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How Important to India's Poor Is the Sectoral Composition of Economic Growth?

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Using a new series of consistent, consumption-based poverty measures spanning forty years, we assess how much India's poor shared in the country's economic growth, taking into account its urban-rural and output composition. Rural consumption growth reduced poverty in both rural and urban areas. Urban growth brought some benefits to the urban poor, but had no impact on rural poverty. And rural-to-urban population shifts had no significant impact on poverty. Decomposing growth by output sectors, we found that output growth in the primary and tertiary sectors reduced poverty in both urban and rural areas but that secondary sector growth did not reduce poverty in either.

It is sometimes claimed that the sectoral composition of economic growth is an important determinant of the rate of poverty reduction in developing countries. But testing that claim is difficult. The main evidence cited by those who emphasize the importance of the pattern of growth is a static poverty profile from a single cross-sectional household survey, showing (among other things) where the poor live and the sectors in which they are employed. Poverty profiles for India (and most other developing countries) have indicated higher absolute poverty levels in the rural sector. But we cannot automatically assume that rural economic growth is the key to poverty reduction; the rural sector may just not have the potential for high growth. As in most developing countries the trend rate of growth in India has been higher in the modern industrial and service sectors—both of which are mostly urban based—than in the agricultural sector (Chenery and Syrquin 1986). Under certain conditions migration from rural to urban areas may be more important to poverty reduction than rural economic growth (Fields 1980; Anand and Kanbur 1985). The effects of growth in one sector can be crucial to growth in another (Thorbecke and Jung 1994). The fortunes of the poor in each sector are linked—through trade, migration, and transfers—to the living standards of both poor and nonpoor households in other sectors.

To avoid small-sample biases in testing the impact of growth on poverty, a reasonable number of time-series observations should be used. But although

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national economic growth can be tracked annually for most countries, the household survey data needed to monitor living standards of the poor are collected much less frequently. Indeed most countries have, at best, a few nationally representative and comparable surveys spanning a period during which there have been shifts in the sectoral pattern of growth.

Among developing countries India has the longest series of national household surveys suitable for tracking living conditions of the poor. At the time of writing distributional data on household consumption in India from thirty-three surveys spanning from 1951 to 1991 could be assembled. The surveys are large enough to be representative at the urban and rural levels as well as nationally, and they are comparable over time because the basic survey method changed very little.

There has been much debate about how much India's poor have shared in the country's economic growth. Some critics have argued that the gains in farm output from the green revolution brought little or no gain to the rural poor, while others have pointed to the growth of farm output as the key to reducing rural poverty. (Lipton and Ravallion 1994 review this debate. On the effects of agricultural growth on rural poverty in India see Ahluwalia 1978, 1985; Bell and Rich 1994; Bhattacharya and others 1991; Gaiha 1989; Ravallion and Datt 1994; Saith 1981; and van de Walle 1985.) Views have also differed on how much urban growth has benefited the poor. The optimism of many of India's postindependence planners, who believed that the country's (largely urban-based) industrialization would bring lasting, longer-term gains to both the urban and rural poor, has not been shared by many critics (see, for example, Eswaran and Kotwal 1994). And the importance to the poor of the tertiary (mainly services) sector is unclear. Such intellectual debates about growth and the poor lie at the heart of ongoing discussions on development strategy and policy reform in India and elsewhere. (On the role of economic growth on a strategy for poverty reduction see World Bank 1990 and Lipton and Ravallion 1994. On the relevance of these issues to concerns about policy reform and the poor in India see Ravallion and Subbarao 1992.)

In this article we report new empirical evidence that sheds light on the effects of the sectoral pattern of economic growth on poverty in India over forty years. We measure the importance to India's poor of intrasectoral growth, rural-to-urban migration, and spillover effects between sectors. We also examine whether these effects differ according to how sensitive the poverty measure is to distribution among the poor.

The following section describes how cross-sectoral spillover effects might occur and sets up a framework to test for the effects of sectoral composition and population shifts on poverty during a period of growth. In section II we describe our data, including our estimates of a consistent time series of different poverty measures for urban and rural areas of India during 1951–91. Section III then presents our results and discusses their implications. Conclusions are summarized in section IV.

I. Poverty and the Sectoral Composition of Growth

Why Would the Sectoral Composition of Growth Matter?

Theories of growth and distributional change have emphasized the role played by population shifts from the "traditional" rural sector to the "modern" urban sector. An influential model of this sort was sketched by Kuznets (1955) and later formalized by Robinson (1976), Fields (1980), and Anand and Kanbur (1985), among others. This model attributes growth and distributional shifts to urbanization, assuming that neither mean income nor its distribution changes within each sector. We call this the "Kuznets process" (following Anand and Kanbur).

Other strands of the literature have given more attention to intrasectoral changes. Growth of a given sector's output will have a direct effect on incomes of those employed in that sector.

In most developing countries the rural sector accounts for a substantially higher share of absolute poverty than the urban sector; a rural resident is also more likely to be poor, by almost any standard (Lipton and Ravallion 1994 survey the evidence). These stylized facts suggest that the urban-rural composition of economic growth influences poverty reduction. Additionally, there may be indirect cross-sectoral effects arising from the sectoral interdependence of economic activity (Thorbecke and Jung 1994). In principle these may either enhance or retard the direct effect of growth.

For the class of additively decomposable poverty measures, national poverty is a population-weighted sum of rural and urban poverty. Thus these measures naturally decompose into population-shift and intrasectoral effects and can illuminate these issues (Ravallion and Huppi 1991). It is also of interest to look at the relationships among these components. The direct impact of a sector's growth on national poverty is limited by its population share. However, in principle, growth or contraction of one sector can affect other sectors, with potentially wide-ranging implications for poverty reduction. For example, it is often said that an important cause of urban poverty in developing countries is rural poverty. According to this view, the vast urban slums of many cities in developing countries are simply the urban analogue of deprivation (often on a larger scale) in the rural hinterland. (For a survey of the literature on poverty in developing countries, including comparisons between urban and rural poverty, see Lipton and Ravallion 1994.) Because of cross-sectoral spillover effects, the significance of the urban-rural composition of growth for poverty extends beyond what is implicit in the sectoral population shares.

Spillover effects can occur in a number of ways. Labor mobility between urban and rural sectors can yield an equilibrium relationship between the real wages of similar workers, entailing some degree of horizontal integration in earnings and income distributions; the living standards of similarly endowed people in different sectors are causally related. Even without labor mobility such

integration can arise through trade in goods; the living standards of similar households in different sectors will move together to the extent that trade in goods eliminates differences in factor costs at the margin. But even without factor-price equalization, the fact that the rural sector produces food that is consumed in the urban sector means that agricultural growth raises urban welfare by lowering food prices. Transfers between related households living in different sectors can also produce horizontal integration.

If the degree of horizontal integration varies with the standard of living, we can also expect growth or contraction in one sector to induce distributional shifts in the other sector. There is no a priori reason to expect the integration to be uniform at all levels. And there is at least one good reason to expect that it will not be: the distributions of living standards in different sectors tend to overlap imperfectly, that is, they share a positive density over certain (compact) intervals of the range of living standards but not others. For example, the urban sector of a developing country will often include an elite class that simply has no counterpart in the rural sector. This imperfect overlapping can have strong implications for how an increase in incomes in one sector will affect both average levels of living and inequalities in other sectors.

