	401	414	570	397	460	772	763	2392	323	2526
Tamil Nadu	530	309	772	745	962	664	765	1823	1394	3541	744	5461
Uttar Pradesh	639	626	1096	1039	163	1007	1197	2546	2428	5982	867	6794
West Bengal	557	437	965	723	1058	613	668	1455	322	4465	740	5149

6.2.2 Disparities in Average PCE

In this Section, we study the average PCE levels in the rural and urban sectors of these States and also the inter-state disparities in them. The estimates of average PCE at current prices for the rural and urban sectors of these states are given in Tables 6.3 and 6.4. These estimates by sub-samples for the 18th and 19th rounds show the margin of error to be low for most of the states even though it varies across states. We also construct indices of average PCE based on combined sample for different states with all India as base. This we do both for the rural and urban sectors (Tables 6.5 and 6.6). They indicate that during most of the rounds both the rural and urban sectors of Assam, Maharashtra, Punjab-Haryana and West Bengal had average PCE levels above the national level. Next, we rank the different states on the basis of average PCE. The rankings of the different states for the rural and urban sectors are given in Tables 6.7 and 6.8 respectively. We find that Punjab-Haryana tops all the states in rural average PCE during all the NSS rounds and Orissa is at the bottom during most of the rounds. The ranks for most of the states fluctuate over rounds. The only states for which they are highly stable are Orissa, Punjab-Haryana and Rajasthan. On the urban front, we find Assam to top during the earlier rounds upto 25th one. The states for which urban ranks remain relatively stable are Assam, Maharashtra, Punjab-Haryana and West Bengal. To verify whether these ranks are stable, we compute Spearman's rank

correlation coefficient for the state rankings between successive rounds for both the rural and urban sectors (Table 6.9). They indicate that the state rankings for the urban sectors are relatively stable while those for the rural are not as indicated by the low coefficients in a few cases.

Table 6.3 Estimates of Monthly Average Per Capital Consumption by States (at current prices ..Rural sector)

NSS Round	17	18			19		
Sample / State	combined	s.s.1	s.s.2	combined	s.s.1	s.s.2	combined
Andhra Pradesh	20.11	20.14	21.37	20.76	26.32	26.56	26.45
Assam	22.23	24.95	27.89	26.43	29.58	29.01	29.30
Bihar	19.00	20.96	21.64	21.31	28.67	25.51	26 60
Gujarat	22.58	23.21	22.13	22.69	29.54	24.46	26 98
Karnataka	25.33	20.03	20 83	20.43	25.78	24.71	25.23
Kerala	21.07	20 20	20.49	20.36	21.72	22.92	22.30
Madhya Pradesh	21.46	24.42	22.31	23.37	27.00	25.62	26.30
Maharashtra	19.91	21.05	22.43	21.72	25.18	25.15	25.16
Orissa	17.40	19.22	19.48	19.35	20.64	20.60	20 61
Punjab-Haryana	32.76	28.59	28.75	28.66	35.04	38.47	37.52
Rajasthan	23.48	23.63	22.69	23.13	31.76	29.32	30.55
Tamil Nadu	22.53	23.96	22.84	23.39	24.12	24.84	24.55
Uttar Pradesh	22.73	21.44	21.17	21.51	26.99	27.20	27.09
West Bengal	20.83	22.54	24.84	23.69	22.67	23.63	23.18
All India	21.73	22.19	22.55	22.37	26.66	26.20	26.44

(contd)

Note: NSS Report No. 184 for the 17th round does not provide data by sub-samples for states.

Table 6.3 (contd)

NSS Round	20	21	22	23	24	25	27	28	32
State \ Sample	comb.	comb.	comb.	comb.	comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	27.66	29.14	30.46	31.47	34.54	34.35	39.79	50.67	69.66
Assam	30.66	36.83	41.53	37.57	37.69	40.27	41.67	52.03	58.95
Bihar	30.31	29.02	33.36	29.78	33.65	33.15	41.20	56.01	57.45
Gujarat	26.57	28.99	31.35	34.53	34.38	36.64	51.70	54.49	70.30
Karnataka	26.42	26.29	31.93	31.21	31.08	35.89	44.53	52.32	64.94
Kerala	21.80	24.56	28.54	36.18	31.07	36.12	42.19	55.35	74.22
Madhya Pradesh	28.07	29.57	31.77	31.13	33.68	32.88	40.72	50.39	59.93
Maharashtra	27.74	28.53	30.66	32.04	33.22	36.39	41.55	52.27	76.87
Orissa	23.50	26.20	30.24	28.24	28.70	28.86	34.96	42.66	52.47
Punjab-Haryana	37.05	44.82	45.01	52.36	53.93	53.97	72.62	74.16	104.48
Rajasthan	32.98	37.14	38.42	41.06	41.26	35.39	51.98	64.01	108.74
Tamil Nadu	24.57	28.59	29.61	30.02	32.08	29.98	37.70	47.74	63.33
Uttar Pradesh	29.46	33.15	35.14	33.09	34.00	35.08	42.12	51.32	67.34
West Bengal	26.71	28.98	32.63	29.85	32.86	33.32	38.45	47.50	59.27
All India	28.40	30.90	33.40	33.29	34.70	35.31	42.32	53.01	68.89

Table 6.4 Estimates of Monthly Per Capita Consumption by States (at current prices) -- Urban Sector

NSS Round	17	18			19			20
Sample / State	combined	s.s.1	s.s.2	combined	s.s.1	s.s.2	combined	combined
Andhra Pradesh	25.19	29.78	26.28	28.16	33.09	30.54	31.78	34.65
Assam	39.20	47.01	46.48	46.64	44.24	41.38	42.66	47.23
Bihar	34.96	28.57	31.01	29.89	32.74	32.09	32.41	33.86
Gujarat	31.73	34.05	32.09	33.03	30.43	31.99	31.19	33.59
Karnataka	27.21	26.59	25.08	25.88	30.18	34.56	32.44	33.84
Kerala	25.82	23.78	31.33	27.29	32.90	27.49	30.11	24.93
Madhya Pradesh	26.70	30.46	29.37	29.93	33.39	35.42	34.44	32.86
Maharashtra	36.66	39.96	34.73	37.24	43.88	45.10	44.48	46.87
Orissa	33.71	32.12	31.70	31.92	31.20	32.34	31.79	34.85
Punjab-Haryana	29.27	31.44	37.51	34.33	38.41	35.62	36.95	36.48
Rajasthan	28.92	35.98	29.02	32.53	35.02	33.45	34.21	34 37
Tamil Nadu	29.74	29.64	33.33	31.47	33.12	35.63	34.34	34.11
Uttar Pradesh	25.40	29.47	28.89	29.17	30.51	29.60	30 05	31.97
West Bengal	38.42	39.74	43.61	41.66	40.57	41.61	41.13	42.77
All India	30.86	32.93	33.00	32.96	36.12	35.97	36.03	36.65

(contd)

Table 6.4 (contd)

NSS Round	21	22	23	24	25	27	28	32
Sample / State	comb.	comb.	comb.	comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	37.34	40.49	44.44	47.68	49.27	56.32	65.30	93.22
Assam	60.44	58.70	55.93	60.52	64.24	60.75	72.78	94.43
Bihar	38.95	44.23	44.14	47.15	51.02	59.91	68.36	83.14
Gujarat	38.35	42.42	40.21	44.24	48.83	57.78	66.76	100.92
Karnataka	34.25	38.33	42.90	45.60	50.71	57.89	66.50	87.59
Kerala	35.45	34.81	38.39	44.11	47.63	58.27	68.93	82.73
Madhya Pradesh	40.08	40.20	44.35	45.77	50.37	61.88	65.50	90.91
Maharashtra	49.46	50.34	52.06	62.20	63.60	78.84	79.78	110.33
Orissa	41.98	47.21	48.26	54.66	52.75	62.35	70.09	86.99
Punjab-Haryana	44.12	47.35	51.59	55.30	62.02	75.00	79.58	113.73
Rajasthan	39.93	44.60	46.49	46.72	54.13	63.87	68.76	95.68
Tamil Nadu	35.31	41.22	40.68	43.70	44.69	54.02	64.78	86.14
Uttar Pradesh	38.87	42.67	41.08	42.55	45.17	53.55	60.81	82.50
West Bengal	48.31	51.94	53.52	59.32	60.89	68.23	80.76	97.13
All India	41.54	44.82	46.04	50.39	52.85	63.33	70.79	96.15

Table 6.5 State-wise Estimates of Average PCE Expressed as Percentage of All India Average PCE: Rural Sector

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	81.63	85.44	88.20	94.54	89.89	90.34	96.52	94.62	97.28	96.08	95.59	101.12
Assam	127.03	141.50	118.40	128.87	145.50	130.97	121.48	120.10	114.05	94.34	98.15	85.57
Bihar	113.29	90.69	89.95	92.39	93.77	98.68	95.87	93.57	93.88	93.28	105.66	83.39
Gujarat	102.82	100.21	86.57	91.65	92.32	94.65	87.34	87.80	103.77	117.05	102.79	102.05
Karnataka	88.17	78.52	90.04	92.33	82.45	85.52	93.18	90.49	101.64	100.82	98.70	94.27
Kerala	83.67	82.80	83.57	68.02	85.34	77.67	83.38	87.54	102.29	95.52	104.41	107.74
Madhya Pradesh	86.52	90.81	95.59	89.66	96.49	89.69	96.33	90.83	93.12	92.19	95.05	86.99
Maharashtra	118.79	112.99	123.45	127.89	119.07	112.32	113.08	123.44	103.06	94.07	98.60	111.58
Orissa	109.24	96.84	88.23	95.09	101.06	105.33	104.82	108.47	81.73	79.15	80.48	76.16
Punjab-Haryana	94.85	104.16	102.55	99.54	106.21	105.64	112.05	109.74	152.85	164.41	139.90	151.66
Rajasthan	93.71	98.70	94.95	93.78	96.12	99.51	100.98	92.72	100.23	117.68	120.75	157.85
Tamil Nadu	96.37	95.48	95.31	93.07	85.00	91.97	88.36	86.72	84.91	85.35	90.06	91.93
Uttar Pradesh	82.31	88.50	83.40	87.23	93.57	95.20	89.23	84.44	99.35	95.36	96.81	97.75
West Bengal	124.49	126.40	114.15	116.70	116.30	115.89	116.25	117.72	94.36	87.05	89.61	86.01
All India	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 6.6 Statewise Estimate of Average PCE Expressed as Percentage of the All India Average PCE : Urban Sector

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	81.63	85.44	88.20	94.54	89.89	90.34	96.52	94.62	93.23	88.93	92.27	96.95
Assam	127.03	141.50	118.40	128.87	145.50	130.97	121.48	120.10	121.55	95.93	102.84	98.21
Bihar	113.29	90.69	89.95	92.39	93.77	98.68	95.87	93.57	96.54	94.60	96.59	86.47
Gujarat	102.82	100.21	86.57	91.65	92.32	94.65	87.34	87.80	92.39	91.24	94.33	104.96
Karnataka	88.17	78.52	90.04	92.33	82.45	85.52	93.18	90.49	95.95	91.41	93.97	91.10
Kerala	83.67	82.80	83.57	68.02	85.34	77.67	83.38	87.54	90.12	92.01	97.40	86.04
Madhya Pradesh	86.52	90.81	95.59	89.66	96.49	89.69	96.33	90.83	95.31	97.71	92.55	94.55
Maharashtra	118.79	112.99	123.45	127.89	119.07	112.32	113.08	123.44	120.34	118.17	112.73	114.75
Orissa	109.24	96.84	88.23	95 09	101.06	105.33	104.82	108.47	99.81	98.45	99.04	90.47
Punjab-Haryana	94.85	104.16	102.55	99.54	106.21	105.64	112.05	109.74	117.35	118.43	112.45	118.28
Rajasthan	93.71	98.70	94.95	93.78	96.12	99.51	100.98	92.72	102.42	100.85	97.16	99.51
Tamil Nadu	96.37	95.48	95.31	93.07	85.00	91.97	88.36	86.72	84.56	85.30	91.54	89.59
Uttar Pradesh	82.31	88.50	83.40	87.23	93.57	95.20	89.23	84.44	85.47	84.56	85.93	85.80
West Bengal	124.50	126.40	114.15	116.70	116.30	115.89	116.25	117.72	115.21	107.74	114.17	101.02
All India	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 6.7 State Ranking in Ascending Order of Rural Average PCE (Unadjusted)

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	4	4	8	7	8	4	7	11	6	4	5	9
Assam	8	13	12	12	12	13	12	12	13	8	7	3
Bihar	2	5.5	9	11	7	10	2	7	4	6	12	2
Gujarat	10	8	10	5	6	6	10	10	12	12	10	10
Karnataka	13	3	6	4	9	8	6	3	9	11	9	7
Kerala	6	2	2	1	1	1	11	2	10	10	11	11
Madhya Pradesh	7	10	7	9	10	7	5	8	3	5	4	5
Maharashtra	3	7	5	8	3	5	8	6	11	7	8	12
Orissa	1	1	1	2	2	3	1	1	1	1	1	1
Punjab-Haryana	14	14	14	14	14	14	14	14	14	14	14	14
Rajasthan	12	9	13	13	13	12	13	13	8	13	13	13
Tamil Nadu	9	11	4	3	4	2	4	4	2	2	3	6
Uttar Pradesh	11	5.5	11	10	11	11	9	9	7	9	6	8
West Bengal	5	12	3	6	5	9	3	5	5	3	2	4

Table 6.8 State Ranking in Ascending Order of Urban Average PCE (Unadjusted)

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	2	3	4	9	4	4	8	9	5	3	3	8
Assam	14	14	13	14	14	14	14	13	14	8	11	9
Bihar	11	5	6	6	7	8	6	8	8	7	7	3
Gujarat	9	10	3	4	5	6	2	4	4	4	6	12
Karnataka	5	1	7	5	1	2	5	5	7	5	5	6
Kerala	3	2	2	1	3	1	1	3	3	6	9	2
Madhya Pradesh	4	6	10	3	9	3	7	6	6	9	4	7
Maharashtra	12	12	14	13	13	12	12	14	13	13	13	13
Orissa	10	8	5	10	10	10	10	10	9	10	10	5
Punjab--Haryana	7	11	11	11	11	11	11	11	12	14	12	14
Rajasthan	6	9	8	8	8	9	9	7	10	11	8	10
Tamil Nadu	8	7	9	7	2	5	3	2	1	2	2	4
Uttar Pradesh	2	4	1	2	6	7	4	1	2	1	1	1
West Bengal	13	13	12	12	12	13	13	12	11	12	14	11

Table 6.9 Spearman's Rank Correlation for State Rankings Based on Average PCE

NSS Rounds Considered	Rural	Urban
Between 17 and 18	0.397	0.769**
18 and 19	0.491	0.697**
19 and 20	0.868**	0.754**
20 and 21	0.842**	0.727**
21 and 22	0.955**	0.877**
22 and 23	0.437	0.837**
23 and 24	0.833**	0.925**
24 and 25	0.512	0.921**
25 and 27	0.802**	9.842**
27 and 28	0.868**	0.859**
28 and 32	0.626**	0.591**

** Significant at 5 per cent level for a two-tail test.

Next, we measure inter-state disparity in average PCE levels using both the LR and Kuznets' index (Table 6.10). The two indices do not show any consistent trend in interstate disparities either for the rural or for the urban sector. The 32nd round, in comparison with the earlier rounds, shows a high degree of inter-state disparities on the rural front. Broadly speaking, there appears to be a decline in inter-state disparity on the urban front. This decline is reflected more clearly by the Kuznets' index than by the LR.

