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Poverty, Pro-Poor Growth and Mobility

A Decomposition Framework with Application to China

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Abstract

This paper proposes a framework for incorporating longitudinal distributional changes into poverty decomposition. It is shown that changes in the Sen-Shorrocks-Thon index over time can be decomposed into two components—one component reflects the progressivity of income growth among the original poor, the other measures the extent of downward mobility experienced by the incumbent poor. The decomposition is applied to appraising poverty trends in China between 1988 and 1996. The results indicate that the proposed decomposition can complement the widely-used growth-distribution decomposition in providing insights into poverty dynamics.

Keywords: poverty decomposition, Sen index, longitudinal data, China
JEL classification: O10, O53, D31

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1 Introduction

In reviewing the current status of poverty research, Thorbecke (2004) noted that most unresolved issues in poverty analysis are related to the dynamics of poverty. One approach to understanding poverty dynamics is to decompose the changes of poverty over time, captured by changes in a certain poverty measure, into their two proximate contributing factors—growth of the average income and shifts in the distribution of income (Datt and Ravallion 1992).[1] While a change in the poverty measure represents the total gains (or losses) to the poor, the distributional component of the decomposition can be interpreted as an indication of whether and to what extent aggregate income growth has been 'pro-poor'. If the distributional component is negative (i.e., poverty-reducing), the poor are said to have benefited more than proportionately from income growth and, as a result, increased their share of total income.

A drawback of the Datt-Ravallion decomposition and other schemes of poverty decomposition in the same vein is that only cross-sectional changes in the income distribution are considered. The heterogeneity among households implies that not only are their incomes affected by individual shocks, but even common shocks to income may have diverse impacts. Therefore, the relative position of a household in the income distribution rarely stays the same over time. This means the composition of the poor households is also constantly changing. In any period of time, there will be non-poor households falling into poverty and poor households climbing out of poverty. Even when households are persistently poor, their positions relative to the other poor may move up and down. The growth-distribution decomposition, essentially comparing the cross-sectional features of two income distributions, is innately unable to convey such longitudinal dynamics.

Purely cross-sectional data are, of course, uninformative of longitudinal dynamics of poverty. When panel data are available, however, distinguishing the effects on poverty of the income growth of the poor from those of the changes in the composition of the poor is of practical interest for at least two reasons. First, cross-sectional and longitudinal dynamics do not necessarily coincide in timing or intensity. As found in studies on income mobility, substantial movements up and down the income ladder can occur alongside little change in the cross-sectional distribution of income (Jenkins 2000). Taking a longitudinal perspective can thus help interpret and assess observed poverty trends. Second, various provisions and services of the social security system differ in their effectiveness in facilitating the escape from poverty and in protecting the vulnerable group from falling into poverty. When resources are limited, prioritization is necessary. This in turn requires tracking income changes of individual households

[1] The Datt-Ravallion decomposition is not exact in that it contains an interaction term of income growth and distributional shifts. The Shapley value decomposition proposed in Shorrocks (1999) overcomes the problem.

through time and identifying whether the progressivity of income growth or insurance against downward mobility is of more pressing concern.

The longitudinal dimension of poverty dynamics have been analysed in different ways. For instance, Bane and Ellwood (1986) study the duration of poverty spells, Stevens (1994) examines the rates of exit from and entry into poverty, and Jalan and Ravallion (1998) differentiate between transitory and chronic poverty. In this paper we take the approach of decomposing poverty trends as summarised by an appropriate poverty index. Despite the growing recognition of poverty as multi-dimensional, the use of a single poverty index is still of wide practical appeal. It provides a succinct way of evaluating progress and communicating it to the general public. The poverty index to be used is the Sen-Shorrocks-Thon (SST) index. The SST index measures the intensity of poverty. Unlike the more commonly used headcount ratio and poverty gap index, the SST index satisfies the monotonicity and transfer axioms, and has a geometrical representation analogous to the Lorenz curve (Shorrocks 1995). Moreover, as demonstrated by Osberg and Xu (2000), percentage changes in the SST index can be decomposed into those in three poverty measures that are intuitively interpretable.