Testing the Impact of the Sectoral Composition of Growth on Poverty

In this section we do not attempt to develop a comprehensive structural model of the potential channels described above. Rather, our aim is to test the importance of the sectoral composition of growth, allowing explicitly for population shifts and cross-sectoral effects.

We restrict attention to the broad class of additive poverty measures (Atkinson 1987) and consider two sectors, urban and rural. The average level of poverty is

$$P = n_u P_u + n_r P_r \tag{1}$$

where n_i and P_i are the population shares and poverty measures, respectively, for sectors $i = u,r$, representing urban and rural areas, respectively. Mean consumption can similarly be written

$$\mu = n_u \mu_u + n_r \mu_r \tag{2}$$

where μ_i is the mean for sector i. Let $s_i^P = n_i P_i / P$ and $s_i^\mu = n_i \mu_i / \mu$ be the sector shares of total poverty and total consumption income. The growth rate in the poverty measure can be decomposed by taking the total differential of equation 1:

$$d\ln P = s_u^P d\ln P_u + s_r^P d\ln P_r + (s_u^P - s_r^P n_u/n_r) d\ln n_u . \tag{3}$$

Equation 3 shows that the average rate of poverty reduction is made up of the intrasectoral gains to the poor, given by the share-weighted rates of poverty reduction within each sector ($s_i^P d\ln P_i$), and the independent contribution of the rate of urbanization. The second term can be interpreted as poverty reduction

attributable to the Kuznets process. Notice that the coefficient on $d\ln n_u$ can also be written as $(P_u - P_r)n_u/P$, indicating that urbanization under the Kuznets process will reduce average poverty only if poverty is greater in rural areas than in urban areas. Similarly,

$$d\ln\mu = s_u^\mu d\ln\mu_u + s_r^\mu d\ln\mu_r + (s_u^\mu - s_r^\mu n_u/n_r)d\ln n_u \tag{4}$$

gives the corresponding breakdown in the rate of growth in mean consumption.

We want to test whether the sectoral composition of growth matters. We have T discrete time-series observations on poverty and the composition of growth (the data are discussed later). Our proposed test entails estimating the following regression equation on the discrete data:

$$\Delta\ln P_t = \pi_u s_{ut-1}^\mu \Delta\ln\mu_{ut} + \pi_r s_{rt-1}^\mu \Delta\ln\mu_{rt} + \pi_n(s_{rt-1}^\mu - s_{ut-1}^\mu n_{rt-1}/n_{ut-1})\Delta\ln n_{rt} + \varepsilon_t \quad (t = 2,..,T) \tag{5}$$

where the π's are parameters to be estimated, Δ is the discrete time difference operator, and ε is an error term. The coefficients π_u and π_r can be interpreted as the impact of (share-weighted) growth in the urban and rural sectors, respectively, while π_n gives the effect of the population shift from rural to urban areas. Of course, other independent factors will influence measured poverty (including measurement errors); these have been allowed for in the above equation by adding the random error term ε. To motivate this test regression, notice that under the null hypothesis $\pi_u = \pi_r = \pi_n = \pi$, equation 5 collapses to:

$$\Delta\ln P_t = \pi\Delta\ln\mu_t + \varepsilon_t \tag{6}$$

using equation 4 and sweeping into the regression's residuals any errors due to replacing the unobserved continuous differential for each variable by its observed discrete time difference. Thus under the null hypothesis $\pi_u = \pi_r = \pi_n$ it is the overall rate of growth that matters, not its composition.

We also want to test whether economic growth in one sector affects distribution in other sectors. We can use equation 3 to decompose the rate of growth in average poverty, and thus estimate the following system of test equations (dropping time subscripts for brevity):

$$s_u^P \Delta\ln P_u = \pi_{u1} s_u^\mu \Delta\ln\mu_u + \pi_{u2} s_r^\mu \Delta\ln\mu_r + \pi_{u3}(s_r^\mu - s_u^\mu n_r/n_u)\Delta\ln n_r + \varepsilon_u \tag{7}$$

$$s_r^P \Delta\ln P_r = \pi_{r1} s_u^\mu \Delta\ln\mu_u + \pi_{r2} s_r^\mu \Delta\ln\mu_r + \pi_{r3}(s_r^\mu - s_u^\mu n_r/n_u)\Delta\ln n_r + \varepsilon_r \tag{8}$$

$$(s_r^P - s_u^P n_r/n_u)\Delta\ln n_r = \pi_{n1} s_u^\mu \Delta\ln\mu_u + \pi_{n2} s_r^\mu \Delta\ln\mu_r + \pi_{n3}(s_r^\mu - s_u^\mu n_r/n_u)\Delta\ln n_r + \varepsilon_n \tag{9}$$

where $\pi_i = \pi_{ui} + \pi_{ri} + \pi_{ni}$, $i = 1, 2, 3$. Summing equations 7, 8, and 9 yields equation 5. Equation 7 shows how the composition of growth and population shifts affect urban poverty, and equation 8 shows how they affect rural poverty. Equation 9 gives the effect on the population shift component of $\Delta \ln P$. We

estimate equations 7 and 8. Equation 9 need not be estimated separately because its parameters can be inferred from the estimates of equations 7 and 8 using the adding-up restriction that $\pi_{ni} = \pi_i - \pi_{ri} - \pi_{ui}$, $i = 1, 2, 3$.

The analysis of the impact of the output composition of growth on poverty is even simpler because there are no population-shift effects to consider. Splitting net domestic product per person into primary, secondary, and tertiary components so that $Y = Y_1 + Y_2 + Y_3$ and noting that the rate of growth in Y can be approximated by the sum of the share-weighted growth rates of the three sectors, we can write the test equation for the effect of output composition as:

$$\Delta \ln P = \pi_1 s_1 \Delta \ln Y_1 + \pi_2 s_2 \Delta \ln Y_2 + \pi_3 s_3 \Delta \ln Y_3 + \varepsilon_Y \tag{10}$$

where $s_1 = Y_1/Y$. Equation 10 can also be broken down into its components:

$$s_u^P \Delta \ln P_u = \pi^*_{u1} s_1 \Delta \ln Y_1 + \pi^*_{u2} s_2 \Delta \ln Y_2 + \pi^*_{u3} s_3 \Delta \ln Y_3 + \varepsilon^*_u \tag{11}$$

$$s_r^P \Delta \ln P_r = \pi^*_{r1} s_1 \Delta \ln Y_1 + \pi^*_{r2} s_2 \Delta \ln Y_2 + \pi^*_{r3} s_3 \Delta \ln Y_3 + \varepsilon^*_r \tag{12}$$

$$(s_r^P - s_u^P n_r/n_u)\Delta \ln n_r = \pi^*_{n1} s_1 \Delta \ln Y_1 + \pi^*_{n2} s_2 \Delta \ln Y_2 + \pi^*_{n3} s_3 \Delta \ln Y_3 + \varepsilon^*_n \tag{13}$$

The breakdown enables us to test for the differential effects of growth in various sectors on urban and rural poverty as well as the effect of rural-to-urban migration. As before, we estimate equations 10–12 and use the condition $\pi^*_{ni} = \pi_i - \pi^*_{ri} - \pi^*_{ui}$, $i = 1, 2, 3$ to infer the parameters of equation 13.

The elasticities of the poverty measures to the sector means can be readily obtained. In the regressions of the national poverty measures (equations 5 and 10) the elasticities are obtained by multiplying the regression coefficients by the relevant consumption or income shares. For the decompositions of the rate of reduction in average poverty (such as equations 7 and 8), the elasticity of poverty in sector i $(= u, r)$ to growth in sector j is obtained by multiplying the regression coefficient for j by that sector's consumption or income share relative to i's share of total poverty.