Table 6.10 Measures of Inter-State Disparity in PCE (Based on Price unadjusted data)

NSS Round	Rural		Urban	
	L.R.	Kuznets' Index	L.R	Kuznets' Index
17	0.065	0.045	0.074	0.069
18	0.045	0.034	0.081	0.060
19	0.058	0.037	0.076	0.060
20	0.059	0.041	0.080	0.064
21	0.064	0.050	0.069	0.057
22	0.057	0.041	0.062	0.047
23	0.067	0.047	0.062	0.051
24	0.055	0.037	0.069	0.067
25	0.056	0.036	0.073	0.059
27	0.071	0.051	0.069	0.048
28	0.056	0.038	0.054	0.045
32	0.098	0.068	0.060	0.045

6.2.3 Inequality in Nominal Consumption Distribution

The estimates of LR based on PCE distributions for the rural and urban sectors of the 14 states are given in Tables 6.11 and 6.13. The standard deviations of logarithms of PCE derived assuming the two-parameter lognormal model are given in Tables 6.12 and 6.14. It may be noted that the LR estimates are made using the trapezoidal method. This may not vitiate our analysis and affect our interpretations significantly for two reasons: First, because of the finding at the all-India level that for the rural and urban sectors, the degree of underestimation involved in using the trapezoidal method is generally less than five per cent. Secondly, because of the finding that the underestimation which is minimum initially, is maximum for the 24th and 25th rounds and again goes down for the 27th, 28th and 32nd rounds. Thus, we know that the results for the earlier and later rounds can be taken to be approximately correct estimates. The two inequality indices compared over rounds for the rural and urban sectors of each state show an improvement in distribution in all of them. However, this is not a real improvement as the actual change in real distributions is concealed by the differential price movements across different expenditure groups. An interesting feature is that for the rural sectors of Maharashtra and Rajasthan, the 32nd round, just as at the national level, shows an unusually high degree of inequality.

Table 6.11 Estimates of Lorenz Ratio by State Rural Sector (at current prices)

NSS Round	17	18			19		
Sample / State	comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.
Andhra Pradesh	0.319	0.285	0.292	0.302	0.302	0.317	0.310
Assam	0.222	0.209	0.221	0.220	0.188	0.193	0.191
Bihar	0.279	0.289	0.289	0.289	0.325	0.273	0.288
Gujrath	0.263	0.267	0.302	0.295	0.320	0.256	0.292
Karnataka	0.365	0.268	0.286	0.287	0.286	0.269	0.278
Kerala	0.327	0.295	0.301	0.300	0.340	0.329	0.333
Madhya Pradesh	0.339	0.359	0.320	0.343	0.314	0.298	0.307
Maharashtra	0.278	0.278	0.299	0.289	0.279	0.258	0.270
Orissa	0.292	0.252	0.275	0.276	0.265	0.265	0.265
Phujab-Haryana	0.348	0 309	0.286	0.298	0.313	0.322	0.314
Rajasthan	0.362	0.297	0.299	0.302	0.313	0.321	0.318
Tamil Nadu	0.316	0.306	0.305	0.305	0.295	0.288	0.293
Uttar Pradesh	0.314	0.287	0.302	0.295	0.302	0.270	0.289
West Bengal	0.267	0.244	0.274	0.261	0.231	0.224	0.237
All India	0.313	0.293	0.300	0.297	0.300	0.287	0.294

(contd)

Table 6.11 (contd)

NSS Round		20	21	22	23	24	25	27	28	32
Sample / State		comb.	comb.	comb.	comb.	comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	..	0.329	0.277	0.280	0.279	0.288	0.269	0.273	0.288	0.298
Assam	..	0.205	0.238	0.174	0.189	0.183	0.172	0.180	0.200	0.204
Bihar	..	0.302	0.310	0.299	0.278	0.281	0.265	0.288	0.273	0.258
Gujarat	..	0.284	0.296	0.279	0.280	0.272	0.266	0.302	0.232	0.285
Karnataka	..	0.306	0.303	0.298	0.316	0.264	0.277	0.274	0.281	0.321
Kerala	..	0.295	0.298	0.315	0.403	0.305	0.325	0.311	0.325	0.354
Madhya Pradesh	..	0.314	0.288	0.322	0.320	0.322	0.308	0.306	0.286	0.331
Maharashtra	..	0.276	0.284	0.255	0.284	0.268	0.246	0.310	0.264	0.462
Orissa	..	0.273	0.246	0.291	0.284	0.287	0.282	0.312	0.262	0.301
Punjab-Haryana	..	0.324	0.300	0 286	0.283	0.303	0.282	0.295	0.280	0.303
Rajasthan	..	0.314	0.340	0.325	0.381	0.345	0.321	0.316	0.276	0.464
Tamil Nadu	..	0.286	0.276	0.270	0.281	0.303	0.261	0.272	0.269	0.319
Uttar Pradesh	..	0.287	0.277	0.279	0.307	0.287	0.287	0.277	0.236	0.299
West Bengal	..	0.260	0.252	0.237	0.227	0.247	0.258	0.305	0.296	0.295
All India	..	0.297	0.293	0.291	0.305	0.293	0.283	0.299	0.276	0.336

Table 6.12 Estimates of Standard Deviation of Logarithm of PCE by States- Rural Sector

NSS Round		17	18			19			20	21
Sample / State		comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	comb.	comb.
Andhra Pradesh	..	0.581	0.516	0.530	0.549	0.549	0.577	0.564	0.595	0.502
Assam	..	0.395	0.375	0.397	0.391	0.336	0.346	0.342	0.364	0.423
Bihar	..	0.498	0.524	0.524	0.519	0.593	0.494	0.517	0.540	0.557
Gujarat	..	0.470	0.482	0.549	0.535	0.583	0.462	0.530	0.515	0.538
Karnataka	..	0.660	0.484	0.518	0.521	0.518	0.486	0.502	0.557	0.550
Kerala	..	0.597	0.535	0.547	0.544	0.622	0.601	0.609	0.536	0.542
Madhya Pradesh	..	0.612	0.659	0.583	0.628	0.572	0.541	0.558	0.572	0.523
Maharashtra	..	0.503	0.503	0.543	0.523	0.505	0.466	0.488	0.499	0.514
Orissa	..	0.523	0.454	0.496	0.494	0.479	0.479	0.479	0.493	0.443
Punjab-Haryana	..	0.632	0.562	0.518	0.540	0.570	0.587	0.571	0.591	0.546
Rajasthan	..	0.658	0.539	0.543	0.549	0.570	0.585	0.579	0.571	0.622
Tamil Nadu	..	0.574	0.556	0.555	0.554	0.535	0.522	0.532	0.518	0.500
Uttar Pradesh	..	0.564	0.570	0.549	0.535	0.549	0.488	0.525	0.519	0.501
West Bengal	..	0.476	0.439	0.496	0.471	0.415	0.402	0.427	0.469	0.454
All India	..	0.564	0.532	0.545	0.540	0.545	0.520	0.533	0.540	0.532

(contd)

Table 6.12 (contd)

NSS Round		22	23	24	25	27	28	32
Sample / State		comb.	comb.	comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	..	0.507	0.505	0.523	0.486	0.493	0.522	0.541
Assam	..	0.306	0.334	0.323	0.303	0.317	0.353	0.365
Bihar	..	0.537	0.497	0.504	0.463	0.515	0.489	0.466
Gujarat	..	0.505	0.507	0.491	0.481	0.549	0.417	0.516
Karnataka	..	0.542	0.575	0.477	0.501	0.495	0.508	0.585
Kerala	..	0.573	0.748	0.555	0.592	0.566	0.593	0.650
Madhya Pradesh	..	0.587	0.583	0.587	0.561	0.556	0.519	0.604
Maharashtra	..	0.459	0.515	0.484	0.443	0.565	0.476	0.871
Orissa	..	0.527	0.515	0.521	0.510	0.559	0.473	0.533
Punjab-Haryana	..	0.518	0.513	0.550	0.510	0.535	0.506	0.551
Rajasthan	..	0.594	0.703	0.632	0.586	0.576	0.500	0.875
Tamil Nadu	..	0.488	0.509	0.550	0.470	0.492	0.486	0.581
Uttar Pradesh	..	0.505	0.559	0.520	0.521	0.502	0.425	0.543
West Bengal	..	0.426	0.409	0.445	0.465	0.555	0.537	0.535
All India	..	0.528	0.555	0.531	0.513	0.544	0.499	0.614

Table 6.13 Estimates of Lorenz Ratio by State-Urban Sector (at current prices)

NSS Round		17	18			19			20	21	22	23
State \ Sample		comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	..	0.305	0.370	0.265	0.326	0.352	0.347	0.314	0.315	0.303	0.310	0.312
Assam	..	0.311	0.294	0.320	0.308	0.271	0.263	0.268	0.279	0.379	0.250	0.237
Bihar	..	0.436	0.311	0.331	0.324	0.299	0.322	0.315	0.318	0.334	0.311	0.316
Gujarat	..	0.307	0.363	0.282	0.322	0.270	0.250	0.262	0.289	0.285	0.272	0.253
Karnataka	..	0.360	0.321	0.337	0.333	0.305	0.332	0.322	0.317	0.299	0.307	0.329
Kerala	..	0.383	0.330	0.362	0.365	0.432	0.318	0.383	0.338	0.349	0.358	0.368
Madhya Pradesh	..	0.331	0.352	0.341	0.347	0.339	0 313	0.327	0.312	0.320	0.314	0.360
Maharashtra	..	0.370	0.365	0.372	0.368	0.386	0.401	0.384	0.372	0.350	0.348	0.338
Orissa	..	0.405	0.297	0.350	0.327	0.313	0.295	0.305	0.328	0.344	0.350	0.345
Punjab-Haryana	..	0.353	0.382	0.362	0.376	0.286	0.292	0.290	0.330	0.304	0.305	0.287
Rajasthan	..	0.313	0.371	0.317	0.352	0.326	0.300	0.315	0.303	0.308	0.295	0.323
Tamil Nadu	..	0.336	0.304	0.367	0.338	0.336	0.379	0.356	0.346	0.314	0.357	0.325
Uttar Pradesh	..	0.358	0.362	0.405	0.384	0.364	0.337	0.350	0.336	0.345	0.348	0.349
West Bengal	..	0.314	0.313	0.299	0.308	0.327	0.327	0.327	0.310	0.300	0.293	0.281
All India	..	0.357	0.356	0.364	0.360	0.352	0.347	0.349	0.339	0.337	0.332	0.329

(contd)

Table 6.13 (contd)

NSS Round		24	25	27	28	32
State \ Sample		comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	..	0.321	0.300	0.291	0.288	0.319
Assam	..	0.260	0.233	0.263	0.297	0.325
Bihar	..	0.313	0.323	0.322	0.262	0.303
Gujarat	..	0.278	0.265	0.242	0.246	0.308
Karnataka	..	0.325	0.313	0.323	0.291	0.342
Kerala	..	0.394	0.379	0.390	0.370	0.396
Madhya Pradesh	..	0.323	0.331	0.348	0.270	0.377
Maharashtra	..	0.316	0.324	0.367	0.331	0.362
Orissa	..	0.321	0.303	0.347	0.342	0.324
Punjab-Haryana	..	0.296	0.293	0.315	0.291	0.361
Rajasthan	..	0.317	0.335	0.333	0.287	0.301
Tamil Nadu	..	0.329	0.335	0.315	0.305	0.333
Uttar Pradesh	..	0.337	0.322	0.312	0.293	0.327
West Bengal	..	0.299	0.298	0.340	0.315	0.317
All India	..	0.340	0.327	0.341	0.301	0.346

Table 6.14 Estimates of Standard Deviation of Logarithms of PCE by State-Urban Sector

NSS Round		17	18			19			20	21	22	23
State \ Sample		comb.	s.s.1	s.s.2	comb.	s.s.1	s.s.2	comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	..	0.549	0.681	0.479	0.595	0.646	0.636	0.572	0.574	0.551	0.565	0.565
Assam	..	0.562	0.533	0.583	0.560	0.490	0.475	0.483	0.506	0.699	0.451	0.426
Bihar	..	0.808	0.566	0.599	0.592	0.543	0.587	0.574	0.580	0.610	0.566	0.575
Gujarat	..	0.554	0.667	0.511	0.588	0.488	0.451	0.474	0.525	0.516	0.492	0.457
Karnataka	..	0.655	0.585	0.616	0.610	0.555	0.606	0.588	0.577	0.543	0.559	0.601
Kerala	..	0.699	0.603	0.665	0.672	0.807	0.579	0.707	0.618	0.639	0.657	0.677
Madhya Pradesh	..	0.597	0.646	0.624	0.635	0.620	0.570	0.597	0.568	0.583	0.572	0.661
Maharashtra	..	0.674	0.671	0.685	0.677	0.713	0.744	0.707	0.686	0.641	0.639	0.618
Orissa	..	0.596	0.539	0.642	0.596	0.570	0.535	0.554	0.599	0.630	0.643	0.632
Punjab-Haryana	..	0.642	0.705	0.665	0.693	0.518	0.530	0.540	0.603	0.552	0.555	0.520
Rajasthan	..	0.563	0.683	0.577	0.645	0.594	0.545	0.573	0.551	0.561	0.536	0.589
Tamil Nadu	..	0.607	0.553	0.675	0.618	0.614	0.699	0.646	0.634	0.571	0.656	0.594
Uttar Pradesh	..	0.651	0.665	0.752	0.710	0.669	0.616	0.643	0.615	0.631	0.637	0.641
West Bengal	..	0.567	0.570	0.543	0.560	0.597	0.597	0.596	0.566	0.544	0.532	0.509
All India	..	0.654	0.653	0.669	0.661	0.646	0.636	0.640	0.619	0.616	0.607	0.601

(contd)

Table 6.14 (contd)

NSS Round		24	25	27	28	32
Sample / State		comb.	comb.	comb.	comb.	comb.
Andhra Pradesh	..	0.585	0.545	0.527	0.522	0.581
Assam	..	0.468	0.419	0.476	0.538	0.593
Bihar	..	0.569	0.589	0.587	0.473	0.551
Gujarat	..	0.502	0.479	0.436	0.444	0.560
Karnataka	..	0.594	0.569	0.588	0.573	0.626
Kerala	..	0.730	0.699	0.721	0.680	0.733
Madhya Pradesh	..	0.588	0.604	0.637	0.488	0.695
Maharashtra	..	0.575	0.591	0.675	0.604	0.665
Orissa8	..	0.585	0.552	0.636	0.626	0.591
Punjab-Haryana	..	0.537	0.532	0.574	0.527	0.663
Rajasthan	..	0.577	0.612	0.609	0.521	0.547
Tamil Nadu	..	0.600	0.613	0.574	0.554	0.608
Uttar Pradesh	..	0.617	0.588	0.568	0.532	0.597
West Bengal	..	0.543	0.542	0.622	0.574	0.577
All India	..	0.622	0.596	0.624	0.548	0.634

To examine how the degree of inequality in the distribution of PCE varies across States, we rank the States on the basis of the LRs (Tables 6.15 and 6.16). The ranks fluctuate over rounds. The only consistent picture provided is that of rural Assam which has the lowest degree of inequality during all the rounds. On the other hand, urban Kerala has the highest degree of inequality for the later rounds. The Spearman's rank correlation coefficients (Table 6.17) show that the rankings of states on the basis of rural LRs are highly stable during the rounds conducted in the 'sixties. The rank correlations are positive for the urban sector too; but are significant only in a few cases. Thus, we find that while the state rankings on the basis of average PCE is unstable and on the basis of LRs is highly stable for the rural sector for most of the cases, it is just the reverse for the urban sector.