In the next section, the SST is decomposed using the intertemporal joint distribution of income. We show that absolute changes in the SST index is the sum of two components—a measure of pro-poor growth and an indicator of downward mobility reflecting changes in the composition of the poor group. Jenkins and Van Kerm (2003) have examined inequality trends along a similar line. In Section 3, the derived decomposition scheme is applied to appraising recent poverty developments in China, a country that was exceptionally successful, yet has since the 1990s experienced significant slowdown, in poverty reduction. Our analysis focuses on the period between 1988 and 1996, making use of the longitudinal income data from the China Nutrition and Health Survey (CNHS). Concluding remarks are provided in Section 4.

2 Decomposing poverty dynamics: growth, distribution and mobility

In trying to understand poverty changes over time, one of the leading concerns is the relationship between poverty reduction and income growth. Since equal sharing in the gains from growth among different income groups is an empirical impossibility, the question always arises as to how pro-poor growth is. The common theme of various decomposition schemes attempting to disentangle the effects of growth from those of other concurrent factors is to posit a hypothetical income distribution where the other factors are held constant.[2]

Suppose the poverty index P takes the following form (Sen 1976)

[2] The type of poverty decomposition under discussion here does not include decomposition by population subgroup or factor component. Nor does it include the decomposition proposed by Osberg and Xu (2000).

$$P(\mathbf{y};z)=\sum_{i=1}^{q}\theta(z,\mathbf{y},y_i) \tag{1}$$

where z is the poverty line, $\mathbf{y}$ is the income vector of the community sorted in ascending order, y_i is the income of the i-th poorest person, and q is the number of individuals with incomes less than z. Note that θ is a function of both y_i and $\mathbf{y}$, implying that the perception of deprivation does not depends on the level of one's income alone, but is also affected by how one's income compares with those of the others in the community.[3]

The growth-distribution decomposition, first proposed by Datt and Ravallion (1992) and later improved upon by Shorrocks (1999), exploits the fact that an income distribution can be completely described by its mean income μ and Lorenz curve L. Hence, the poverty index can always be expressed as a function of μ and L, i.e., $P(\mathbf{y};z)=P(\mu,L;z)$. The changes in P can then be decomposed into a growth component due to changes in μ and a distribution component attributed to changes in L. The Shapley-values of the growth component G and the distribution component D can be written as (Shorrocks 1999)

$$\begin{aligned} G &\equiv 0.5\times[P(\mu^1,L^0)-P(\mu^0,L^0)+P(\mu^1,L^1)-P(\mu^0,L^1)] \\ D &\equiv 0.5\times[P(\mu^0,L^1)-P(\mu^0,L^0)+P(\mu^1,L^1)-P(\mu^1,L^0)] \end{aligned} \tag{2}$$

where the superscripts index time periods and

$$\Delta P=P^1-P^0=P(\mu^1,L^1)-P(\mu^0,L^0)=G+D \tag{3}$$

The growth component G represents the reduction in poverty that would have been achieved in the absence of distributional changes. The distribution component D shows whether distributional changes have helped (if D is negative) or hindered (if D is positive) poverty reduction. The poverty reduction observed in reality is a result of the confluence of the growth of mean income and distributional changes. Ravallion and Chen (2003) thus suggest using the mean growth rate of the poor as a measure of pro-poor growth rate (PPG). This PPG rate can be considered as the growth of mean income adjusted for distributional changes embodied in D (Ravallion 2004).

To carry out the decomposition in expression (2), it suffices to know the marginal distributions of $\mathbf{y}$. This constitutes a convenience when only cross-sectional data are available. What is not reflected in the growth-distribution decomposition is that the y_i's used to calculate P in period 0 may be associated with different individuals than those in period 1 (see equation (1)). It follows that the PPG rate obtained as per Ravallion and

[3] This is not the case for the Atkinson (1987) class of additively separable poverty measures where only the level of individual income matters.