II. Data

The Consumption Distributions

For this investigation we derived a new and consistent time series of poverty measures for rural and urban India between 1951 and 1991. This time series is based on consumption distributions from thirty-three household surveys conducted by the National Sample Survey Organization (NSSO). We use distributions from the third survey round, for August to November 1951, up to the forty-seventh round, for July to December 1991.[1] This series substantially improves upon the most widely used time series on poverty measures in India to

1. The first two rounds of the National Sample Survey (NSS) covered rural areas only.

date. Past work has relied on poverty measures presented in Ahluwalia (1978), which gives estimates of the head count index, and Sen's (1976) poverty measure for rural areas, including only twelve rounds, spanning 1956–57 to 1973–74. One extra round (1977–78) was added in Ahluwalia (1985). Datt (1995) describes in detail how our new series was estimated, so we will be brief here. A set of data discs and a manual are available from the authors.

Several points should be made about the consumption distributions. Following the now well-established practice for India and elsewhere, a household's standard of living is measured by real consumption expenditure per person. The consumption measure is comprehensive, following sound and consistent survey and accounting practices. The underlying NSSO data do not include incomes—although it can be argued that current consumption is a better indicator of living standards than current income.[2] Nonetheless, this measure cannot capture various nonincome dimensions of well-being, and we say nothing here about how responsive these dimensions may be to growth (for further discussion and references see Anand and Ravallion 1993).

The average sample size of the thirty-three surveys is 10,988 urban households and 18,691 rural households. But there is considerable variation over time. The urban samples range from 514 to 58,162, while the rural samples range from 1,361 to 99,766. In both cases the smallest samples were in 1953 (although in different rounds), and the largest were in 1977–78. From 1955 onward all samples exceeded 1,000.

We use the urban-rural classification of the NSSO's tabulations.[3] Over such a long period some rural areas naturally became urban areas. To the extent that rural (nonfarm) economic growth may foster such reclassifications, it may produce a downward bias in our estimates of the (absolute) elasticities of rural poverty to rural economic growth. The impact on urban elasticities could be positive or negative, depending on the circumstances of the new urban areas relative to the old ones. We have little choice but to use the NSSO's classification, given that unit record data are unavailable and given that we do not know what the best corrective action would be if we had access to those data.

Whenever the dependent and independent variables are estimated from the same survey data, a bias may arise because measurement errors in the survey can be passed on to both variables; if the mean is overestimated, poverty will tend to be underestimated. In all of our regressions we have also tried an instru-

2. Current consumption is a better indicator than current incomes particularly in this setting. For an overview of supporting arguments see Ravallion (1994). Using village panel data from India, Chaudhuri and Ravallion (1994) find that current consumption and income are better indicators of chronic poverty than other measures tested, although the choice between consumption and income is less clear. Even so, it can be argued that current consumption is the better indicator of current level of living.

3. The NSS has followed the census definition of urban areas, which is based on a number of criteria, including a population greater than 5,000, a density not less than 400 persons per square kilometer, and three-fourths of the male workers engaged in nonagricultural pursuits (Government of India 1992).

mental variables estimator, in which the instruments excluded variables derived from the same survey as the dependent variable.

The Poverty Line and Deflators

Consistent measurement of absolute poverty requires that the poverty line be the cost of a fixed standard of living over the period of analysis and across sectors (Ravallion 1994). The poverty line we use is the line originally defined by Government of India (1979) and recently endorsed by the Planning Commission (Government of India 1993). This poverty line is based on a nutritional norm of 2,400 calories per person per day in rural areas and 2,100 calories in urban areas. The poverty lines for rural and urban sectors were defined as the level of average per capita total expenditure at which the caloric norms were typically attained in each of the two sectors, following what has been termed the "food energy method" (Ravallion 1994). The rural poverty line was thus set at a per capita monthly expenditure of 49 rupees (rounded to the nearest rupee), and the urban at 57 rupees, measured at 1973–74 prices.

The food energy method may not yield consistent poverty lines (representing a uniform threshold in terms of the living standard indicator), especially if the average levels of living vary substantially across sectors (Ravallion 1994). Better-off regions or sectors will tend to have lower average food shares and hence reach caloric requirements at higher real expenditure levels. This tendency can severely distort the poverty profile. A case study for Indonesia found that this method produced poverty lines that vary so much in terms of their basic-needs purchasing power that the method produced considerable reranking of regions and sectors (Ravallion and Bidani 1994). However, one can readily test the method for India; independent estimates of the urban-rural cost of living differential can be used in conjunction with the rural poverty line to derive the equivalent urban line. For 1973–74 Bhattacharya, Choudhury, and Joshi (1980) estimated that the cost of living for the poor was 16 percent higher in urban areas—the same amount (to the nearest integer) implied by the food energy method (although this result may stem from the higher caloric requirement used for rural areas in the Planning Commission's poverty lines).[4] It can thus be argued that, for India, the food energy method has not vitiated the urban-rural poverty comparison.

After August 1968 the all-India consumer price index for industrial workers (CPIIW) is used as the deflator for the urban sector. A detailed discussion of the deflators used for comparisons over time can be found in Datt (1995). We will limit ourselves to only a brief description here. For the earlier period the Labour Bureau's consumer price index for the working class is used, which is an earlier incarnation of the CPIIW, albeit with less coverage of urban centers (twenty-seven compared with fifty). The rural cost of living index series was constructed in three parts. For the period since September 1964 the rural cost of living index

4. This is the Fisher index, which gave a differential of 15.9 percent. The Laspeyres index gave 16.5 percent, while the Paasche index gave 15.2 percent.

is the all-India Consumer Price Index for Agricultural Laborers (CPIAL) published by the Labour Bureau. For September 1956 to August 1964 (for which an all-India CPIAL does not exist), a monthly series of the all-India CPIAL was constructed as a weighted average of the state-level CPIALs, using the same state-level weights as those used in the all-India CPIAL published since September 1964. For August 1951 to August 1956 forecasts were obtained from a dynamic model of the CPIAL as a function of the CPIIW and the wholesale price index (for details see Datt 1995).

Our CPIAL series also overcame the problem that arose because the Labour Bureau had used the same price for firewood in its published series since 1960–61. Firewood is typically a common property resource for agricultural laborers, but it is also a market good, and thus the Labour Bureau's practice is questionable. This practice is even more questionable because the NSS values nonpurchased firewood consumption at local market prices (see Minhas and others 1987 for further discussion). Our CPIAL series replaces the firewood subseries in the CPIAL with one based on mean rural firewood prices (only available from 1970) and a series derived by assuming that firewood prices increased at the same rate as all other items in the Fuel and Light category (prior to 1970).

The final CPIIW and CPIAL indexes are averages of monthly indexes corresponding to the survey period of each of the NSS's rounds. We differ in this respect from Ahluwalia (1978), who uses averages of the CPIAL over the agricultural year (July to June), even for NSS rounds in which the survey period was different. Given the seasonality of prices, matching the survey period is arguably a better procedure.