Table 6.15 : Ranking of States in Ascending Order of Lorenz Ratio - Rural Sectors

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	9	11.5	11	14	5.5	7	4	9	7	3	12	5
Assam	1	1	1	1	1	1	1	1	1	1	1	1
Bihar	4	5.5	6	9	13	11	3	6	5	6	7	2
Gujarat	2	7.5	8	5	9	5.5	5	5	6	8	2	3
Karnataka	14	4	5	10	12	10	11	3	8	4	10	10
Kerala	10	10	14	8	10	12	14	12	14	12	14	12
Madhya Pradesh	11	14	10	11.5	8	13	12	13	12	10	11	11
Maharashtra	3	5.5	4	4	7	3	8.5	4	2	11	5	13
Orissa	6	3	3	3	2	9	8.5	7.5	9.5	13	4	7
Panjab-Haryana	12	9	12	13	11	8	7	10.5	9.5	7	9	8
Rajasthan	13	11.5	13	11.5	14	14	13	14	13	14	8	14
Tamil Nadu	8	13	9	6	4	4	6	10.5	4	2	6	9
Uttar Pradesh	7	7.5	7	7	5.5	5.5	10	7.5	11	5	3	6
West Bengal	5	2	2	2	3	2	2	2	3	9	13	4

Table 6.16 Ranking of States in Ascending Order of Lorenz Ratio - Urban Sector

NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	1	5	5	6	4	8	5	9	5.	3	5	5
Assam ..	3	1.5	2	1	14	1	1	1	1	2	9	7
Bihar ..	14	4	7	8	9	9	6	5	9	7	2	2
Gujarat ..	2	3	1	2	1	2	2	2	2	1	1	3
Karnataka ..	10	7	8	7	2	7	9	11	7	8	6.5	12
Kerala ..	12	11	13	12	12	14	14	14	14	14	14	14
Madhya Pradesh	6	9	10	5	8	5	13	10	11	12	3	13
Maharashtra	11	12	14	14	13	11	10	6	10	13	12	11
Orissa ..	13	6	4	9	10	12	11	8	6	11	13	6
Punjab-Haryana	8	13	3	10	5	6	4	3	3	5.5	6.5	10
Rajasthan ..	4	10	6	3	6	4	7	7	12	9	4	1
Tamil Nadu ..	7	8	12	13	7	13	8	12	13	5.5	10	9
Uttar Pradesh	9	14	11	11	11	10	12	13	8	4	8	8
West Bengal ..	5	1.5	9	4	3	3	3	4	4	10	11	4

6.17 Spearman's Rank Correlation for State Rankings Based on Lorenz Ratio

NSS Rounds considered			Rural	Urban
Between	17 and 18	...	0.748**	0.373
	18 and 19	..	0.860**	0.507
	19 and 20	..	0.775**	0.692**
	20 and 21	..	0.666**	0.380
	21 and 22	..	0.722**	0.404
	22 and 23	..	0.701**	0.714**
	23 and 24	..	0.700**	0.859**
	24 and 25	..	0.795**	0.736**
	25 and 27	..	0.513	0.627**
	27 and 28	..	0.226	0.496
	28 and 32	..	0.367	0.430

** Significant at 5 per cent level for a two-tail test.

6.2.4 Relation between average PCE and Lorenz Ratio

In development literature, an extensively studied issue is whether there exists any relation between per capita income levels and the degree of inequality. Beginning with Kuznets' pioneering study (1955), which found an inverted-U relation between the two variables, a number of other studies based on time series and cross-section data have found the relation to be true. It is generally believed that a developing country with low per capita income levels is likely to experience an increase in income inequality as growth takes place. Our own trend analysis[1] has shown that India is likely to be passing through Kuznets' first phase of development. Further, the general development pattern being the same in almost all the constituent states, the experience at the all India level is likely to be shared by the states also. In order to verify this, we look for the existence of any relation between per capita nominal consumption and LR in its distribution across states for the two sectors for all the 12 rounds under consideration.[2] Also since we examine the hypothesis by sectors, we can only verify the constituent parts of the Kuznets' hypothesis, namely, that in the initial stages of development, higher levels of inequality are associated with higher levels of income in the rural and urban sectors. To examine this, we compute Spearman's rank correlation between state rankings based on average PCE and those

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1 See Chapter 2.

2 It may be noted that the Kuznets' hypothesis cannot be tested in its entirety because the range of values of average PCE across states is too narrow to permit such an analysis.

based on LR (Table 6.18). They do not show any consistent significant relation for either of the two sectors. The only significant result for the rural sector (32nd round) shows a positive association and that for the urban (24th round) shows a negative association. Thus, we do not find firm cross-sectional evidence to believe that higher inequalities are associated with higher consumption levels across states. However, these results have tobe taken with caution as they are likely to have been distorted by inter-state price variation which we have not taken care of.

Table 6.18: Spearman's Rank Correlation Between State Rankings Based on Average PCE and those Based on LR, by NSS Rounds

Round	Rural	Urban
17	0.512	(-) 0.046
18	0.062	(-) 0.271
19	0.235	0.042
20	0.298	(-) 0.152
21	0.282	0.398
22	(-) 0.052	(-) 0.437
23	0.229	(-) 0.419
24	0.145	(-) 0.639**
25	(-) 0.104	(-) 0.169
27	0.108	0.496
28	0.033	0.402
32	0.556**	0.178

** significant at 5 per cent level for a two-tail test

6.3 Trend analysis Based on Reconstructed Distributions

6.3.1 Trends in average real PCE

As already pointed out in Chapter 4, we reconstruct the NSS distributions for the rural and urban sectors of all the 14 states using sets of fractile group-specific price indices separately for the two sectors of each state. These indices show uniformly in all the states the impact of inflation to be more severe on the poorer groups than on the rich. The estimates of average real PCE based on such distributions are given in Tables 6.19 and 6.20. They do not show, just as at the national level, much improvement in living standards. We find the all India pattern of a dip in real consumption during the mid-sixties for the rural sectors of Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. We do not see this pattern for the urban sector of any state; rather the urban average PCE exhibit frequent fluctuations.

Table 6.19 : Estimates of Rural Monthly Average Per Capital Consumption, by States(at 1961/62 Prices)

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	20.11	18.85	20.98	20.28	18.62	17.22	18.45	19.35	18.82	19.55	20.80	21.26
Assam	22.23	23.74	22.74	22.04	23.04	22.42	21.61	20.84	21.60	19.71	19.90	17.53
Bihar	19.00	19.96	23.93	25.85	21.75	24.41	20.71	18.62	17.67	24.22	26.85	17.95
Gujarat	22.58	20.68	21.39	19.57	18.66	17.74	20.17	19.33	19.75	25.06	21.57	21.65
Karnataka	25.33	18.57	20.01	19.60	18.98	18.26	19.20	17.52	19.77	21.67	21.05	20.56
Kerala	21.07	18.60	18.05	16.47	16.26	16.97	22.29	18.05	20.42	21.70	23.77	22.06
Madhya Pradesh	21.46	21.21	20.70	21.95	18.87	17.85	18.29	18.91	18.01	19.20	19.84	18.34
Maharashtra	19.91	19.73	19.95	20.53	18.47	17.48	19.12	18.78	19.97	20.53	21.42	23.31
Orissa	17.40	17.49	16.04	16.97	16.39	16.63	16.23	15.89	15.69	16.69	16.71	16.09
Punjab-Haryana	32.76	26.32	30.72	28.11	30.14	26.91	31.50	31.15	30.11	36.76	31.53	32.26
Rajasthan	23.47	21.19	24.58	24.53	24.34	22.28	24.46	23.42	19.47	25.61	25.57	34.57
Tamil Nadu	21.72	21.21	19.47	18.12	18.36	16.82	17.70	18.01	16.44	18.57	19.57	19.88
Uttar Pradesh	22.72	19.35	21.41	21.60	21.35	19.84	19.61	19.28	19.40	19.94	20.59	20.41
West Bengal	20.83	21.47	18.17	19.43	18.32	18.15	17.27	18.34	18.15	18.71	19.14	18.46

Table 6.20 : Estimates of Urban Monthly Average Per Capita Consumption, by States (at 1961/62 prices)

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	25.19	25.70	25.68	25.98	24.59	23.85	26.97	27.51	27.58	28.59	27.52	29.59
Assam	39.20	42.45	34.64	35.39	40.11	35.31	34.43	35.81	36.48	30.94	30.36	29.51
Bihar	34.96	26.94	26.94	27.60	29.65	29.91	27.83	29.88	32.24	28.67	31.45	25.90
Gujarat	31.75	30.38	25.45	25.51	25.65	25.50	24.72	25.82	27.49	29.76	28.52	30.96
Karnataka	27.21	23.61	26.33	25.67	22.88	22.85	25.99	26.32	28.42	29.73	28.53	26.54
Kerala	25.82	25.00	24.81	19.16	24.13	21.33	23.93	25.92	27.08	30.92	30.39	26.02
Madhya Pradesh	26.70	27.44	28.06	24.91	26.85	24.12	27.33	26.89	28.60	31.83	28.11	27.89
Maharashtra	36.66	34.30	36.93	36.19	33.93	31.43	33.08	37.63	37.05	39.99	35.46	35.14
Orissa	33.71	29.21	25.87	26.45	28.13	28.47	30.01	32.66	30.47	32.61	30.45	26.52
Punjab-Haryana	29.27	31.73	30.35	27.88	29.73	28.72	31.56	32.22	34.75	38.52	34.03	36.22
Rajasthan	28.92	29.87	27.85	25.94	26.54	26.51	28.07	26.90	30.14	32.44	29.06	29.44
Tamil Nadu	29.74	28.65	27.90	25.86	25.57	24.66	24.90	25.39	25.15	27.83	27.75	27.09
Uttar Pradesh	25.40	26.75	24.46	24.24	26.00	25.54	25.23	24.93	25.61	27.58	26.13	26.36
West Bengal	38.42	38.24	33.85	32.16	32.59	31.86	33.45	35.41	34.99	35.90	35.04	31.13
	30.86	30.24	29.51	27.90	27.94	27.14	28.58	29.75	30.14	32.96	30.60	30.58

6.3.2 Trends in real consumption inequality

The LR estimates based on reconstructed distributions at 1961-62 prices are given in Tables 6.21 and 6.22. As expected they show less improvement in real distributions than the LRs based on nominal distributions. In fact, we find an increase in inequality in rural West Bengal. But in the rural sectors of Assam, Karnataka, Punjab, Haryana and Tamil Nadu, we find a quite perceptible decline in inequality. On the urban front,Kerala and Tamil Nadu seem to be going through a phase of increase in inequality.

Table 6.21 Estimates of Lorenz Ratio, by State - Rural Sector (Based on Reconstructed Distribution)

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	0.314	0.302	0.322	0.332	0.295	0.307	0.306	0.310	0.288	0.295	0.314	0.310
Assam ..	0.220	0.220	0.197	0.207	0.240	0.179	0.192	0.186	0.174	0.184	0.205	0.213
Bihar ..	0.275	0.289	0.292	0.304	0.315	0.301	0.284	0.289	0.271	0.305	0.315	0.266
Gujarat ..	0.260	0.295	0.299	0.291	0.306	0.295	0.290	0.282	0.274	0.313	0.236	0.294
Karnataka ..	0.359	0.288	0.288	0.316	0.318	0.323	0.337	0.285	0.295	0.287	0.289	0.332
Kerala ..	0.327	0.300	0.341	0.318	0.313	0.334	0.423	0.324	0.340	0.334	0.335	0.370
Madhya Pradesh	0.334	0.344	0.321	0.328	0.308	0.353	0.343	0.346	0.329	0.313	0.296	0.338
Maharashtra ..	0.274	0.290	0.280	0.286	0.297	0.276	0.301	0.283	0.257	0.328	0.283	0.480
Orissa ..	0.288	0.275	0.270	0.276	0.255	0.305	0.295	0.299	0.290	0.306	0.264	0.312
Punjab-Haryana	0.345	0.298	0.326	0.335	0.310	0.313	0.301	0.321	0.298	0.319	0.307	0.313
Rajasthan ..	0.358	0.303	0.328	0.323	0.356	0.349	0.398	0.363	0.335	0.298	0.276	0.480
Tamil Nadu ..	0.315	0.305	0.301	0.295	0.290	0.291	0.299	0.321	0.274	0.333	0.287	0.330
Uttar Pradesh	0.309	0.297	0.306	0.301	0.300	0.313	0.355	0.314	0.311	0.289	0.259	0.310
West Bengal ..	0.263	0.261	0.246	0.269	0.267	0.258	0.243	0.266	0.274	0.324	0.316	0.308
All India ..	0.310	0.300	0.308	0.309	0.322	0.315	0.326	0.314	0.301	0.322	0.299	0.347

Table 6.22 Estimates of Urban Lorenz Ratio, by State (Based on Reconstructed Distribution)

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	0.302	0.328	0.328	0.331	0.324	0.340	0.334	0.341	0.316	0.291	0.315	0.339
Assam ..	0.309	0.309	0.278	0.287	0.390	0.270	0.253	0.274	0.245	0.268	0.295	0.338
Bihar ..	0.432	0.323	0.315	0.319	0.335	0.327	0.316	0.315	0.326	0.329	0.267	0.319
Gujarat ..	0.304	0.324	0.275	0.303	0.305	0.300	0.276	0.301	0.289	0.256	0.262	0.328
Karnataka ..	0.356	0.336	0.339	0.337	0.324	0.341	0.355	0.344	0.328	0.355	0.298	0.357
Kerala ..	0.379	0.366	0.398	0.356	0.441	0.389	0.392	0.413	0.394	0.418	0.400	0.408
Madhya Pradesh	0.327	0.349	0.340	0.325	0.359	0.342	0.377	0.342	0.347	0.377	0.301	0.389
Maharashtra ...	0.366	0.371	0.394	0.384	0.368	0.376	0.359	0.338	0.342	0.398	0.367	0.378
Orissa ..	0.326	0.329	0.323	0.345	0.368	0.384	0.374	0.349	0.329	0.383	0.377	0.340
Punjab-Haryana	0.350	0.379	0.315	0.349	0.331	0.338	0.312	0.319	0.311	0.344	0.325	0.373
Rajasthan ..	0.309	0.354	0.327	0.316	0.346	0.321	0.341	0.337	0.350	0.357	0.315	0.321
Tamil Nadu ..	0.332	0.339	0.367	0.359	0.333	0.386	0.348	0.351	0.346	0.342	0.335	0.346
Uttar Pradesh	0.354	0.387	0.367	0.354	0.368	0.384	0.375	0.362	0.341	0.344	0.330	0.342
West Bengal ..	0.311	0.309	0.340	0.324	0.319	0.322	0.303	0.318	0.315	0.370	0.347	0.331
All India ..	0.356	0.363	0.364	0.354	0.362	0.365	0.355	0.364	0.349	0.371	0.346	0.364

6.3.3 Changes in consumption levels and distributions and their impact upon poverty

In this Section we examine the changes in average real PCE and in its distribution and the associated changes in poverty. In our analysis, we confine ourselves to the rural sector in each of the 14 states. This is because of the following considerations:

i) State-specific rural poverty lines are readily available in Bardhan (1973), while no such povertylines have been estimated for the state urban sectors.

ii) The rural population accounts for more than three-fourths of the total in almost all the 14 states and hence, presents a fairly clear picture about the total also.

iii) The rural sector is dominated by agriculture which has been subject to more frequent fluctuations than the non-agricultural sector (Rao, 1983). Then, it would be of interest to see the pattern of fluctuations in rural poverty and the behaviour of distribution over time and their implications.

The estimates of rural absolute poverty for all India and for the 14 states are given in Table 6.23. They do not show any consistent trend as such. As regards the relationship between poverty and average PCE, the results point out to significant negative association in all the states except Bihar, Maharashtra and Orissa. For these States, the product moment correlation between mean consumption and absolute poverty are uniformly negative and high.

Let us now analyse the behaviour of inequality in the distribution of real PCE in relation to that of average real PCE. This we do by examining the product-moment correlation between:

i) average real PCE and LR of real PCE distribution;

ii) average real PCE and real PCE share of the bottom 10 per cent; and

iii) average real PCE and real PCE share of the bottom 40 per cent.

At the all India level, we do not find any significant relation between average real PCE and LR (Table 6.25). The percentage shares in consumption of the bottom 10 per cent and of the bottom 40 per cent of the rural population are also not significantly correlated with average real PCE. For the majority of the states, we find positive correlation between average PCE and LR. Of them, it is significant for Bihar, Maharashtra and Rajasthan. This would imply that distribution worsens (improves) in periods of rise (fall) in average real consumption. To verify how exactly the poor are affected, we examine the correlations between mean PCE and shares of the two bottom groups. None of these correlations is significant. However, for the states of Andhra Pradesh, Assam, Bihar, Karnataka, Kerala and Tamil Nadu, they are negative. This would imply that consumption of the poorer sections of the rural society tend to rise (fall) at a slower rate than that of the average rate for thepopulation in periods of rise (fall) in average real PCE. Thus, it appears that in these states, the distribution behaviour has been such as to offset (in a statistical and qualitative

sense) the negative relation between mean PCE and incidence of poverty. Thus, it appears that in these states increases in consumption accrued largely to the richer sections but the poor are relatively protected during fall in consumption.

On the other hand, we findthat for Gujarat, Madhya Pradesh and Orissa there is a weak inverse association between mean PCE and LR. Further, the percentage shares in consumption of the bottom groups are found to be positively, although weak, correlated with mean PCE. This would imply that consumption of the poorer groups in these states tend to rise (fall) at a faster rate than that of the average rate for the population in periods of rise (fall) in average PCE. This would also imply that rural consumption distributions of these states tend to improve (deteriorate) in periods of rise (fall) in average real PCE. Thus, they tend to reinforce the negative relationship between mean PCE and incidence of poverty. For Maharashtra, we find that mean PCE is significantly and positively associated with LR but weakly positively associated with consumption shares of the poorer groups. Thus, here is a case where distribution worsens (improves) as a whole and improves (worsens) at the lower end simultaneously in periods of rise (fall) in mean PCE. For Punjab-Haryana and Uttar Pradesh, different measures give conflicting pictures.

Table 6.23 Percentage of Rural Population in Poverty by States

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh ..	46.07	51.26	45.91	46.46	52.20	59.48	49.66	48.30	50.00	47.09	47.02	40.25
Assam ..	24.40	20.95	18.90	24.27	24.72	20.70	23.47	27.14	22.28	31.04	34.22	36.40
Bihar ..	49.71	47.92	39.67	36.29	38.58	39.47	39.23	51.40	54.45	48.54	39.42	38.30
Gujarat ..	37.36	51.00	38.62	51.55	57.00	58.78	48.50	55.54	56.01	34.78	38.84	37.25
Karnataka ..	33.16	50.00	45.95	47.54	49.06	52.50	56.27	55.90	42.41	36.62	44.63	40.60
Kerala ..	49.16	57.81	61.65	67.54	68.00	64.34	58.83	62.13	55.70	49.47	42.56	36.70
Madhya Pradesh ..	37.96	40.01	38.20	37.33	44.54	55.31	49.97	47.59	50.02	46.04	42.07	40.07
Maharashtra ..	41.33	46.46	42.77	42.14	48.19	50.04	48.38	48.63	39.88	44.80	38.21	45.50
Orissa ..	48.75	46.26	45.05	49.89	50.00	57.62	55.46	57.06	56.15	56.71	55.19	58.00
Punjab-Haryana ..	24.95	27.03	23.01	28.76	20.02	28.85	18.10	22.81	22.15	12.11	18.56	13.50
Rajasthan ..	32.95	31.27	23.34	24.49	27.73	34.28	31.48	31.47	40.10	23.19	16.28	20.81
Tamil Nadu ..	51.70	55.38	61.18	65.47	63.65	69.42	67.21	67.93	71.65	65.97	61.41	48.32
Uttar Pradesh ..	33.78	46.92	36.88	37.98	36.30	43.76	47.15	48.06	46.06	41.37	38.21	36.00
West Bengal ..	61.56	51.95	62.63	57.08	64.81	62.76	68.84	63.57	64.21	67.15	64.41	60.53
All India ..	38.50	43.28	40.26	41.84	44.40	49.63	48.24	48.08	44.57	43.51	38.43	41.44

Table 6.24 Product Moment Correlation between average PCE and Incidence of Poverty for Rural Areas by States

State		Correlation
Andhra Pradesh	..	(-) 0.910**
Assam	..	(-) 0.904**
Bihar	..	(-) 0.525
Gujarat	..	(-) 0.898**
Karnataka	..	(-) 0.876**
Kerala	..	(-) 0.861**
Madhya Pradesh	..	(-) 0.829**
Maharashtra	..	(-) 0.552
Orissa	..	(-) 0.472
Punjab-Haryana	..	(-) 0.818**
Rajasthan	..	(-) 0.692**
Tamil Nadu	.	(-) 0.891**
Uttar Pradesh	..	(-) 0.892**
West Bengal.	..	(-) 0.776**
All India	..	(-) 0.932**

** Significant at 5 per cent level for a two-tail test.

Table 6.25 Product Moment Correlation between Average PCE and Relative Inequality Indices

State	Correlation between Per Capita Consumption and		
	Lorenz Ratio	Share of the Bottom 10%	Share of the Bottom 40%
Andhra Pradesh ..	0.527	(-) 0.259	(-) 0.338
Assam ..	0.208	(-) 0.365	(-) 0.453
Bihar ..	0.826**	(-) 0.513	(-) 0.371
Gujarat ..	(-) 0.036	0.324	0.347
Karnataka ..	0.462	(-) 0.233	(-) 0.355
Kerala ..	0.542	(-) 0.515	(-) 0.517
Madhya Pradesh ..	(-) 0.173	0.397	0.197
Maharashtra ..	0.703**	0.066	0.008
Orissa ..	(-) 0.225	0.311	0.162
Punjab-Haryana ..	0.248	0.110	(-) 0.362
Rajasthan ..	0.673**	0.156	0.210
Tamil Nadu ..	0.443	(-) 0.528	(-) 0.517
Uttar Pradesh ..	(-) 0.200	(-) 0.011	0.130
West Bengal ..	0.057	0.291	0.099
All India ..	0.040	0.325	0.226

** Significant at 5 per cent level for a two-tail test.

Looking at Table 6.25, one might be tempted to infer that the positive correlation between average PCE and LR in majority of the states lends support to the Kuznets' hypothesis and also our own expectation. But it is difficult to justify this interpretation. This is because in none of the states, there has been a significant growth in real mean PCE. What it all means is that during a period of stagnation with fluctuations in mean PCE group of states, the poor gain (lose) less in periods of rise (fall) in living standards. Thus, it would seem that the development strategy should include vigorous efforts to ensure the percolation of the growth benefits to the poorer sections of the society in these states.

6.4 Trends and Disparities in Average PCE at all India Prices

6.4.1 Introduction

The results in Sections 6.2 and 6.3, particularly those based on analysis of average PCE, suffer from a few limitations:

i) The data on average PCE in Section 6.2 are at current prices and are not adjusted for price variations across states and over time. Hence, they cannot be said to capture the real changes in average PCE either across states or over time within a state.

ii) The data in Section 6.3, while adjusted for inflation over time, are based on deflators using all India wholesale prices and not state specific prices. Therefore, they may provide an approximate picture about real changes over time but not about inter-state disparities.

In this Section, we propose to over come the above mentioned limitations in a limited way by adopting a different approach. The approach is as follows. By using state-specific ALCPI we express rural average PCE of the different NSS rounds for each state at 1973-74 prices of that state. For the year 1973-74, we already have indices of consumer price differentials between different states of India with all India as base from Bhattacharya et al (1980)[3] who constructed such indices for both the rural and urban sectors using budget data from the NSS 28th round. Using these indices we express rural average PCE of different NSS rounds for each state at all India 1973-74 prices. By this approach, we overcome the problems of price variations across states and over time simultaneously. However, the correctness of the method depends upon the appropriateness of the ALCPI for the general population[4]. This approach cannot be used for the urban sector as we do not have state-specific urban prices for any group[5].

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3 It may be noted that similar indices of consumer price differentials between states have been constructed by Maitra (1959), Rath (1973), Chatterjee and Bhattacharya (1974b), Bhattacharya et al (1984) etc. for the rural sector. But we choose the indices from Bhattacharya et al (1980) as they are based on much more disaggregated data for 94 items.

4 This is because the ALCPI, while based on state-specific rural retail prices, makes use of budget weights of the agricultural labour population of the state and not of the rural population.

5 It may be noted that price indices like Industrial Workers Consumer Price Index and Urban Non-manual Employees' Consumer Price Index are available for a few cities ineach state but not for the urban sector as a whole of each state. Such price indices do not appear appropriate because of considerable differences between cities and urban sector as a whole and the low weightage of cities in the urban sector.

6.4.2 Rural average PCE at 1973-74 all India prices

The ALCPI for each state are given with 1960-61 as base. For our purpose we simply shift their base to 1973-74 so as to make use of inter-state price differential indices constructed by Bhattacharya et al (1980). Such ALCPI for the 14 states are given in Table 6.26. They show that rates of inflation vary between states. The average PCE deflated using these indices are given in Table 6.27. They show a pattern of fluctuations in rural average real PCE of allthe states. The 32nd round data shows a high level of average real PCE for the states of Andhra Pradesh, Kerala and Tamil Nadu. These estimates of state-wise rural average real PCEs are further adjusted for inter-state price differentials using the indices from Bhattacharya et al (1980). These average PCEs at all India prices are presented in Table 6.28. They show that inter-state price variations do matter and affect our results whether or not such factors are taken into account. While the price-unadjusted data (Table 6.5) showed the rural sectors of Assam, Maharashtra, Punjab-Haryana and West Bengal to have mean PCE levels above the national level for most of the rounds, our new indices (Table 6.29) show it to true only in the case of Punjab-Haryana. Madhya Pradesh and Rajasthan,which had a nominal average PCE less than the all India average have their real PCEs above the national level.

Table 6.26 : Consumer Price Indices for Agricultural Labour

State \ Year	1961-1962	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1972-1973	1973-1974	1977-1978
Andhra Pradesh	41.74	43.22	51.65	56.61	64.08	66.53	69.01	72.73	70.66	84.71	100.00	122.73
Assam	38.08	43.46	50.38	55.77	73.08	84.23	80.00	71.54	78.08	82.69	100.00	121.15
Biham	30.56	35.01	44.51	53.11	67.95	74.18	55.48	59.94	61.13	71.22	100.00	101.18
Gujarat	41.46	43.01	54.07	55.28	62.20	65.04	65.04	69.11	70.33	91.46	100.00	115.85
Karnataka	36.36	39.82	53.09	62.18	65.09	68.00	66.18	64.00	68.36	79.27	100.00	112.00
Kerala	38.41	39.53	47.83	54.35	58.33	62.32	70.65	73.19	77.54	80.07	100.00	114.86
Madhya Pradesh	33.33	38.67	44.98	50.49	65.37	70.87	63.11	66.99	64.08	77.67	100.00	111.65
Maharashtra	35.51	40.18	54.71	57.61	63.41	48.19	64.13	66.30	69.57	88.41	100.00	115.94
Orissa	31.68	40.68	44.41	50.31	59.32	64.91	86.12	66.15	65.84	77.02	100.00	109.01
Punjab-Haryana	38.10	41.87	50.92	50.55	63.74	70.70	70.70	71.79	71.06	83.52	100.00	121.61
Rajasthan	33.10	36.51	46.45	49.30	58.80	60.92	64.08	69.01	60.92	80.28	100.00	114.79
Tamil Nadu	46.69	50.00	57.02	59.09	72.31	71.07	73.14	78.51	71.90	79.34	100.00	126.45
Uttar Pradesh	33.00	43.09	54.13	54.46	69.64	77.89	59.08	65.02	60.40	77.23	100.00	110.89
West Bengal	38.04	48.12	49.28	50.72	60.51	87.32	72.46	71.74	74.64	78.62	100.00	116.30
All India	36.01	41.26	49.65	54.20	66.43	72.03	64.69	67.48	67.13	78.67	100.00	112.94

Source: Various issues of Bulletin on Food Statistics

Table 6.27: Estimates of Rural Average Real PCE Obtained using ALCPI (at 1973/74 State Specific Prices)

State \ Year	1961-1962	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1972-1973	1973-1974	1977-1978
Andhra Pradesh	48.18	48.03	51.21	48.86	44.91	45.78	45.60	47.49	48.61	46.97	50.67	56.76
Assam	50.38	60.81	50.15	54.98	50.40	49.31	46.96	52.68	51.58	50.39	52.03	48.66
Bihar	62.17	60.87	59.76	57.07	42.71	44.97	53.68	56.14	54.23	57.84	56.01	56.77
Gujarat	54.46	52.76	49.90	48.06	46.61	48.20	53.04	49.75	52.10	56.53	54.49	60.68
Karnataka	69.66	51.31	47.52	42.49	45.00	46.96	47.16	48.56	52.50	56.18	52.32	57.98
Kerala	54.86	51.51	46.62	48.11	42.11	45.88	51.21	42.45	46.58	52.69	55.35	64.62
Madhya Pradesh	64.39	60.43	58.47	55.60	45.23	44.83	49.36	50.28	51.31	52.43	50.39	53.68
Maharashtra	56.07	54.06	45.99	48.15	44.99	63.62	49.96	50.11	52.31	47.00	52.27	66.30
Orissa	54.92	47.57	46.41	46.71	44.17	46.59	32.79	43.39	43.83	45.39	42.66	48.13
Punjab-Haryana	85.98	68.45	73.68	73.29	70.32	63.66	74.06	75.12	75.95	86.95	74.16	85.91
Rajasthan	70.94	63.35	64.73	66.90	63.16	63.07	64.08	59.79	58.09	64.75	64.01	94.73
Tamil Nadu	48.25	46.78	43.06	41.58	39.54	41.66	41.04	40.86	41.78	47.52	47.74	50.08
Uttar Pradesh	68.88	48.55	50.05	54.09	47.60	45.11	56.01	52.29	58.08	54.54	51.32	60.73
West Bengal	54.76	49.23	47.04	52.66	47.89	37.37	41.20	45.80	44.64	48.91	47.50	50.96
All India	60.34	54.22	53.25	52.40	46.52	46.37	51.46	51.42	52.60	56.15	53.01	61.00

Table 6.20: Estimates of Rural Average PCE at all India 1973/74 Prices

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	54.50	54.33	57.92	55.27	50.00	51.78	51.58	53.72	54.98	53.13	57.31	64.20
Assam	57.87	60.27	57.64	54.49	49.96	48.88	46.55	52.22	51.12	49.95	51.57	48.23
Bihar	53.74	52.62	51.66	49.33	36.92	38.87	46.40	48.53	46.87	50.00	48.42	49.08
Gujarat	47.08	45.61	43.14	41.55	40.30	41.67	45.85	43.01	45.04	48.87	47.11	52.46
Karnataka	63.56	46.82	43.36	38.77	41.06	42.85	43.03	44.31	47.91	51.26	47.74	52.91
Kerala	52.80	49.58	44.87	38.60	40.53	44.08	49.29	40.86	44.83	50.71	53.27	62.19
Madhya Pradesh	68.73	64.51	62.41	59.35	48.28	47.85	52.69	53.67	54.77	55.97	53.78	57.30
Maharashtra	50.87	49.04	41.72	43.68	40.81	57.72	45.32	45.46	47.46	42.64	47.42	60.15
Orissa	63.54	55.04	53.70	54.04	51.10	53.90	37.94	50.20	50.71	52.52	49.36	55.69
Punjab-Haryana	85.88	68.37	73.59	73.20	70.24	63.58	73.97	75.03	75.86	86.85	74.07	85.81
Rajasthan	72.23	64.50	66.92	68.11	64.30	64.21	65.24	60.87	59.14	65.92	65.17	96.45
Tamil Nadu	52.22	50.63	46.61	45.00	42.80	45.09	44.42	44.23	45.13	51.43	51.67	54.21
Uttar Pradesh	73.67	51.93	53.53	57.85	50.91	48.25	59.90	55.93	62.12	58.33	54.89	64.95
West Bengal	49.21	44.24	42.28	47.33	43.04	33.58	37.03	41.16	40.12	43.96	42.69	45.80
All India	60.34	54.22	53.25	52.40	46.52	46.37	51.46	51.42	52.60	56.15	53.01	61.00

Table 6.29 : Statewise Estimates of Average PCE Expressed as Percentage of all India Average PCE: Rural sector.