The National Accounts and Population Data

Our data on sectoral incomes are taken from various issues of the National Accounts Statistics (NAS) published by the Central Statistical Organization (CSO). In particular, we draw upon the NAS to create an annual series of the net domestic product (NDP) at factor cost at constant 1980–81 prices, and its sectoral components, that is, NDP in the primary, secondary, and tertiary sectors. The constant price conversions implicit in these series are based on the national accounts deflators. The primary sector includes agriculture, forestry, fishing, mining, and quarrying; the secondary sector includes manufacturing, construction, and electricity, gas, and water supply; the tertiary sector includes trade, hotels, restaurants, transport, storage, communication, finance, insurance, real estate, business services, and community, social, and personal services. We also draw upon the NAS to construct a series on private final consumption expenditure at constant prices as an alternative to the NSS-based series.

The NAS reports these series annually for the financial year April to March. To mesh these data with the poverty data from the NSSO, we linearly interpolated the annual national accounts data to the midpoint of the survey period for different rounds. But the first ten NSS rounds covered periods shorter than one year (from four to nine months), and thus the mapping into annual national

accounts data was far more problematic. We thus deleted the first ten surveys in any regressions using national accounts data.

The population estimates are based on the census population totals and assume a constant growth rate between censuses. They are also centered at the midpoints of NSS survey periods.

Poverty Measures

We use three poverty measures:

- The headcount index, given by the percentage of the population that lives in households with a per capita consumption below the poverty line.
- The poverty gap index, defined by the mean distance below the poverty line, expressed as a proportion of that line. The mean is formed over the entire population, counting the nonpoor as having a zero poverty gap.
- The squared poverty gap index introduced by Foster, Greer, and Thorbecke (1984), defined as the mean of the squared proportionate poverty gaps. Unlike the poverty gap index this measure is sensitive to distribution among the poor. A transfer of income from a poor person to a poorer person, for example, will not alter either the headcount index or the poverty gap index, but it will decrease the squared poverty gap index. Furthermore—and unlike the Sen (1976) distribution sensitive measure of poverty—the squared poverty gap index satisfies the "subgroup consistency" property; that is, if poverty increases in any subgroup (say the urban sector), and it does not decrease elsewhere, then aggregate poverty must also increase (Foster and Shorrocks 1991).

All three measures are members of the Foster-Greer-Thorbecke (FGT) class, for which the individual poverty measure is

$$p_{\alpha,i} = (1 - x_i/z)^{\alpha} \text{ if } x_i \leq z \qquad (14)$$
$$= 0 \text{ if } x_i > z$$

where x_i is consumption expenditure of the ith person in a population of size n, z is the poverty line, and α is a nonnegative parameter. Average poverty is simply

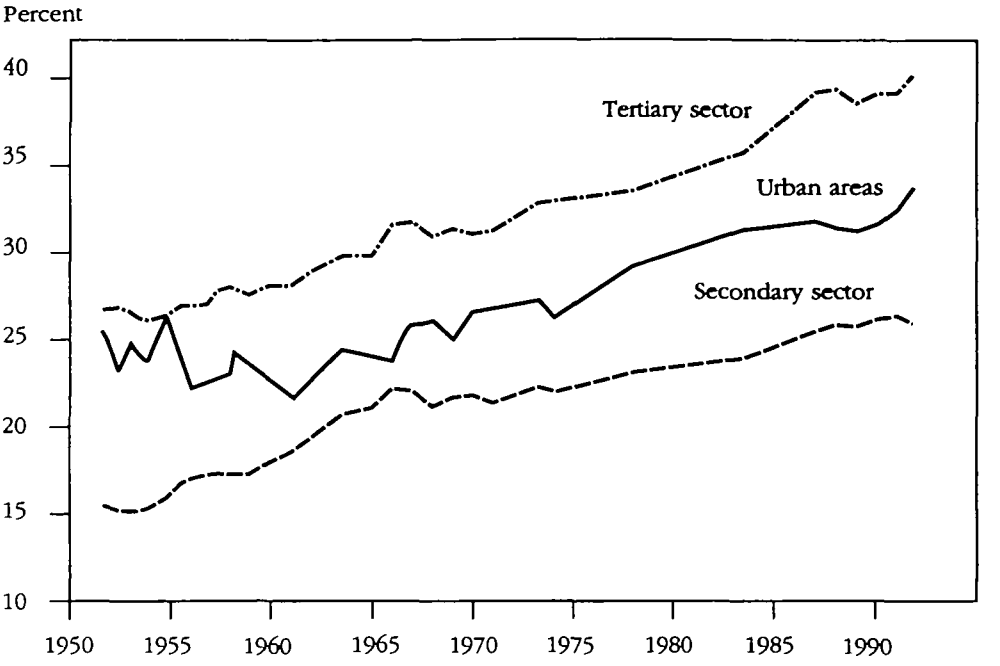
$$P_{\alpha} = \sum_{i=1}^{n} p_{\alpha,i}/n. \qquad (15)$$

The headcount index is obtained when $\alpha = 0$, the poverty gap index when $\alpha = 1$, and the squared poverty gap index when $\alpha = 2$. The poverty measures are estimated from the grouped data on consumption distributions using parameterized Lorenz curves (see Datt and Ravallion 1992).

III. RESULTS

The urban sector's share of consumption has risen steadily since about 1960 (figure 1). Both the secondary and tertiary sectors' shares of national income

Figure 1. *Sectoral Composition of Economic Activity in India, 1951–91*



Note: The urban share is of total national consumption as estimated from National Sample Surveys. The secondary and tertiary shares are of net domestic product as estimated from the National Accounts Statistics.

Source. Authors' calculations from National Sample Surveys and National Accounts Statistics.

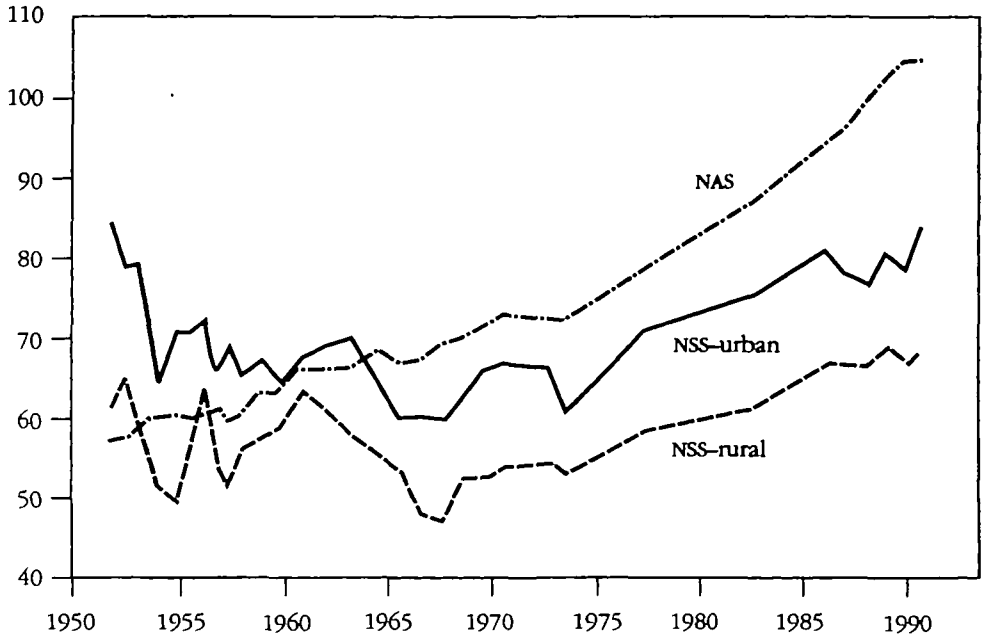
have been on a trend increase over the whole period (the balance is the primary sector).