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	90.32	100.20	108.77	105.48	109.20	111.67	100.23	104.47	104.52	94.62	108.11	105.25
Assam	95.91	111.16	100.24	103.99	107.39	105.41	90.46	101.56	97.19	88.96	97.28	79.07
Bihar	89.06	97.05	97.01	94.14	79.36	83.83	90.17	94.30	89.11	89.65	91.34	80.46
Gujarat	78.02	84.12	81.01	79.29	86.63	89.86	89.10	83.64	85.63	87.03	88.87	86.00
Karnataka	105.34	86.35	81.43	73.99	88.26	92.41	83.62	86.17	91.08	91.29	90.06	86.74
Kerala	87.50	91.44	84.26	73.66	87.12	95.06	95.78	79.46	85.23	90.31	100.49	101.95
Madhya Pradesh	113.90	118.98	117.20	113.26	103.78	103.19	102.39	104.38	104.13	99.68	101.45	93.93
Maharashtra	84.31	90.45	78.35	83.36	87.73	124.48	88.07	88.41	90.23	75.94	89.45	98.61
Orissa	105.30	101.51	100.85	103.13	109.85	116.24	73.73	97.63	96.41	93.54	93.11	91.30
Punjab-Haryana	142.33	126.10	138.20	139.69	150.99	137.11	143.74	145.92	144.22	154.67	139.73	140.67
Rajasthan	119.71	118.96	125.67	129.98	138.82	138.47	126.78	118.37	112.43	117.40	122.94	158.11
Tamil Nadu	86.54	93.38	87.53	85.88	92.00	97.24	86.32	86.02	85.80	91.59	97.47	88.87
Uttar Pradesh	122.09	95.78	100.53	118.48	109.44	104.05	116.48	108.77	118.18	103.88	103.55	106.48
West Bengal	81.55	81.59	79.40	90.32	92.52	72.42	71.96	88.05	76.27	78.29	88.53	75.08
All India	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

6.4.3 Inter-state disparities in rural average PCE

To begin with, we examine inter-state disparities by ranking the states in ascending order of average PCE (Table 6.30). Punjab-Haryana followed by Rajasthan have the highest while West Bengal has one of the lowest consumption levels during most of the rounds. The rankings of the states seem to be relatively stable as indicated by the high positive values for the rank correlation for state rankings between successive rounds (Table 6.31). This is contrary to the picture provided by the analysis based on unadjusted average PCE (See Table 6.9). Further, a comparison of the state rankings before and after deflation shows Andhra Pradesh, Bihar, Madhya Pradesh and West Bengal to be the states whose ranks are affected most by deflation. Both LR and Kuznets' index based on this data set (Table 6.31) show generally a higher degree of disparity than those based on price unadjusted data (Table 6.10); the exceptions being the LRs for 28th and 32nd round. However, these indices based on the two data sets are similar in that they do not show any consistent trend in disparity over time. But unlike the LR based on unadjusted data, the present LR for the 32nd round shows a lower extent of inter-state disparity than those for the earlier rounds.

Table 6.30 : Rankings of States in Ascending Order of Rural Average Real PCE.

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	7	9	11	10	10	10	10	11	11	10	12	11
Assam	8	11	10	9	9	9	8	9	9	4	7	2
Bihar	6	8	7	7	1	2	7	7	5	5	5	3
Gujarat	1	2	3	3	2	3	6	3	3	3	2	4
Karanataka	10	3	4	2	5	4	3	5	7	7	4	5
Kerala	5	5	5	1	3	5	9	1	2	6	9	10
Madhya Pradesh	11	13	12	12	8	7	11	10	10	11	10	8
Maharashtra	3	4	1	4	4	12	5	6	6	1	3	9
Orissa	9	10	9	8	12	11	2	8	8	9	6	7
Punjab-Haryana	14	14	14	14	14	13	14	14	14	14	14	13
Rajasthan	12	12	13	13	13	14	13	13	12	13	13	14
Tamil Nadu	4	6	6	5	6	6	4	4	4	8	8	6
Uttar Pradesh	13	7	8	11	11	8	12	12	13	12	11	12
West Bengal	2	1	2	6	7	1	1	2	1	2	1	1

Table 6.31: Spearman's Rank Correlation for State Rankings Based on Rural Average PCE at all India 1973-74 prices

Rounds considered		Rank correlation
Between 17	and 18	0.750**
18	19	0.952**
19	20	0.873**
20	21	0.815**
21	22	0.736**
22	23	0.519
23	24	0.741**
24	25	0.974**
25	27	0.807**
27	28	0.895**
28	32	0.815**

**significant at 5 per cent level for a two-tail test

Table 6.32: Measures of Inter-State Disparity
(Based on average PCE at all India prices)
(Rural Sector)

NSS Round	LR	Kuznets' Index
17	0.096	0.079
18	0.064	0.046
19	0.089	0.063
20	0.094	0.070
21	0.091	0.068
22	0.093	0.064
23	0.074	0.100
24	0.080	0.059
25	0.088	0.067
27	0.081	0.056
28	0.047	0.066
32	0.072	0.103

6.4.4 Relation between average PCE and LR

With the adjustment for inter-state price variation, we go on to examine the relation between average PCE and LR. It may be noted that the LRs are based on nominal distributions and not on adjusted distributions for inter-state price variations. But it is generally considered that such LRs are fairly comparable across states. The results based on such comparisons are presented in Table 6.33. They show low degree of positive association between average PCE and its degree of inequality in the rural sector across states. But the values being positive for all the rounds except one can be considered to lend some support for the belief that higher consumption levels are associated with higher degrees of inequality. Using the indices provided by Bhattacharya et al (1980) we carry out a similar exercise for the urban sector for the 28th round. They show a significant positive association between the two variables.

Table 6.33: Spearman's Rank Correlation between LR and Price-adjusted average MCE

NSS Round	Rural	Urban
17	0.618**	
18	0.348	
19	0.446	
20	0.423	
21	(-) 0.197	
22	0.115	
23	0.397	
24	0.369	
25	0.373	
27	0.055	
28	0.182	0.619**
32	0.622**	

** significant at 5 per cent level for a two-tail test

6.4.5 Poverty, inequality and average PCE levels

In this Section, we study the estimates of poverty obtained using a different approach than the one discussed in Section 6.3.3. In Section 6.3.3 the poverty lines are expressed at 1961-62 prices and the poverty estimates are made using the reconstructed distributions at the same prices. But in this Section we follow the methodology adopted by Bardhan (1973) and Ahluwalia (1978). The poverty lines are expressed at current prices (see Table 6.34) using state-specific ALCPI and poverty estimates are made using distributions of PCE at current prices. These estimates are presented in Table 6.35. The estimates based on the two approaches differ for all the rounds and states.

Table 6.34 : Rural Poverty lines: Consumption Per Person for 30 days (Rs at current prices)

State \ Year	1961-1962	1963-1964	1964-1965	1965-1966	1966-1967	1967-1968	1968-1969	1969-1970	1970-1971	1972-1973	1973-1974	1977-1978
Andhra Pradesh	15.70	16.20	19.38	21.24	24.34	25.00	25.90	27.28	26.50	31.78	37.50	46.04
Assam	16.10	18.40	21.40	23.64	30.97	35.70	33.90	30.32	33.10	35.05	42.90	51.35
Bihar	16.30	18.60	23.70	28.28	36.18	39.50	29.50	31.92	32.50	37.92	53.20	53.88
Gujarat	17.10	17.80	22.30	22.85	25.70	26.90	26.90	28.56	29.10	37.80	41.30	47.88
Karnataka	15.60	17.10	22.80	26.68	27.92	29.20	28.40	27.46	29.30	34.01	42.90	48.05
Kerala	17.10	17.60	21.30	24.15	25.92	27.70	31.40	32.52	34.50	35.58	44.40	51.04
Madhya Pradesh	14.50	16.80	19.60	22.00	28.40	31.90	27.50	29.19	27.90	33.84	43.60	48.65
Maharashtra	15.70	17.70	24.20	25.44	28.00	29.30	28.30	29.20	30.70	39.04	44.20	51.20
Orissa	14.80	19.90	20.70	23.49	27.70	30.30	31.60	30.89	30.70	35.96	43.90	50.90
Punjab-Haryana	16.50	18.20	22.10	21.94	27.67	30.70	30.70	31.16	30.80	36.25	43.40	52.79
Rajasthan	13.80	15.20	19.40	20.50	24.55	25.43	26.80	28.81	25.40	33.52	41.70	47.92
Tamil Nadu	18.50	19.80	22.60	23.45	28.70	28.20	29.30	31.16	28.50	31.49	39.70	50.18
Uttar Pradesh	15.20	19.30	23.80	23.93	33.60	34.22	26.30	28.57	26.50	33.93	43.90	48.72
West Bengal	19.80	24.80	24.60	25.34	30.23	43.60	36.80	35.84	37.30	39.28	50.10	58.10
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Table 6.35 : Percentage of Rural Population in Poverty by States

State \ NSS Round	17	18	19	20	21	22	23	24	25	27	28	32
Andhra Pradesh	46.82	44.60	40.92	44.21	49.43	48.42	45.02	41.90	40.00	42.01	37.78	30.21
Assam	27.66	23.16	20.18	28.35	44.85	39.87	47.90	32.31	31.47	35.86	36.49	38.00
Bihar	49.72	52.44	52.95	58.15	74.10	70.81	59.67	57.00	58.53	54.75	56.71	55.02
Gujarat	36.57	45.04	50.61	49.78	52.32	49.96	41.46	45.72	41.29	40.10	34.02	31.49
Karanataka	34.34	50.49	54.28	63.49	71.44	55.60	59.60	53.42	45.01	38.50	48.04	42.21
Kerala	49.73	52.58	61.67	72.79	68.24	63.05	64.76	69.10	61.82	51.56	50.73	41.67
Madhya Pradesh	39.56	43.08	40.50	42.55	57.67	62.85	55.98	54.76	52.56	52.01	53.08	51.61
Maharashtra	42.79	47.28	60.57	55.82	62.85	55.17	55.00	52.19	44.19	56.37	46.82	53.95
Orissa	48.34	59.02	60.68	61.65	64.50	63.89	70.25	65.94	65.01	66.06	57.92	61.49
Punjab-Haryana	23.84	27.09	25.29	26.88	25.66	31.72	21.53	25.16	21.42	14.44	19.81	14.83
Rajasthan	33.58	31.89	29.66	29.14	37.19	34.58	38.79	40.62	39.05	32.27	27.61	24.87
Tamil Nadu	50.29	51.58	57.46	59.43	63.57	58.51	61.02	62.28	47.98	46.42	46.54	48.75
Uttar Pradesh	34.79	55.66	53.20	46.67	48.03	61.86	46.86	49.45	32.86	39.78	47.49	38.64
West Bengal	56.28	63.79	64.93	54.88	64.61	80.59	75.42	67.62	69.45	64.04	66.28	62.09
All India	38.22	45.35	45.75	47.21	56.09	55.79	52.62	49.12	45.39	42.92	44.90	40.21

Our time-series analysis in Section 6.3.3 showed significant negative association between average real MCE and poverty. Our cross-section analysis for each round in this Section also shows statistically significant inverse relationship between poverty and average MCE (see Table 6.36). However, as regards the relationship between average MCE and LR, a slightly different picture emerges from the cross-section analysis. Thecoefficient of correlation is positive, though not all significant, for 11 out of the 12 rounds. This may indicate that across states, the distribution behaviour is such as to offset the negative association between poverty and average MCE. Thus, when the individual experiences of the different states differed from one another as regards the relationship between LR and average MCE, the experience across states for different rounds have more or less been the same.

Table 6.36: Product Moment Correlation between Poverty and Average MCE and between Average MCE and LR

NSS Round	Poverty and AMCE	Poverty and LR
17	(-) 0.673**	0.592**
18	(-) 0.749**	(-) 0.193
19	(-) 0.820**	0.026
20	(-) 0.830**	0.275
21	(-) 0.887**	0.181
22	(-) 0.754**	0.179
23	(-) 0.855**	0.362
24	(-) 0.760**	0.344
25	(-) 0.737**	0.213
27	(-) 0.775**	0.155
28	(-) 0.779**	0.117
32	(-) 0.718**	0.573**

** significant at 5 per cent level for a two-tail test

We cannot carry out a similar analysis for the urban sector also. This is, as already pointed out, because of the lack of appropriate state-specific poverty lines and deflators for the urban sector. We now attempt to overcome the first limitation by estimating state-specific urban poverty lines corresponding to the all India urban poverty line using the indices from Bhattacharya et al (1980). For this purpose we adopt the poverty line estimated for the all India urban sector by the Indian Planning Commission (1981). On the basis of the NSS 28th round data for the Indian urban sector, the Planning Commission estimated that a PCE of Rs 56.64 at 1973-74 prices would be required to buy a consumption basket providing 2,100 calories. The estimates of poverty lines corresponding to all this all India norm are given in Table 6.37. We find urban poverty to be the highest in Kerala and lowest in Orissa. The product moment correlation coefficient between average PCE and poverty is negative and significant at (-) 0.741. On the other hand, LR and average PCE are significantly positively correlated at 0.595. Thus, it appears that the distribution worsens at higher levels of consumption offsetting the latter's effect of reducing poverty.

Table 6.37: Estimates of State-specific Urban Poverty Lines at 1973-74 prices

State	Index of consumer price differential (Base: All India urban price)	Poverty Line	Percentage of urban people below poverty line	MPCE at all India urban 1973-74 prices
(1)	(2)	(3)	(4)	(5)
Andhra Pradesh	89.67	50.79	44.79	73.05
Assam	102.59	58.11	51.21	71.58
Bihar	109.76	62.13	53.93	62.28
Gujarat	110.95	62.84	53.50	60.17
Karnataka	103.00	58.34	52.58	64.56
Kerala	99.36	56.28	59.32	69.37
Madhya Pradesh	97.92	55.46	50.02	66.89
Maharashtra	107.36	60.81	45.16	74.31
Orissa	85.19	48.25	44.38	82.27
Punjab-Haryana	100.80	57.01	39.74	78.85
Rajasthan	102.60	58.11	49.43	67.02
Tamil Nadu	93.16	52.77	51.80	69.54
Uttar Pradesh	93.38	52.89	53.64	65.12
West Bengal	113.79	64.45	46.64	70.97
All India	100.00	56.64	48.87	70.77

6.5 Summing-up

In the preceding Sections, we examined inter-state disparities in levels and distributions of PCE at three different levels.

i) To begin with, we examined the problem using PCE data at current prices. We found an improvement in average PCE and in the

distribution of PCE in the two sectors in all the states. The state rankings in terms of average PCE and LR did not undergo any drastic change. The state-wise distribution of consumption also did not show any consistent trend either in the rural or in the urban sector. Further, cross-sectional analysis of the association between average PCE and LR did not show consistently any significant relation between the two.

ii) Next, we examined the changes in average real PCE and in the distribution of real PCE in the rural and urban sectors of each state at the 1961-62 prices. This was done using fractile group-specific deflators; and subsequent analysis showed less improvement in average real PCE and less decline in real LR than in those based on nominal PCE. We also examined the association between average real PCE and real LR over time for the rural sectors of each state and its impact upon rural poverty. In all the states, except Bihar, Maharashtra and Orissa, we found statistically significant negative correlation between poverty and average PCE. In majority of the states and particularly Bihar, the distributional behaviour was such as to offset the negative relationship between poverty and average PCE.

iii) Finally, we examined the data on average PCE by using methods, not attempted so far in Indian studies. We adjusted the state-wise rural average PCEs at their respective 1973-74 prices using state-specific ALCPI. Next we expressed all these average

PCE values at the all India 1973-74 prices using indices of inter-regional variation in consumer prices. The data so adjusted, like those at 1961-62 prices, showed a pattern of fluctuation in average real PCE in all the states. For Andhra Pradesh, Kerala, and Tamil Nadu, we found even growth in real consumption. Unlike our analysis based on nominal average PCE (Table 6.9), the newly adjusted data at 1973-74 prices showed the state rankings to be relatively stable. While both LR and Kuznets' Index based on this adjusted data (at 1973-74 prices) showed similar changes as those based on the nominal data, they showed a higher degree of disparity than the latter. The analysis based on this adjusted data on average PCE also did not lend much from support for the Kuznetsian hypothesis of higher LR to be associated with higher average PCE. Further, our cross-sectional analysis, unlike the analysis of experiences of individual states over time, showed a low degree of positive association between average PCE and LR and thus a tendency to offset the inverse relation between poverty and average PCE. Next, we constructed state-specific urban poverty lines for the year 1973-74 corresponding to the all India urban poverty line of Rs 56.64 (at 1973-74 prices). We found urban poverty to be the highest in Kerala and the least in Orissa. Also, we found higher levels of inequality at higher levels of average PCE for the urban sector for 1973-74. Thus, we found that at the urban sector level, with adjusted data for inter-regional price variations, there was some evidence of the operation of the Kuznetsian hypothesis.

Chapter 7

TREATMENT OF POVERTY IN THE INDIAN PLANS AND ITS IMPLICATIONS

7.1 Introduction

An important aspect of low level of income and some degree of inequality in its distribution is poverty. The problem of poverty, as an economic malaise afflicting the modern societies, has received considerable attention all the world over. In India too the problem has been examined at length covering such various issues as the size of and trends in poverty, the causes and solutions for it, etc. Indian studies on mass poverty have employed the absolute poverty framework in their analysis. This is mainly because the average level of income is low that the emphasis came to be laid upon ascertaining how many are incapable of buying even the basics required for a living. Accordingly, most of the studies defined a poverty line in terms of a consumption basket that can provide the required amount of calories (protein is excluded since it has been found that Indians do not suffer from protein deficiency) and found out the poor as having consumption levels below the poverty line using largely the data provided by the NSS[1]. In Indian Plans too, the problem has been examined both at the macro level and micro level and various *adhoc* as well as lasting solutions have been worked out.

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1 For details see Bardhan (1974)

At the macro level, the problem of poverty is treated within the two-parameter log normal model. Poverty is shown to decline because of both growth and reduction in inequality (called redistribution). In recent years, heavy emphasis has come to be placed upon reduction in inequality of distribution as an instrument for achieving the set targets of poverty reduction. But, most of these plan exercises have not really examined the feasibility of the set targets. Also, these exercises are based on outdated data and hence, their projections are likely to be over or under-estimates depending upon the nature of their deviation from the actual values. This naturally leads us to the following questions--both theoretical and empirical:

i) Are the instruments designed for poverty alleviation appropriate under Indian conditions?

ii) What is the extent of reduction in inequality required to achieve the set target of poverty alleviation? Are they feasible in the light of past experiences and trends in inequality in India?

iii) How do the use of inappropriate data and assumptions made in such exercises affect other plan projections?

These three questions are addressed to in the same order in the next three Sections. That is, in Section 7.2 we deal with the first question at the theoretical level employing the two parameter log normal model. Section 7.3 deals with the second question using the Sixth Plan model as a case study. Section 7.4 uses the Fifth Plan exercises to check the soundness of some of the projections. The choice of this Plan is largely dictated by the fact that all the relevant data are

readily available for verifying some of the projections. The final Section is devoted to conclusions.

7.2 Solutions for Poverty: A Theoretical Analysis

Raising the average standard of living of the people in general is one of the explicitly stated objectives of development planning in India. Beginning with the Perspective Planning Division's (PPD) work Notes on Perspective of Development, India 1960-61 to 1975-76 (PPD, 1964), a major attention has been focussed on such issues related to poverty as defining the required minimum subsistence level of consumption called the poverty line, the magnitude of the poor population, identification of the poverty groups and regions, measures to be adopted for poverty alleviation etc. It is also well recognised that, in broad terms, the proportion of population living below the poverty line is dependent upon and hence, can be influenced by changing either the mean consumption level or the consumption dispersion about the mean (alternatively given by the Lorenz ratio) or both. An increase in mean consumption, other things remaining the same, results in poverty reduction; conversely, a reduction in consumption dispersion or inequality may bring about a decline in the size of the poverty group. The reduction in poverty will take place at a much faster pace if increase in mean consumption is simultaneously accompanied by a reduction in the inequality of its distribution. The first strategy focusses on growth alone while the second concentrates on redistribution only. It is the third strategy, called 'Growth with Redistribution'strategy, which has come to be relied heavily upon for solving

Indian poverty by the planners. Symbolically, we have

$$P = f(\mu, L)$$

$$\text{and} \quad \frac{\partial P}{\partial \mu} < 0 \quad \frac{\partial P}{\partial L} > 0 \qquad \ldots \quad (7.1)$$

where P = Proportion of population living below the poverty line;

μ = Mean consumption level;

L = Lorenz measure of inequality in the size distribution of consumption.

This knowledge about the broad determinants of poverty per se does not lead us far in determining the exact solution for the realization of the set targets. However, the problem has been sought to be solved by the Indian Planners by making suitable assumptions about the distribution function for consumption. It has been assumed that the size distribution of PCE in India follows a two-parameter log-normal distribution, which is specified by the mean and a variance parameter. This distribution has certain convenient properties: e.g. the degree of inequality as measured by the Lorenz ratio depends upon the variance parameter. Also, the proportion of people having a consumption level below a specified level is dependent, given the mean consumption, upon the variance parameter only.

In other words, if PCE follows a log normal distribution with parameters θ and λ, then the Lorenz ratio for the consumption distribution is given by

$$L = 2 \Phi \left(\frac{\lambda}{\sqrt{2}} \right) - 1 \qquad \ldots \quad (7.2)$$

where Φ is defined by

$$\Phi(\xi) = \int_{\alpha}^{\xi} \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}t^2} dt \qquad \ldots \quad (7.3)$$

And for such a distribution, the proportion of population having a per capita consumption below a certain level, say c, is given by

$$P(c) = \Phi\left(\frac{\ln c - \theta}{\lambda}\right) \quad \ldots (7.4)$$

Let C* be the poverty line. Then the proportion of poor population, say P* is given by

$$P^* = \Phi\left(\frac{\ln C^* - \theta}{\lambda}\right) \quad \ldots (7.5)$$

Other features of the log normal model are:

$$\mu = E[X] = e^{\theta + \frac{1}{2}\lambda^2} \quad \ldots (7.6)$$

$$\text{and} \quad \theta = \ln \mu - \tfrac{1}{2}\lambda^2 \quad \ldots (7.7)$$

Thus, we have the following relations:

i) Poverty is a function of both θ and λ (vide eqn.7.5);

ii) θ is positively related to mean consumption (vide eqn.7.6);

iii) λ represents inequality (see eqn. 7.2);

iv) Hence, a positive change in θ alone can be taken to mean growth and an increase in λ can be interpreted as an increase in inequality.

With these data, we shall now examine the likely changes in poverty in response to changes in its determinants, namely, ' θ ' and ' λ '.[2] From equation (7.5), we have

$$P^* = \Phi\left(\frac{\ln C^* - \theta}{\lambda}\right) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\left(\frac{\ln C^* - \theta}{\lambda}\right)} \exp\left(-\tfrac{1}{2}t^2\right) dt \quad \ldots (7.8)$$

Partially differentiating (7.8) with respect to θ, we get:

$$\frac{\partial P^*}{\partial \theta} = (-)\frac{1}{\lambda\sqrt{2\pi}} \exp\left[-\tfrac{1}{2}\left(\frac{\ln C^* - \theta}{\lambda}\right)^2\right] < 0 \quad \ldots (7.9)$$

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2 It is more realistic to work with a three-parameter lognormal model. But, then, analysis becomes difficult.

Taking the second-order partial derivative,

$$\frac{\partial^2 P^*}{\partial \theta^2} = (-)\frac{1}{\lambda^3\sqrt{2\pi}}(\ln C^* - \theta)\exp\left\{-\frac{1}{2}\left(\frac{\ln C^* - \theta}{\lambda}\right)^2\right\} \quad \ldots (7.10)$$

Now, we have the following conditions:

$$\frac{\partial^2 P}{\partial \theta^2} > 0 \text{ if } \ln C^* < \theta \text{ or } P^* < \tfrac{1}{2} \quad \ldots (7.11)$$

$$\frac{\partial^2 P}{\partial \theta^2} < 0 \text{ if } \ln C^* > \theta \text{ or } P^* > \tfrac{1}{2} \quad \ldots (7.12)$$

$$\frac{\partial^2 P}{\partial \theta^2} = 0 \text{ if } \ln C^* = \theta \text{ or } P^* = \tfrac{1}{2} \quad \ldots (7.13)$$

The above mentioned results have the following interpretations:

i) Equation (7.9) implies that an increase in θ, given the distribution, will always cause a reduction in poverty; and

ii) this reduction in poverty will

(a) take place at an increasing rate if poverty is less than 50 per cent (eqn. 7.11);

(b) occur at a decreasing rate if poverty is greater than 50 per cent (eqn. 7.12); and

(c) will be maximum when poverty is equal to 50 per cent (eqn. 7.13).

These results are depicted graphically in Fig. 7.1

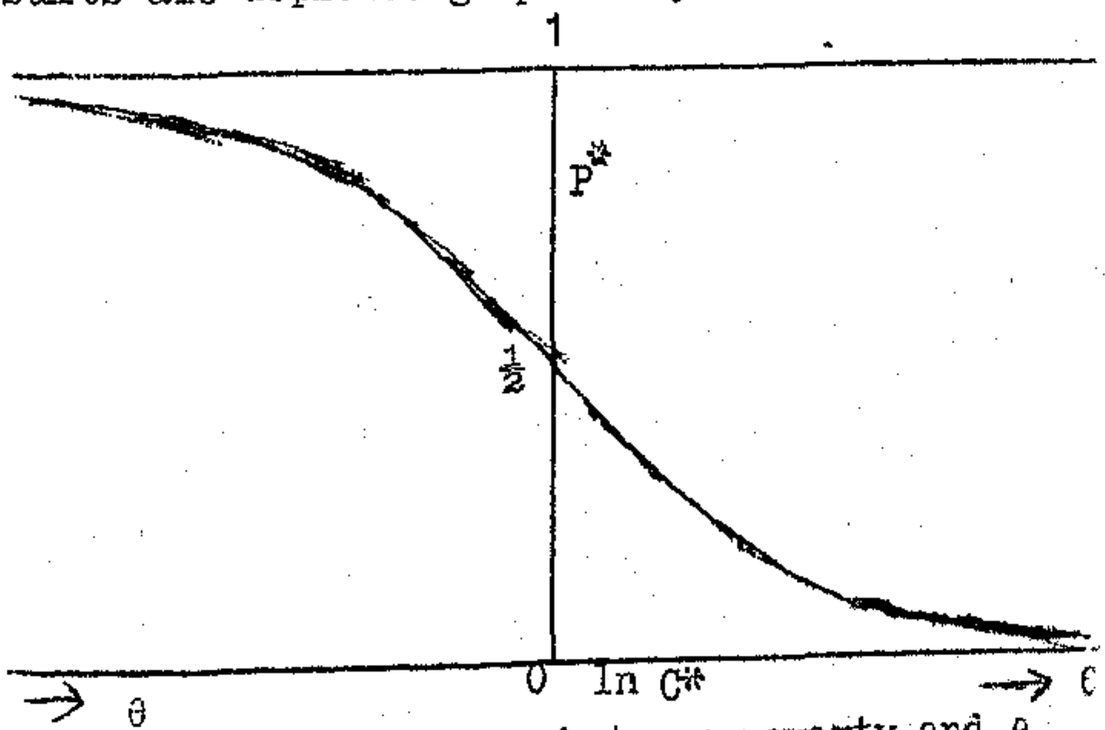

Fig: 7.1 Relation between poverty and θ

Let us now examine poverty behaviour in response to changes in inequality. We have

$$\frac{\partial P^*}{\partial \lambda} = (-)\frac{1}{\lambda\sqrt{2\pi}}(\ln C^* - \theta)\exp\left\{-\tfrac{1}{2}\left(\frac{\ln C^* - \theta}{\lambda}\right)^2\right\} \quad \ldots(7.14)$$

And,

$$\frac{\partial P^*}{\partial \lambda} > 0 \text{ if } \ln C^* < \theta \text{ or } P^* < \tfrac{1}{2} \quad \ldots(7.15)$$

$$\frac{\partial P^*}{\partial \lambda} < 0 \text{ if } \ln C^* > \theta \text{ or } P^* > \tfrac{1}{2} \quad \ldots(7.16)$$

$$\frac{\partial P^*}{\partial \lambda} = 0 \text{ if } \ln C^* = \theta \text{ or } P^* = \tfrac{1}{2} \quad \ldots(7.17)$$

That is, an increase in inequality will

i) increase in poverty when it is less than 50 per cent \eqn. 7.15);

ii) decrease it when it is greater than 50 per cent (eqn 7.16);

iii) be neutral when poverty is 50 per cent (eqn.7.17).

Next, we have

$$\frac{\partial^2 P^*}{\partial \lambda^2} = \frac{1}{\lambda^3\sqrt{2\pi}}(\ln C^* - \theta)\exp\left\{-\tfrac{1}{2}\left(\frac{\ln C^* - \theta}{\lambda}\right)^2\right\} \left\{2 - \left(\frac{\ln C^* - \theta}{\lambda}\right)^2\right\} \quad (7.18)$$

For a country with a significant proportion of the population below the poverty line, it can safely be assumed that $\left(\frac{\ln C^* - \theta}{\lambda}\right)^2 < 2$

Then,

$$\frac{\partial^2 P^*}{\partial \lambda^2} < 0 \text{ if } \ln C^* < \theta \text{ or } P^* < \tfrac{1}{2} \quad \ldots(7.19)$$

$$\frac{\partial^2 P^*}{\partial \lambda^2} > 0 \text{ if } \ln C^* > \theta \text{ or } P^* > \tfrac{1}{2} \quad \ldots(7.20)$$

$$\frac{\partial^2 P^*}{\partial \lambda^2} = 0 \text{ if } \ln C^* = \theta \text{ or } P^* = \tfrac{1}{2} \quad \ldots(7.21)$$

Equations (7.14) to (7.21) imply the following:

i) When poverty is less than 50 per cent a worsening of the

distribution will increase poverty at a decreasing rate;

ii) When it is greater than 50 per cent, an increase in inequality will decrease poverty at an increasing rate; and

iii) Distributional changes will be neutral when poverty is equal tc 50 per cent.

The above findings are depicted graphically in Fig. 7.2 below.