There have been sizable fluctuations in the NSSO-based means of consumption, although some patterns are evident (figure 2). There was a contraction in the early 1950s, followed by a long period of stagnation, and a reasonably sustained period of growth since the mid-1970s. Throughout the entire period there is strong comovement between the urban and rural means (the simple correlation coefficient is 0.84; the correlation coefficient of the first differences between survey rounds is 0.49). Thus the historical gap in average living standards between the sectors was maintained: there is no significant time trend in the ratio of the rural to the urban mean.[5] The consumption mean derived from the national accounts shows a reasonably strong trend increase over the whole period, and has been higher than even the urban NSSO-based mean since the mid-1960s. The discrepancy between the national accounts consumption numbers and those from the NSSO has been noted before, and we will not discuss the issue here. For

5. If the log of the ratio of the means is regressed on time and one corrects for the serial correlation in the errors, the implied rate of growth in the ratio of the urban mean to the rural mean is −1.4 percent per year, but the *t*-ratio is only 1.2.

Figure 2. *Average Consumption in India, 1951–91*

Mean consumption (rupees per month per person; 1973–74 prices)



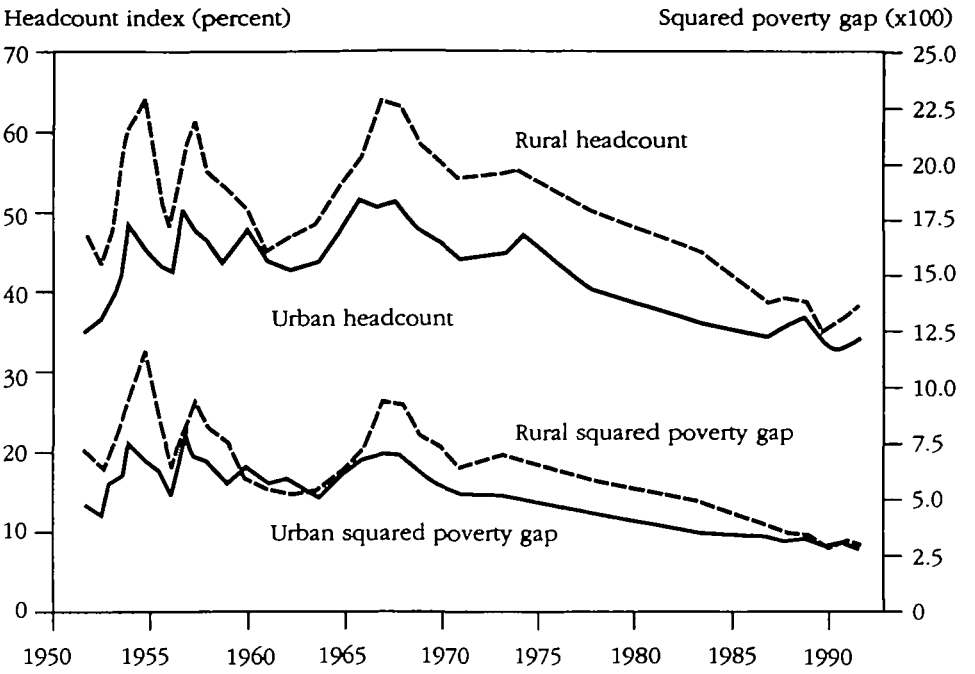
Source: Authors' calculations from National Sample Surveys (NSS) and National Accounts Statistics (NAS).

further discussion see Vaidyanathan (1986), Suryanarayana and Iyengar (1986), Minhas (1988), and Bhattacharya and others (1991).

The bulk of the consumption growth since about 1970 is attributable to growth within sectors; the Kuznets process of rural to urban migration, at given sector means, accounts for very little. Averaging the three survey rounds in 1969–71 and the three rounds in 1989–91, we find that only 6.4 percent of the increase in log consumption from 1970 to 1990 is attributable to population shifts (the third term in equation 4), while 20.0 and 73.5 percent are attributable to growth within the urban and rural sectors, respectively (given the initial urban population share).

Neither the headcount index nor the squared poverty gap index for either urban or rural sectors shows a trend increase or decrease until about 1975, when a trend decrease emerged (figure 3). The pattern of change over time is very similar for the poverty gap index (see Datt 1995 for details). This pattern also holds for urban poverty although the fluctuations seem less pronounced. Comovement is strong: the simple correlation coefficient between the contemporaneous sector values of the log headcount index is 0.92 (0.68 between the first differences). There are also signs of convergence between urban and rural areas by the end of the period, with the urban squared poverty gap overtaking the rural index. However, the rural sector still accounts for 74 percent of the

Figure 3. *Poverty Measures for India, 1951–91*



Source: Authors' calculations.

total number of poor at the end of the period, 70 percent of the average poverty gap index, and 68 percent of the average squared poverty gap index.

As with growth in mean consumption, the bulk of the poverty reduction after 1970 is attributable to gains within sectors rather than the population shift effect. For example, the impact of population shifts accounts for only 3.2 percent of the difference in the log headcount index between 1970 and 1990, while the urban and rural sectors account for 12.3 percent and 84.5 percent, respectively (the results are similar for the squared poverty gap).

The Growth Elasticities of National Poverty Measures

The elasticities of all three poverty measures with respect to the three measures of economic growth—the mean consumption per person as estimated by the NSSO, the mean consumption per person as estimated by the national accounts and population census, and the mean NDP ("income" for short) per person also taken from the national accounts and census—are estimated by regressing the first difference of the log poverty measure against the first difference of log mean consumption or income (table 1). We also give an "adjusted" estimate in which another variable was added, namely the first difference of the log of the ratio of the consumer price index for agricultural laborers to the national in-

Table 1. *Elasticities of National Poverty Measures to Economic Growth in India*

	Elasticity with respect to				
	Mean consumption from national sample surveys	*Mean private consumption from national accounts*		*Mean net domestic product*	
Poverty measure		*Unadjusted*	*Adjusted*[a]	*Unadjusted*	*Adjusted*[a]
Headcount index ($\alpha = 0$)	−1.33	−1.21	−0.90	−0.99	−0.75
	(15.19)	(4.04)	(4.23)	(3.38)	(3.68)
Poverty gap index ($\alpha = 1$)	−1.88	−1.79	−1.36	−1.49	−1.15
	(12.83)	(4.02)	(3.98)	(3.44)	(3.59)
Squared poverty gap index ($\alpha = 2$)	−2.26	−2.18	−1.67	−1.85	−1.45
	(10.22)	(3.73)	(3.45)	(3.32)	(3.27)

Note: Absolute *t*-ratios in parentheses. Based on regressions of first differences of the log poverty measures against first differences of the log consumption or net product per person, using thirty-three surveys spanning 1951–91 for estimating the elasticity with respect to the surveys-based mean consumption and twenty-three surveys spanning 1958–91 for estimating elasticities to consumption or income from the national accounts. All regressions comfortably passed residual diagnostic tests for serial correlation, functional form, normality, and heteroskedasticity (see appendix for details).

a. The adjusted estimates include an additional regressor, that is the difference in the rates of inflation implied by the consumer price index and the national income deflator.

Source: Authors' calculations.

come deflator (that is, the difference in the rate of inflation implied by the two deflators). This variable was included to allow for possible bias in estimating the growth elasticity, which may arise because of the difference in the deflator used for the national accounts data and that used for the poverty lines.