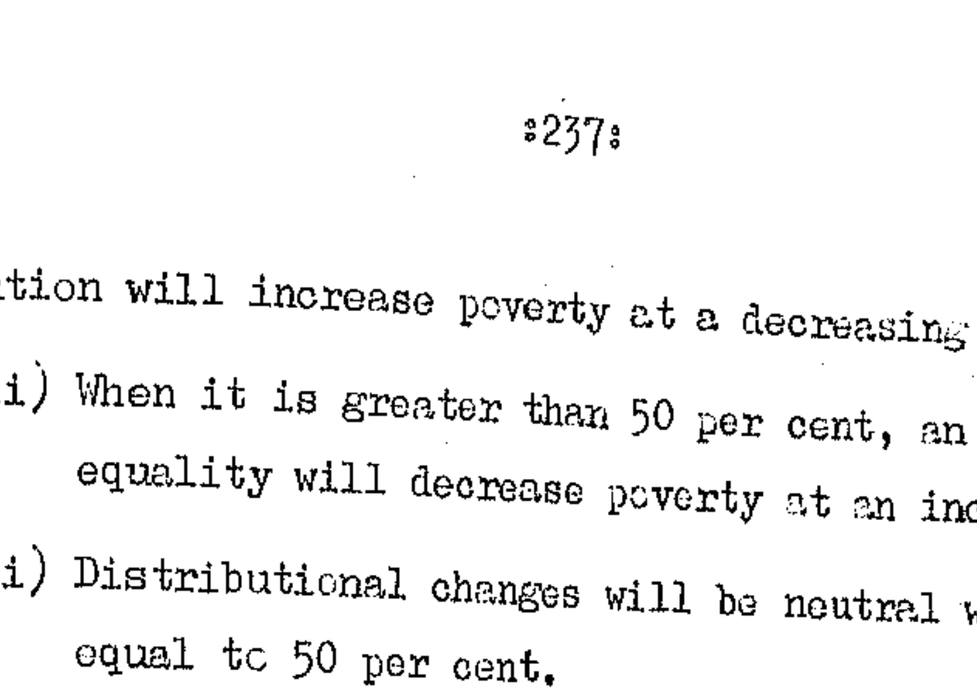

Fig. 7.2: Relation between poverty and inequality

The above results have some relevance in the Indian context. This is particularly so far rural India. As per the Draft Sixth Five Year Plan (Planning Commission, 1980), rural poverty in India in 1979-80 was 50.70 per cent and urban poverty in the same year was 40.31 per cent. This would, in the light of the above findings, give the impression that distributional changes as an instrument for reducing poverty may have only limited efficacy in the rural Indian context.

7.3 Treatment of Poverty in the Sixth Plan

7.3.1 Sixth Plan Objectives

Different plans have adopted different strategies to tackle the

problem of poverty depending upon their perceptions regarding the magnitude of the problem and the prevalent exigencies. For instance, the 1962 model sought to reduce poverty by laying relatively large emphasis on growth (Perspective Planning Division, 1964). However, due recognition of the constraints involved and of the limits to the extent of poverty reduction that could be achieved by such a strategy, has led to its reformulation in terms of growth with redistribution (Perspective Planning Division, 1973, 1982). That poverty still continues to exist in all its staggering dimensions in spite of the plan programmes and efforts only show the wide gap between planning and its implementation. It is against this backdrop that the need for setting up realistic goals assumes added significance.

The Sixth Plan, in line with its predecessor plans, has set itself with quite an ambitious target of sharp reduction in poverty. Poverty is initially defined as the inability of the population to buy a consumption packet containing 2400 calories in rural areas and 2100 calories in urban areas. Using the observed rural and urban consumption patterns for the year 1973-74, the poverty lines corresponding to these nutritional norms are found to be Rs 49.09 and Rs 56.64 per capita per month in the rural and urban areas respectively. Using appropriate deflators, the poverty lines are expressed at 1979-80 prices. The percentages of poor population are then found to be 50.70 in rural areas and 40.31 in urban areas for the year 1979-80, using the NSS distribution for 1977-78 and the CSO estimate of mean

consumption for 1979-80.

Now, the Plan seeks to redress poverty partly by growth in real consumption and partly by redistribution of consumption. The Plan conceives a growth in real consumption of 15.44 per cent (i.e. from Rs 87.97 to 101.55 at 1979-80 prices) in rural areas and of 11.32 per cent (i. e. from Rs 123.16 to 137.10 at 1979-80 prices) in urban areas during the period 1979-80 to 1984-85. Gorwth in consumption alone is shown to bring down poverty from 50.70 to 40.47 per cent in the rural sector and from 40.31 to 33.71 per cent in the urban areas. A further reduction in poverty to the targeted level of 30 per cent in both the rural and urban sectors is supposed to be achieved through redistribution.

7.3.2 Redistributional Implications

Let us now examine how such a strategy of redistribution works in terms of the extent of reduction in inequality. This can be done as in the following. Assuming a two parameter log normal model (as in the Sixth Plan), given the targeted growth in mean consumption, the required amount of reduction in inequality to achieve a targeted level of poverty can be determined by finding the new inequality parameter, λ corresponding to the targeted poverty level. This is done as follows. From equation (7.5), we have

$$P^* = \Phi\left(\frac{\ln C^* - \theta}{\lambda}\right) \text{ so that}$$

$$\ln C^* = \theta + \lambda\, t_{P^*} \qquad \ldots \qquad (7.22)$$

where t_{P^*} is such that

$$P^* = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{t} \exp\left(-\tfrac{1}{2}t^2\right) dt$$

Substituting (7.7) in (7.22)

$$\ln C^* = \ln \mu - \tfrac{1}{2}\lambda^2 + \lambda\, t_{P^*} \qquad \ldots (7.23)$$

which is a quadratic equation of the form

$$\tfrac{1}{2}\lambda^2 - \lambda\, t_{P^*} + \ln \frac{C^*}{\mu} = 0 \qquad \ldots (7.24)$$

Hence,

$$\lambda = t_{P^*} \pm \left(t_{P^*}^2 - 2 \ln \frac{C^*}{\mu}\right)^{\frac{1}{2}} \qquad \ldots (7.25)$$

Solution of (7.25) gives us the new inequality parameter which, in relation to that in the base year, gives us the required extent of reduction in inequality. The Lorenz ratios corresponding to the different inequality parameters can be worked out using equation (7.2).

Using the methodology discussed above, we work out the relevant parameters of the consumption distributions for the base and terminal years of the Sixth Plan and are given in Table 7.1.

Table 7.1: Estimated Parameters of the Consumption distribution: All India (Rural and Urban), 1979-80 and 1984-85

Parameter	Rural		Urban	
	1979-80	1984-85	1979-80	1984-85
λ	0.555	0.398	0.612	0.555
θ	4.323	4.541	4.626	4.767
$\bar{X}$ (in Rs)	87.97	101.55	123.16	137.10
L	0.305	0.222	0.335	0.305

The degree of inequality, as measured by the Lorenz ratio, has been found to be 0.305 and 0.335 for the rural and urban areas respectively for the base year. Now, given the targeted growth rates in the mean real consumption of the rural and urban areas, a reduction in poverty to the targeted level of 30 per cent involves a drastic reduction in the variance parameter. Applying (7.2), the Lorenz ratios corresponding to the new variance parameters are found to be 0.222 and 0.305 for the rural and urban sectors respectivaly for the terminal year. This implies a reduction in inequality of 27.42 per cent in the rural areas and 8.93 per cent in the urban sector during the plan period.

The question that arises in this context is whether such a rapid reduction in inequality as implied by the Sixth Plan is feasible, given the fact that the plan does not seek to achieve it by any institutional change. In fact, redistribution is seen largely to come about by "many poverty alleviation programmes which operate mainly by way of transforming assets and skills and by providing employment in the slack seasons of the year" (Planning Commission, 1981, p. 53). These are the very programmes that have been in vogue in one form or the other during the last two decades. Hence, one way of assessing the possibilities would be to examine the past trends in inequality behaviour. Because of the price factor (discussed in Chapters 1 and 4), these trends have to be examined in real terms. In Table 7.2 the Lorenz ratios for real consumption distributions at 1961/62 prices - obtained

fractilewise deflation — by sectors for the years from 1961-62 to 1977-78 are given.

Table 7.2: Lorenz Ratios for Real Consumption Distributions — All India (Rural and Urban), 1961-62 to 1977-78

Year	Rural	Urban
1961-62	0.316	0.362
1963-64	0.302	0.369
1964-65	0.309	0.371
1965-66	0.312	0.362
1966-67	0.314	0.371
1967-68	0.320	0.380
1968-69	0.329	0.366
1969-70	0.318	0.385
1970-71	0.304	0.373
1972-73	0.324	0.378
1973-74	0.305	0.344
1977-78	0.352	0.360

The results presented in Table 7.2 show no consistent trend in inequality in both the rural and urban sectors. In either sectors, broadly, there has been a slight worsening of the distribution of levels of living. So, considering the fact that the Sixth Plan too envisages combating poverty by continuing along the same lines as the earlier Plans, it looks doubtful whether it would be really successful in bringing about the required extent of reduction in the inequality of levels of living within the existing institutional framework.

The preceding analysis shows that, judged by past experiences, the targets set in the Sixth Plan for poverty reduction and consumption

redistribution are quite ambitious and are unlikely to be realised. This is because all sorts of assumptions are made to suit convenience rather than to impart realism to the exercises involved and the projections made. For instance, the base year distribution (1973-74) for the Fifth Plan was derived from the consumption distributions of 1968-69, without mentioning any of the underlying assumptions. (Planning Commission, 1973 p.2). But the observed distributions for the year 1973-74 were very much different from the ones that prevailed in the year 1968-69 in both the rural and urban sectors. On fitting a two-parameter log-normal distribution, we have found the inequality parameter (λ) to be 0.560 in 1968-69 and 0.503 in 1973-74 in the rural areas, and 0.642 in 1968-69 and 0.504 in 1973-74 in the urban areas. The Sixth Plan has also assumed that the inequality parameter in the base year (1979-80) is the same as that in 1977-78. (Perspective Planning Division, 1981, p.77). It is well known that any estimate of the demand structure in terms of both commodity composition and their magnitude depends not only upon the mean level of consumption but also on the particular pattern of distribution in that year (Iyengar, 1960a; Jain, 1975, 1978). If so, the commodity-wise projections made for the plan period would turn out to be over-estimates or under-estimates, depending upon the nature and extent of deviation of the assumed distribution from the actual one for the base year. This is precisely what we propose to do in the following Section.

7.4 Plan Assumptions and their Implications for Redistributional and Demand Projections

7.4.1 Introduction:

Quite often plan models are designed to make quantitative projections for the economy over a specified time period. That is the reason why certain plan assumptions particularly about parametric constants play as good a role as plan targets and the policy instruments suggested for realizing the set targets. Generally assumptions are made to facilitate analytical derivations. But, sometimes, due to the non-availability of up-to-date data, assumptions are made based on past, outdated data which would mean considerable uncertainty about plan projections. The purpose of this Section is to illustrate such a problem in the context of the Fifth Five Year Plan for which all the relevant data are readily available.

7.4.2 The Problem:

An important part of the recent Indian Plan models is the consumption block. It is here that the various parameters like the inequality parameter and other projections are worked out corresponding to the different targeted values. Many of these exercises are based on the empirical information provided by the NSS on commodity-wise as well as aggregate consumer expenditure distribution by sectors. Such NSS distributions are used not only to determine base-year commodity-wise expenditure proportions but also to find out the magnitude of poverty and to make projections about the related targets.

As already seen in the previous Section, all such exercises are carried out, in the Indian Plan models, employing largely the two-parameter lognormal framework. Some of the important properties of the model have already been discussed in the earlier Sections. Other important properties of the model are the following:

i) Under the assumption of bivariate lognormal distribution for PCE and per capita expenditure on a specific item, the Engel elasticity--which is an essential parameter in demand projections--for the specific item is given by

$$\eta = \frac{t_{\pi_s}}{t_{\pi_o}} \quad , \quad , \quad (7.25)$$

where π_s is the share of total consumption of a specific item 's' accruing to the lower 50 per cent of the population, π_o is the corresponding share in aggregate consumption and t_α denotes the standard normal deviate corresponding to α $(0 < \alpha < 1)$ [3].

ii) Under the same assumption, it is also possible to estimate the increase in consumer demand for different commodities under conditions of growth in consumption and changes in distribution. That is to say,

$$Y_i(t) = Y_i(0) \exp\left[\tfrac{1}{2}\bar{\eta}_i(\bar{\eta}_i - 1)(\lambda^{*2} - \lambda^2)\right](1+\beta)^{t\bar{\eta}_i} \quad , \quad , \quad (7.27)$$

where

$Y_i(t)$ = Per capita specific expenditure on the i^{th} item in the terminal year.

$Y_i(o)$ = Per capita specific expenditure on the i^{th} item in the base year.

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[3] For details, see, Iyengar (1960[a])

$\bar{\eta}_i$ = adjusted Engel elasticity[4] for th i^{th} item.

λ^* = Standard deviation of the lognormal model for PCE in the terminal year.

λ = Standard deviation of the lognormal model for PCE in the base year.

β = Compound annual growth rate of total consumption during 't' years.[5]

From the foregoing discussion, it is clear that in any planning exercise involving redistributional estimates, commodity projections, etc., the parameters θ, λ, η and β are crucial. How sound these exercises and their results are would crucially be dependent upon the values assumed for these parameters. Any deviation of the values assigned for these parameters from the actual ones would mean under-estimation (over-estimation) of the plan projections made.

---

4 For projection purposes, estimated Engel elasticities have to be adjusted for additivity using the formula

$$\bar{\eta}_i = \eta_i + \left[1 - \Sigma\ w_i\ \eta_i\right]$$

where $\bar{\eta}_i$ = adjusted Engel elasticity for the i^{th} commodity

w_i = Engel ratio for the i^{th} commodity

η_i = Engel elasticity for the i^{th} commodity

(For details, See, Iyengar and Jain, 1969)

5 For details of derivation see Iyengar (1960b). It may be also noted that analogous formulae are available for other Engel curve forms.

7.4.3 Empirical Illustration:

Every distribution can broadly be characterized by a mean and a dispersion parameter. The Fifth Five Year Plan, while it had upto date information about the mean of the consumption distribution, had to make certain assumptions about the distribution parameters for the base year 1973-74. For purposes of convenience, it assumed that the 1973-74 distribution followed the same pattern as the 1968-69 distribution for which NSS could provide data from its 23rd Round Survey. In other words, the λ parameter for the 1973-74 consumption distribution was assumed to be the same as that of 1968-69. However, the value of λ (0.558) for 1968-69 was markedly different from the one (0.499) that prevailed in 1973-74 ie. an over-estimation by 11.86 per cent. Since, as we have already seen, λ plays a crucial role in most of the relevant exercises, a difference in λ assumed for the base year--in other words, use of NSS data for an earlier year--would cause a difference in:

1. required degree of redistribution over the plan period;
2. commodity-wise expenditure proportions in the base year;
3. Engel elasticity estimates for the base year; and
4. commodity-wise demand projections over the plan period.

The above mentioned implications are discussed in detail below:

7.4.4 Redistributional Implications:

Like the preceding plans, the Fifth Five Year Plan also targeted to increase the living standards of the population in general and that of the poor in particular. It sought to increase the consumption levels of the poor partly by growth and partly by redistribution of consumption. As per the Plan document, the mean consumption level was Rs 49.27

in the rural sector and Rs 62.08 in the urban sector at 1971-72 prices in the base year 1973-74. As per its assumptions about consumption distributions, the bottom 30 per cent had a consumption level of Rs 22.90 in the rural and Rs 25.17 in the urban sector (See Table 7.3). Growth in consumption alone was supposed to raise these levels to Rs 26.33 and Rs 28.44 in the rural and urban sectors respectively. A further increase to Rs 36.64 (rural) and to Rs 39.64 (urban) was supposed to be achieved through redistribution.

Table 7.3: Monthly Per Capita Consumption (Rs at 1971-72 prices) All India -- Rural and Urban

Fractile Group (per cent)	1978-79: 1973-74 (as per the Plan assumption about)	Without redistribution	With redistribution	Percentage change between (3) and (2)	Percentage change between (4) and (3)
(1)	(2)	(3)	(4)	(5)	(6)
		RURAL			
0-30	22.90	26.33	36.64	14.98	39.16
70-100	84.35	96.98	80.38	14.98	(-)17.12
0-100	49.27	56.65	56.59	14.98	(-) 0.10
		URBAN			
0-30	25.17	28.44	39.64	12.98	39.28
70-100	113.19	127.87	108.07	12.98	(-)15.48
0-100	62.08	70.13	70.06	12.98	(-) 0.10

However, what is to be noted is that by assuming altogether different distributions with higher inequality parameters for the base

year, the Plan document under-estimated the consumption levels of the bottom 30 per cent and over-estimated those of the top in both the rural and urban sectors for the base year and for the terminal year in the 'without redistribution case' (See, Table 7.4). The underestimation for the bottom 30 per cent was about nine per cent in the rural and 14 per cent in the urban sector. The overestimation for the top 30 per cent was by about five per cent in the rural and about seven per cent in the urban sector. Accordingly, the Plan document also overestimated the projected changes in the levels of living of the different sections of the society over the Plan period as can be seen by a comparative look at Tables 7.3 and 7.4.

Table 7.4: Monthly Per Capita Consumption (Rs at 1971-72 prices)
All India -- Rural and Urban

Fractile Group (per cent)	1973-74 (as per the observed distribution)	1978-79 Without redistribution	1978-79 With redistribution	Percentage change between (3) and (2)	Percentage change between (4) and (3)
(1)	(2)	(3)	(4)	(5)	(6)
		RURAL			
0-30	25.14	28.90	36.64	14.96	26.78
70-100	80.45	92.51	80.38	14.96	(-)13.11
0-100	49.27	56.65	56.59	14.96	(-) 0.10
		URBAN			
0-30	29.36	33.17	39.64	12.98	19.51
70-100	105.38	119.04	108.07	12.98	(-) 9.21
0-100	62.08	70.13	70.06	12.98	(-) 0.10

It follows straight from the preceding analysis that the Plan might have also overestimated the extent of redistribution required to achieve the targeted levels of consumption for the bottom 30 per cent. The inequality parameters, both λ and L, corresponding to the assumed and observed distributions for the base year and those for the ones corresponding to the Plan targets are given in Table 7.5. It can be seen that the Plan envisaged an inequality reduction of about 39 per cent in the rural and of about 32 per cent in the urban sector. But the actual reduction in inequality required to achieve the set targets was only 32 per cent in the rural and about 21 per cent in the urban sector. Thus, we find that the Plan had overestimated the required degree of reduction in inequality to realize the Plan targets by 22 per cent for the rural and by as much as 54 per cent for the urban sector.

Table 7.5: Estimated Parameters of the Consumption Distributions All India - Rural & Urban (1973-74 and 1978-79)

Parameters	1973-74 Assumed	1973-74 Observed	1978-79 Targeted	Percentage change between (4) and (2)	Percentage change between (4) and (3)	Percentage change between (5) and (6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			RURAL			
λ	0.558	0.499	0.338	(-)39.46	(-) 32.28	22.24
L	0.307	0.276	0.189	(-)38.50	(-) 31.54	22.07
			URBAN			
λ	0.643	0.548	0.431	(-)32.92	(-) 21.28	54.70
L	0.350	0.301	0.239	(-)31.66	(-) 20.54	54.14

Notes: 1. The parameters for the distributions are estimated using the relation $t_q = t_p - \lambda$ for $p=\frac{1}{2}$ where t_q and t_p stand for Standard normal deviates of cumulative proportions of consumption-shares and population respectively.

2. The Lorenz ratio (L) parameters are estimated using the λ values so estimated by the relation $L=2\phi\left(\frac{\lambda}{\sqrt{2}}\right) - 1$ where ϕ denotes the distribution function.

7.4.5 Implications for Consumption Patterns

As already stated, a difference in NSS distribution used would also imply a difference in consumption pattern assumed for the base year. Here, we examine the consumption pattern with reference to only three commodities groups, viz., (1) cereals, (2) cereal substitutes and (3) pulses for, these groups corresponded with the classification adopted by the Plan. It can be seen that the Plan underestimated the expenditure proportions for the first two groups in the rural and for all the three groups in the urban sector. Also, we find differences in Engel elasticities for the three commodity groups. The elasticities as per the 23rd round of NSS underestimated the ones for cereals and cereal substitutes in the rural and for cereal substitutes and pulses in the urban sector. Accordingly, we would also find differences in commodity-wise demand projections for the terminal year.

Table 7.6: Estimates of Engel elasticities and Engel ratios for selected commodities: All India (Rural and Urban), 1968-69 and 1973-74

Commodity	Engel ratio		Percentage change between (3) and (2)	Adjusted Engel elasticity		Percentage change between (6) and (5)
	1968-69	1973-74		1968-69	1973-74	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			RURAL			
Cereals	0.418	0.434	3.85	0.528	0.555	(-) 4.91
Cereal substt.	0.006	0.007	26.32	(-)0.397	(-)0.177	124.45
Pulses	0.038	0.037	(-) 1.57	1.001	0.951	5.27
			URBAN			
Cereals	0.252	0.269	6.54	0.267	0.246	8.92
Cereal substt.	0.001	0.002	63.64	(-)0.757	(-)0.172	(-)340.14
Pulses	0.031	0.033	8.82	0.595	0.6560	(-) 9.33

7.4.6 Implications for Demand Projections

The very difference in Engel ratios assumed for the different commodity groups would mean deviations of base year estimated values of consumption from the actual ones. The difference was as much as 36 per cent (underestimation) for cereal substitutes and eight per cent (underestimation) for pulses in the urban sector (See, Table 7.7). Since the terminal year projections of per capita consumption of different items are also functions of base year values for per capita consumption (item-wise), Engel elasticities and λ parameter, we would naturally find wide divergences between the projected values based on assumed distributions and those based on observed values. That is, precisely what we observe from Table 7.7. We find thedifference to be particularly marked in the case of cereal substitutes, where urban demand is underestimated by as much as 36 per cent. However, in the rural sector we do not find much wide differences.

Table 7.7: Demand Projections: All India (Rural and Urban)

Commodity	Monthly per capita consumption				Percentage change between (4) and (5)
	1973-74		1978-79		
	Assumed	Observed	Based on assumed values	Based on observed values	
(1)	(2)	(3)	(4)	(5)	(6)
			RURAL		
Cereals	20.59	21.38	22.70	23.48	(-) 3.32
Cereal subs.	0.28	0.28	0.28	0.28	0.00
Pulses	1.88	1.85	2.16	2.12	1.89
			URBAN		
Cereals	15.67	16.69	17.09	17.38	(-) 1.67
Cereal subs.	0.07	0.11	0.07	0.11	(-) 36.36
Pulses	1.90	2.07	2.10	2.27	(-) 7.49

7.4.7 Conclusions

The preceding analysis shows that Plan assumptions about parametric values do play a significant role and can cause wide differences to the required degree of changes in various variables. The study, with special focus on redistributional issues and demand projections, shows that the problem is particularly serious in the context of redistributional changes required for ameliorating the living conditions of the lower segments of the society. However, we do not find the same degree of difference in the context of demand projections. But this finding has to be taken with a little caution as it is based on commodity projections for three commodity groups only. It may also be because of the fact that consumption patterns in India have not changed much over the years and are more or less the same across different income groups so that differences in distributional parameters do not make much difference in the case of demand projections.

7.5 Summing-up

In the preceding sections, we have examined the appropriateness of the Indian Plan strategies for poverty alleviation, the redistributional implications of the Plan targets and the problems involved in the use of inappropriate data base. We find that reduction in inequality as a solution for poverty will not be uniformly effective under all conditions. The precise impact of distributional changes on poverty depends upon the magnitude of poverty itself. For countries with more than 50 per cent of their population living below the poverty line,

even a worsening of the distribution can bring about a reduction in poverty. Further we find that the Sixth Plan targets for poverty alleviation are quite ambitious and their realization will require a reduction in inequality to an extent which has not been experienced in the country in recent years. Our analysis of the Fifth Plan assumptions about distributions has shown that with assumed distributions based on data for an earlier period (rather than for the base year of the Plan), one often makes unrealistic plan projections about redistributions required and commodity-wise demand in the terminal year. This underlines the need for making available the NSS data without much time lag and also the need for choosing the data for as recent a period as possible.

Chapter 8

IMPORTANT FINDINGS AND LIMITATIONS

8.1 Introduction

The main focus of the present thesis is on the growth trends and income distributional patterns in India. To be specific, the questions sought to be answered are the following:

- Whether the first phase of the Kuznets' Inverted-U hypothesis is operative in India?

- Whether with planned economic development regional disparities have declined?

- Whether there exists any relation between consumption level and its inequality levels?

- How far the goals for poverty redressal are realistic? and what are their implications for redistributions and plan projections?

We examined all these questions at the sectoral level. The findings of this study on these questions can broadly be divided into the following groups: (i) economic; (ii) statistical; and (iii) those having policy relevance.

8.2 Economic Findings

Indian economic growth, defined in per capita terms, has not been adequate during the post-Independence period. While the secondary and tertiary sectors increased their output shares, their share of labour

force did not increase at all. On the other hand, the primary sector while retaining its share of labour force, saw its output share fall considerably. In consequence, average income levels in the secondary and tertiary sectors in relation to that in the primary sector might have gone up considerably. The predominance of the former sectors in the urban areas and cities would imply a worsening of the rural-urban and rural-city disparities. For the same reason, within the urban sector city-non-city urban disparities would have increased.

Further, growth in India seems to have taken the dualistic form: the dualism being between the modern and traditional sectors. And the observed growth pattern has been a combination of modern sector enrichment and traditional sector enlargement, resulting in worsening of income distribution. The marked presence of dualism in the urban sectors and cities might have caused a relatively faster deterioration in income distribution in these areas.

These expectations based on indirect evidences were borne out only partly by direct evidences on consumption distribution, which is a direct measure of welfare. There had not been any growth in real consumption levels of either rural or non-city urban areas or cities in India during 1961/62 to 1973/74. The inter-sectoral disparities in nominal terms did not show any drastic change. But in all the sectors considered, consumption distributions had worsened. This was particularly marked for the cities. The NSS 32nd Round data showed an unusally high degree of inequality in the rural and urban sectors. Thus, altogether, we found practically stagnant consumption levels and some increase in inequality in consumption distribution in all the sectors at the all India level.

A contribution in this respect is the analysis of distributional issues at three levels viz., rural, non-city urban and cities. So far studies on income distribution have examined the problem for the rural and urban sectors of the economy. But, in this study, we have decomposed the urban sector further into 'non-city urban' and cities, and studied consumption distributions for these two constituent parts of the urban sector at the all India level.

At the state level, our analysis of consumption levels and distributions in nominal terms showed overall improvement in both rural and urban sectors. This is quite expected in an inflationary world. However, with adjustment for inflation we found stagnant consumption levels and distributions in the two sectors of most of the states. Further, we did not find any significant change in inter-state disparities in average PCE either in nominal or in real terms for the rural sector. The inter-state disparities for the rural sector in real terms was found to be higher than that in nominal terms. For the urban sector, the inter-state disparities showed a small decline during the period of the study. Also we did not find any significant relation between average PCE and Lorenz ratio for the rural sector either in nominal or in real terms i.e. with price adjustment in average PCE for regional variation. However, the association between these two variables in real terms was found to be positive for the urban sector during the 32nd round. Further, we found statistically significant negative correlation between incidence of poverty and average real PCE for the rural sector in all states except Bihar, Maharastra and Orissa. In

majority of the states like Bihar and Maharastra the temporal behaviour of real consumption distribution was such as to offset this inverse relationship while in a few it tended to strengthen the negative relation. Our cross-sectional analysis of poverty, average PCE and LR for the rural sectors of state also throw up such an inverse relationship between poverty and average PCE. A positive correlation, but not statistically significant, between average PCE and LR would imply a distribution behaviour which tended to weaken the negative relation between average PCE and poverty.

Our analysis of the Sixth Plan Strategy for poverty-alleviation has shown the goals to be unrealistic and unlikely to be feasible in the present socio-economic context given the past experiences. To achieve the plan target of poverty reduction to 30 per cent in both the rural and urban sectors of India, there would have to be a reduction in inequality to the extent of 27.42 per cent in rural areas and 8.93 per cent in the urban, something the like of which the country has not experienced even during the whole of the post-Independence period. Further analysis of the Fifth Plan strategy has shown that with assumed distributions for the plan base year, the Planning Commission had overestimated the required degree of redistribution for achieving targeted poverty reduction. Similar distortions appeared also on the demand projection side, where the urban demand for cereal substitute was found to be overestimated by nearly 37 per cent.

8.3 Statistical Findings

One important statistical aspect overlooked by most of the studies based on NSS consumption distribution is with respect to the way NSS data are classified and presented. The NSS provides data in the form of size distribution of population and consumption across unequal class intervals which are kept invariant with respect to inter-regional and inter-temporal variations in distributions. In applying the usual trapezoidal method of estimation of LR and group PCE, one has necessarily to assume intra-group equality in each class interval. But distributions differ across space and over time with respect to both mean and dispersion. Hence, different distributions have different forms and are located at different points. Because of this, the relative information lost about inequality, on account of the assumption of intra-group equality, will be different for different distributions and are then not strictly comparable. Over time, due to inflation distributions at current prices have been moving upwards with considerable concentration in the top wider class intervals. In consequence, one has got to assume equality for an increasingly larger proportion of population which, as a result, gives an illusive picture of decline in inequality.

To overcome this problem, we tried to estimate the LR by three different alternative methods. They are (i) Ramakrishnan (1982) approach; (ii) the lognormal model approach; and (iii) the Kakwani-Podder approach. We found that the Ramakrishnan approach gave results which conformed to our a priori expectation and also fulfilled statistical considerations.

8:4 Policy Relevant Findings

Our statistical finding that the NSS system of using the same class intervals for data presentation for all the regions and of changing the system at infrequent intervals involves differential loss of information for distributions across sectorsand over time has the following implication. It would imply the need for following optimal grouping procedure for different distributions across sectors and over time. Since the Fractile Graphical Analysis (FGA) method of data presentation and analysis developed by Mahalanobis (1960) does not involve any such problem, this finding may lend further support to the FGA approach.

Further, we found that the use of out-dated data in planning exercises had caused distortions in plan projections. This would hence underline the need for making available latest data at the earliest and their use in planning.

The general belief that a reduction in inequality always causes a decrease in poverty was found to be untrue. Using the two-parameter log-normal framework we found that the precise impact of a change in inequality depended upon the magnitude of poverty itself. For countries with more than 50 per cent of their population in poverty, even an increase inequality could cause a decline in poverty. Hence, while designing plan strategies and giving weightages to different plan instruments, one has to consider the current status of the country with respect to the magnitude of absolute poverty.

8.5 Limitations

However, the findings of this study are subject to a few limitations. Apart from the data limitations already discussed in Chapter 3, a few additional remarks on these are in order.

(i) While trying to solve the bias arising from grouping, we considered Ramakrishnan approach to be better of all the methods considered. But, it is questionable whether his assumption of uniform distribution can be made particularly when the population falling in a single class-interval is as high as 40 per cent as observed .. in the case of cities for the 25th round.

(ii) As already pointed out, the fractile group-specific price indices for different sectors of all India and of states are based on common all India wholesale price indices. Perhaps a better procedure would have been to base them on retail price indices pertaining to those regions; but this could not be done as they were not available.

(iii) While comparing LRs across states, we assumed them to be fairly comparable. But the decile-specific indices of inter-regional variations in consumer price constructed by Chatterjee and Bhattacharya (1974b) imply that this is not true.

(iv) Also, contrary to our expectations, we did not find marked increases in inequality in any of these sectors considered. This might be because of the weaknesses of the NSSO data. For instance, from the 19th round onwards NSS has stopped collecting data on house construction. In recent years, a very significant part of

household saving is in the form of investment in housing. Also our analysis in section 3.5 would imply a picture of decline in inequality thrown up by NSS data. Inspite of this, we found some increase in inequality in real PCE distribution. Further, in recent years household savings in India has increased significantly. Considering that savings are usually done by the rich, this would imply an increase in income inequality.

(v) Further, we could have studied the question of inequality from various angles using different measures — both positive and normative. We did not do this as our study was based on grouped data and most other measures are highly susceptible to the grouping bias, as shown by Prasad and Iyengar (1984). In the absence of satisfactory solution for this problem in some measures, their estimates, if made, would not have provided much additional useful insight.

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