The national poverty measures responded to all three measures of economic growth. The elasticities are higher if the NSSO estimate of mean consumption is used rather than the national accounts estimate, although the difference is not large for a given value of α. The elasticities are lowest for per capita NDP. This result may be due to intertemporal consumption smoothing, which may make poverty (in terms of consumption) less responsive to income growth than to consumption growth in the short term.

The Impact of the Urban-Rural Composition of Growth on Poverty

All of the regressions of equations 5, 7, and 8 fitted well and passed almost all standard tests on the residuals (table 2). However, a correction for serial correlation in the residuals was needed in some of the urban poverty equations. The appendix tables give results for the complete regressions and various statistical tests.

Table 2. *Impacts of the Urban-Rural Composition of Growth on Poverty in India*

Poverty measure	*National poverty*	*Urban poverty*	*Rural poverty*
Urban growth			
Headcount	−0.549	−0.560	−0.169
	(1.367)	(5.687)	(0.542)
	[−0.142]	[−0.824]	[−0.053]
Poverty gap	−0.288	−0.623	0.278
	(0.449)	(4.821)	(0.436)
	[−0.075]	[−0.915]	[0.087]
Squared poverty gap	0.234	−0.559	0.777
	(0.244)	(3.302)	(0.805)
	[0.061]	[−0.829]	[0.243]
Rural growth			
Headcount	−1.461	−0.076	−1.141
	(12.636)	(2.951)	(12.691)
	[−1.083]	[−0.320]	[−1.027]
Poverty gap	−2.123	−0.129	−1.979
	(11.502)	(3.977)	(10.800)
	[−1.574]	[−0.543]	[−1.781]
Squared poverty gap	−2.651	−0.174	−2.446
	(9.585)	(4.113)	(8.811)
	[−1.965]	[−0.739]	[−2.197]

Note: Absolute *t*-ratios in parentheses; elasticities at mean points in brackets (see appendix tables for detailed results). At the mean points, the urban share of national consumption was 0.259, and the primary-secondary-tertiary breakdown was 0.487, 0.202, 0.312. The urban share of total poverty was 0.176 for both the headcount index and the poverty gap index and 0.175 for the squared poverty gap.

Source: Authors' calculations.

There is strong evidence that the urban-rural composition of growth matters to India's rate of progress in reducing all three national poverty measures. The urban growth effect is not significantly different from zero in explaining the rate of poverty reduction nationally. But the rural growth term is highly significant. A Wald test of the null hypothesis that urban consumption growth has the same effect on national poverty as rural growth can be rejected in all cases (appendix tables A-1, A-2, and A-3). A stronger version of the test requiring uniform effects of urban and rural growth as well as sectoral population shifts was also rejected for the poverty gap and the squared poverty gap indexes, though we were unable to reject it for the headcount index (see the appendix tables for details). We found that the urban-rural population shift had no significant effects on poverty. Thus it appears that the strong growth effects evident in table 1 are largely attributable to rural consumption growth, with very little contribution from either urban growth or the Kuznets process.

Turning to the urban-rural decomposition of poverty reduction, we find that urban growth reduced urban poverty (table 2), but so did rural growth, which had a significant impact on poverty in both sectors for all three poverty measures. Indeed for the squared poverty gap the elasticity of urban poverty to rural growth is almost as high as it is to urban growth. The effect of urban growth is too small to be detected in the national average poverty measures.

The relatively low impact of urban growth on urban poverty and the propoor spillover effect of rural growth suggest significant distributional effects within urban areas. This proposition is confirmed by regressing the change between surveys in the (log) Gini index for urban areas on the growth rates in both urban and rural means:[6]

$$(16)\qquad \Delta \ln Gini(urban) = \underset{(5.85)}{0.73}\Delta \ln mean(urban) - \underset{(4.15)}{0.41}\Delta \ln mean(rural).$$

Urban consumption growth has been increasing inequality in urban areas, while rural growth has improved urban distribution. By contrast, performing the same regression for the rural Gini, the changes in either mean are not significant, either individually or jointly.

The Impact of the Output Composition of Growth on Poverty

In explaining the rate of progress in reducing poverty nationally, we find a marked difference between the primary and tertiary sectors on the one hand and the secondary sector on the other (table 3). Growth in both the primary and tertiary sectors was poverty reducing, the tertiary sector generating a larger impact, though the difference between these two sectors is not significant. By contrast, growth in the secondary sector had an adverse impact, though not significantly different from zero at the 5 percent level for any poverty measure.

6. Absolute t-ratios are given in parentheses. The R^2 is 0.65. A correction was made for serial correlation in the errors.

Table 3. *Impacts of the Output Composition of Growth on Poverty in India*

Sector and poverty measure	*National poverty*	*Urban poverty*	*Rural poverty*
Primary sector growth			
Headcount	−1.157	−0.316	−0.858
	(2.964)	(2.755)	(2.625)
	[−0.563]	[−0.872]	[−0.507]
Poverty gap	−1.586	−0.432	−1.313
	(2.615)	(2.983)	(2.341)
	[−0.772]	[−1.194]	[−0.776]
Squared poverty gap	−1.905	−0.471	−1.660
	(2.192)	(2.719)	(2.040)
	[−0.927]	[−1.313]	[−0.979]
Secondary sector growth			
Headcount	3.409	0.609	2.531
	(1.837)	(1.176)	(1.629)
	[0.688]	[0.697]	[0.620]
Poverty gap	5.816	1.254	5.162
	(2.016)	(1.917)	(1.936)
	[1.174]	[1.437]	[1.265]
Squared poverty gap	7.026	1.532	6.338
	(1.700)	(1.960)	(1.637)
	[1.418]	[1.771]	[1.550]
Tertiary sector growth			
Headcount	−3.418	−0.702	−2.373
	(2.737)	(2.009)	(2.270)
	[−1.065]	[−1.240]	[−0.898]
Poverty gap	−5.869	−1.216	−5.124
	(3.024)	(2.755)	(2.856)
	[−1.185]	[−2.151]	[−1.938]
Squared poverty gap	−7.274	−1.458	−6.449
	(2.616)	(2.763)	(2.476)
	[−1.468]	[−2.601]	[−2.434]

Note: Absolute *t*-ratios are in parentheses; elasticities at mean points in brackets. These regressions were augmented for differences in the rate of inflation implied by the consumer price indexes (CPIs) and national income deflators (see appendix tables for details).

Source: Authors' calculations.

When we turn to the tests for output compositional effects on the rates of poverty reduction in the urban and rural sectors we find that primary and tertiary sector growth was poverty reducing in both urban and rural sectors (table 3). The highest elasticities were for tertiary growth, although tertiary growth started from a smaller base. By contrast, secondary sector growth had no significant impact on the rate of poverty reduction in either urban or rural areas.

One striking feature of the results in table 3 is that, for a given poverty measure, the coefficients on secondary and tertiary growth components are nearly equal in absolute value, although they have opposite signs. In fact, the null $\pi_3 = -\pi_2$ cannot be rejected at the 1 percent level for any poverty measure, and this result also holds for the urban-rural components of the change in poverty (ap-

pendix table A-4). In terms of equation 10, this result is telling us that the relationship can be simplified to

$$\Delta \ln P = \pi_1 s_1 \Delta \ln Y_1 + \frac{\pi_3 \Delta(Y_3 - Y_2)}{Y} + \varepsilon_Y \tag{17}$$

and our regressions indicate that π_1 and π_3 are negative. Thus it is not tertiary sector growth per se that is reducing poverty, but increases in the difference between tertiary sector output and the output of the (smaller) secondary sector.

At first sight this result seems odd, but it has a plausible interpretation. In India (as in other developing countries) the tertiary sector includes a hybrid of activities that are of varying importance to the poor. It combines, for example, formal sector finance and insurance firms with informal trade and transport activities. Let $Y_3 \equiv Y_{3f} + Y_{3i}$, where the subscripts $3f$ and $3i$ refer to the formal and informal tertiary sectors, respectively. Suppose that the true relationship between the rate of progress in reducing poverty and the composition of growth is

$$\Delta \ln P = \pi_1 s_1 \Delta \ln Y_1 + \pi_3 s_{3i} \Delta \ln Y_{3i} + \varepsilon_Y. \tag{18}$$

This equation assumes that (in addition to the primary sector) it is the informal tertiary sector that matters to the poor, and not the secondary sector or the formal tertiary sector. However, the formal tertiary sector is likely dependent on the secondary sector: secondary sector growth generates demand for outputs from the formal tertiary sector. Suppose, in particular, that average incomes in the secondary sector move so closely to those in the formal tertiary sector that the unobserved variable ΔY_{3f} is approximated well by ΔY_2. Under these assumptions, equation 18 implies that equation 17 is an estimable model. According to this interpretation, the secondary sector is acting as a proxy for the formal tertiary sector, when in fact it is growth in the informal tertiary sector that matters to the poor.

Does the Poverty Measure Matter?

Tables 1–3 show that our qualitative results are robust to the choice of poverty measure. However, the growth elasticities tend to be higher (in absolute value) for higher values of α. To help interpret this result, note that the poverty gap indexes can be written in a nested form:

$$\begin{aligned} P_1 &= P_0(1 - \mu^p/z) \\ P_2 &= P_1\left[1 + \mu^p/z + \frac{(\sigma^p/z)^2}{1 - \mu^p/z}\right] \end{aligned} \tag{19}$$

where μ^p and σ^p are the mean and standard deviation of consumption by the poor, respectively. As can be seen from equation 19, the higher growth elasticity of P_1 compared with P_0 implies that the depth of poverty (as measured by $1 - \mu^p/z$) is also reduced by growth. Similarly, the higher elasticity of P_2 relative to P_1 implies that inequality among the poor—as measured by the coefficient of

variation—is reduced by growth.[7] Thus the effects of growth within and between sectors are not confined to households within a neighborhood of the poverty line.

IV. Conclusions

Despite the substantial sectoral shifts that have occurred over the last forty years, poverty in India is still overwhelmingly rural. At the beginning of the 1990s, 74 percent of the country's poor lived in rural areas. That fact alone does not imply that urban economic growth is unimportant. The nature of intrasectoral and intersectoral effects of growth and of rural-to-urban migration on poverty may mean that rural economic growth is far less important than the sheer size of the rural sector would suggest.

In fact, the main conclusion of this article holds that, if anything, the opposite is true: the relative effects of growth within and between each sector reinforced the importance of rural economic growth to national poverty reduction in India. Both the urban and rural poor gained from rural sector growth. By contrast, urban growth had adverse distributional effects within urban areas, which militated against the gains to the urban poor. And urban growth had no discernible impact on rural poverty. Nor did the (much researched) Kuznets process of growth through rural-to-urban migration significantly reduce poverty in India.

When we decompose growth in national income by sectors defined by output, we again find marked differences in the impact on poverty. Both primary and tertiary sector growth reduced poverty nationally and within urban and rural areas. By contrast, secondary sector growth had no discernible positive effect on the poor in either urban or rural areas. In the historical shift from the primary sector to the secondary and tertiary sectors it seems that it was the tertiary sector that delivered significant gains to India's poor.

Our investigation points clearly to the quantitative importance of the sectoral composition of economic growth to poverty reduction in India. Despite the rising urbanization of Indian poverty, it is likely to remain true for many years to come that—from the point of view of India's poor—it is the dog (the rural economy) that wags the tail (the urban sector), not the other way around. Fostering the conditions for growth in the rural economy—in both primary and tertiary sectors—must thus be considered central to an effective strategy for poverty reduction in India. But there is another more subtle implication for the future. We have studied the historical experience in a period in which India's development strategy (starting from the Second Plan in the 1950s) emphasized capital-intensive industrialization concentrated in the urban areas of a largely closed economy. It may not be surprising that urban economic growth fueled by such industrialization brought negligible gains to the poor. This result underlines the importance of making a successful transition to an alternative industrialization process; even then (we suspect), the tail will not wag the dog. But it could surely do a lot more to help it move.

7. Note that a higher growth elasticity for P_1 compared with P_0 implies that μ^p must be increasing in μ, and thus a higher elasticity for P_2 relative to P_1 must imply that σ^p is decreasing in μ.

Table A-1. *Change in Headcount Index as a Function of Urban and Rural Consumption Growth in India*

	Change in national poverty		*Components of change in national poverty*			
			Urban		*Rural*	
Variable or statistic	*OLS*	*IV*	*AR(1)*	*IV*	*OLS*	*IV*
Urban growth (π_1)	−0.549	−0.445	−0.560	−0.489	−0.169	−0.185
	(1.37)	(0.937)	(5.69)	(4.29)	(0.54)	(0.50)
Rural growth (π_2)	−1.461	−1.498	−0.076	−0.087	−1.141	−1.154
	(12.64)	(11.00)	(2.95)	(2.67)	(12.69)	(10.91)
Population shift (π_3)	−4.458	−4.718	−0.775	−0.908	−1.624	−1.534
	(1.31)	(1.35)	(1.25)	(1.08)	(0.61)	(0.56)
R^2	0.895	0.894	0.761	0.732	0.886	0.886
Standard error of estimate	0.0295	0.0295	0.0068	0.0071	0.0229	0.0229
Autocorrelation (1)	2.555	2.494	n.a.	3.161	1.812	2.026
Functional form (1)	0.006	0.005	n.a.	0.191	0.071	0.062
Normality (2)	0.059	0.056	n.a.	0.613	0.552	0.412
Heteroskedasticity (1)	0.132	0.157	n.a.	0.224	0.634	0.544
Sargan's IV test (11)	n.a.	4.765	n.a.	4.903	n.a.	5.926
Wald test (2): $\pi_1=\pi_2=\pi_3$	4.10	3.881	n.a.	n.a.	n.a.	n.a.
Wald test (1): $\pi_1=\pi_2$	3.879	3.656	n.a.	n.a.	n.a.	n.a.

n.a. Not applicable.

Note: The table shows ordinary least squares (OLS) and instrumental variables (IV) parameter estimates for equations 5, 7, and 8. Absolute *t*-ratios are given in parentheses. The data are from thirty-three household surveys spanning from 1951 to 1991 (see text for details). The equations for urban poverty correct for first-order autocorrelation, AR(1). The following set of instruments were used in the IV estimation: date (midpoint) of the survey; time interval between the surveys; lagged rural and urban log real mean consumption; current rural and urban price indices (in logs) and their lagged values; change in log real per capita output from the primary, secondary, and tertiary sectors; and log real per capita consumption from the national accounts and its lagged value. The bottom part of the table reports a number of diagnostic tests; the test statistics are distributed as χ^2 with the degrees of freedom as noted in parentheses. The last two rows report Wald tests on the null of no compositional effects of growth on poverty. The stronger version tests the restriction that the effects on poverty of urban growth, rural growth, and sectoral population shift are the same; the weaker version tests for uniform effects of urban and rural growth only.

Source: Authors' calculations.

Table A-2. *Change in the Poverty Gap Index as a Function of Urban and Rural Consumption Growth in India*

	Change in national poverty		*Components of change in national poverty*			
			Urban		*Rural*	
Variable or statistic	*OLS*	*IV*	*AR(1)*	*IV/AR(1)*	*OLS*	*IV*
Urban growth (π_1)	–0.288	–0.116	–0.623	–0.534	0.278	0.399
	(0.45)	(0.153)	(4.82)	(2.90)	(0.44)	(0.53)
Rural growth (π_2)	–2.123	–2.157	–0.129	–0.152	–1.979	–2.029
	(11.50)	(9.92)	(3.98)	(3.52)	(10.80)	(9.40)
Population shift (π_3)	–9.284	–9.555	–1.327	–1.463	–7.595	–7.524
	(1.71)	(1.71)	(1.82)	(1.69)	(1.41)	(1.35)
R^2	0.868	0.868	0.777	0.769	0.841	0.841
Standard error of estimate	0.0471	0.0471	0.0092	0.0095	0.0467	0.0468
Autocorrelation (1)	1.314	1.194	n.a.	n.a.	1.300	1.350
Functional form (1)	0.648	0.635	n.a.	n.a.	1.708	1.730
Normality (2)	0.088	0.105	n.a.	n.a.	0.463	0.528
Heteroskedasticity (1)	0.324	0.391	n.a.	n.a.	0.006	0.020
Sargan's IV test (11)	n.a.	9.968	n.a.	5.551	n.a.	11.398
Wald test (2): $\pi_1=\pi_2=\pi_3$	6.813	6.021	n.a.	n.a.	n.a.	n.a.
Wald test (1): $\pi_1=\pi_2$	6.165	5.399	n.a.	n.a.	n.a.	n.a.

n.a. Not applicable.
Note: See note to table A-1.
Source: Authors' calculations.

Table A-3. *Change in the Squared Poverty Gap Index as a Function of Urban and Rural Consumption Growth in India*

	Change in national poverty		*Components of change in national poverty*			
			Urban		*Rural*	
Variable or statistic	*OLS*	*IV*	*AR(1)*	*IV/AR(1)*	*OLS*	*IV*
Urban growth (π_1)	0.234	0.258	–0.559	–0.558	0.777	0.786
	(0.24)	(0.23)	(3.30)	(2.29)	(0.44)	(0.69)
Rural growth (π_2)	–2.651	–2.649	–0.174	–0.185	–2.446	–2.476
	(9.59)	(8.14)	(4.11)	(3.23)	(8.81)	(7.58)
Population shift (π_3)	–13.578	–13.301	–1.924	–1.783	–11.733	–11.044
	(1.67)	(1.59)	(2.06)	(1.56)	(1.44)	(1.31)
R^2	0.811	0.811	0.748	0.738	0.771	0.771
Standard error of estimate	0.0705	0.0705	0.0122	0.0126	0.0708	0.0708
Autocorrelation (1)	0.681	0.622	n.a.	n.a.	0.561	0.585
Functional form (1)	0.399	0.431	n.a.	n.a.	1.265	1.366
Normality (2)	0.250	0.256	n.a.	n.a.	0.275	0.292
Heteroskedasticity (1)	1.395	1.447	n.a.	n.a.	0.182	0.121
Sargan's IV test (11)	n.a.	10.105	n.a.	5.928	n.a.	11.024
Wald test (2): $\pi_1=\pi_2=\pi_3$	7.434	5.474	n.a.	n.a.	n.a.	n.a.
Wald test (1): $\pi_1=\pi_2$	6.790	4.889	n.a.	n.a.	n.a.	n.a.

n.a. Not applicable.
Note: See note to table A-1.
Source: Authors' calculations.

Table A-4. *Change in Poverty as a Function of the Primary-Secondary-Tertiary Composition of Growth in India*

	Headcount index			*Poverty gap index*			*Squared poverty gap index*		
		Components of change in national poverty			*Components of change in national poverty*			*Components of change in national poverty*	
Variable or statistic	*Change in national poverty*	*Urban*	*Rural*	*Change in national poverty*	*Urban*	*Rural*	*Change in national poverty*	*Urban*	*Rural*
Primary sector growth (π_1)	−1.158	−0.316	−0.858	−1.586	−0.432	−1.313	−1.905	−0.471	−1.660
	(2.96)	(2.76)	(2.62)	(2.62)	(2.98)	(2.34)	(2.19)	(2.72)	(2.04)
Secondary sector growth (π_2)	3.409	0.609	2.531	5.816	1.254	5.162	7.026	1.532	6.338
	(1.84)	(1.18)	(1.63)	(2.02)	(1.92)	(1.94)	(1.70)	(1.96)	(1.64)
Tertiary sector growth (π_3)	−3.418	−0.702	−2.373	−5.869	−1.216	−5.124	−7.274	−1.458	−6.449
	(2.74)	(2.01)	(2.27)	(3.02)	(2.75)	(2.86)	(2.62)	(2.76)	(2.48)
Change in rural price index relative to NDP deflator	0.939		0.726	1.284		1.173	1.512		1.409
	(5.63)		(5.20)	(4.96)		(4.90)	(4.07)		(4.05)
Change in urban price index relative to NDP deflator		0.254			0.350			0.467	
		(2.71)			(2.95)			(3.30)	
R^2	0.752	0.491	0.701	0.714	0.490	0.699	0.631	0.469	0.618
Standard error of estimate	0.0378	0.0095	0.0316	0.0587	0.0120	0.0543	0.0841	0.0144	0.0788
Autocorrelation (1)	0.143	0.002	0.158	0.147	1.024	0.001	0.273	4.084	0.101
Functional form (1)	2.813	0.191	2.762	5.036	0.086	3.513	5.953	0.109	3.975
Normality (2)	1.300	0.940	0.527	1.677	0.123	0.924	1.547	0.516	0.059
Heteroskedasticity (1)	0.060	1.693	0.145	0.226	0.075	0.820	0.297	0.018	0.669
Wald test (2): $\pi_1 = \pi_2 = \pi_3$	5.109	n.a.	n.a.	6.065	n.a.	n.a.	4.468	n.a.	n.a.
Wald test (2): $\pi_1 = \pi_3$, $\pi_2 = 0$	3.731	n.a.	n.a.	5.925	n.a.	n.a.	4.057	n.a.	n.a.
Wald test (1): $\pi_2 + \pi_3 = 0$	0.000	0.199	0.054	0.002	0.020	0.001	0.019	0.055	0.004

n.a. Not applicable.

Note: The table gives least squares parameter estimates for equations 10–12, n = 23. The associated absolute *t*-ratios are given in parentheses. The bottom part of the table reports a number of diagnostic tests. The test statistics are distributed as χ^2 with the degrees of freedom as noted in parentheses. The last two rows report Wald tests on the nulls of (a) no sectoral composition effects of growth on poverty (testing for uniform effects of primary, secondary, and tertiary sector growth); (b) the effects of primary and tertiary sector growth are the same, but secondary sector growth has a zero effect; and (c) the effects of secondary and tertiary sector growth are equal but of opposite signs.

Source: Authors' calculations.

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