Chen (2003) may not equal the real gains to those who are poor in period 0. Also neglected is expression (2) is the possibility that the relative position of y_i in **y** may have changed between the two periods even if both μ and L stay the same. Examining such changes in the composition of the poor requires the knowledge of the joint distribution of the incomes of the two periods. When panel data are available, a different view of poverty dynamics, complementary to that of the growth-distribution decomposition, ensues. To fix ideas, we use the SST index below to show that the same changes in poverty trends can be decomposed into a component measuring the 'pro-poorness' or progressivity of real income gains to the group who are originally poor, and a component indicating the degree of downward mobility experienced by those who end up poor.

As demonstrated by Osberg and Xu (2002), the SST index is a composite of the headcount ratio of poverty, the average poverty gap ratio among the poor and the Gini index of the poverty gap ratio over the entire population. It also has the desirable theoretical property of satisfying the entire set of Sen's (1976) axioms for poverty measures. The SST index is given by (Shorrocks 1995)

$$SST = P(\mathbf{y}; z) = \frac{1}{n^2} \sum_{y_i < z} \left[2n - 2r(y_i) + 1 \right] \frac{z - y_i}{z} \tag{4}$$

where n is the size of the population, and $r(y_i)$ denotes the rank of y_i in the income distribution. Let $\mathbf{y}^0$ and $\mathbf{y}^1$ be the income vectors of periods 0 and 1 respectively. The difference between the values of the SST index for this two periods SST^1 and SST^0 result from changes in the incomes of three groups of individuals: those who are poor in both periods (i.e., $y_i^0 < z$ and $y_i^1 < z$), those who are poor in period 0 only (i.e., $y_i^0 < z$ and $y_i^1 \geq z$), and those who fall into poverty in period 1 (i.e., $y_i^0 \geq z$ and $y_i^1 < z$).[4] Hence,

$$\begin{aligned} \Delta P &= SST^1 - SST^0 \\ &= \frac{1}{n^2} \sum_{y_i^0 < z, y_i^1 < z} \left\{ \left[2n - 2r(y_i^1) + 1 \right] \frac{z - y_i^1}{z} - \left[2n - 2r(y_i^0) + 1 \right] \frac{z - y_i^0}{z} \right\} \\ &\quad - \frac{1}{n^2} \sum_{y_i^0 < z, y_i^1 \geq z} \left[2n - 2r(y_i^0) + 1 \right] \frac{z - y_i^0}{z} + \frac{1}{n^2} \sum_{y_i^0 \geq z, y_i^1 < z} \left[2n - 2r(y_i^1) + 1 \right] \frac{z - y_i^1}{z} \end{aligned} \tag{5}$$

The first summation term in equation (5) can be rewritten as

4 As the SST index satisfies the Focus axiom, it is not affected by changes in the incomes of individuals who are not poor in either period.

$$
\begin{aligned}
&\frac{1}{n^2}\sum_{y_i^0<z,y_i^1<z}\left\{\left[2n-2r(y_i^1)+1\right]\frac{z-y_i^1}{z}-\left[2n-2r(y_i^0)+1\right]\frac{z-y_i^0}{z}\right\}\\
&=\frac{1}{n^2}\sum_{y_i^0<z,y_i^1<z}\left\{\begin{array}{l}\left[2n-2r(y_i^1)+1\right]\frac{z-y_i^1}{z}-\left[2n-2r(y_i^0)+1\right]\frac{z-y_i^1}{z}\\ +\left[2n-2r(y_i^0)+1\right]\frac{z-y_i^1}{z}-\left[2n-2r(y_i^0)+1\right]\frac{z-y_i^0}{z}\end{array}\right\}\\
&=-\frac{1}{n^2}\sum_{y_i^0<z,y_i^1<z}\left[2n-2r(y_i^0)+1\right]\frac{y_i^1-y_i^0}{z}-\frac{2}{n^2}\sum_{y_i^0<z,y_i^1<z}\left[r(y_i^1)-r(y_i^0)\right]\frac{z-y_i^1}{z}
\end{aligned}
\tag{6}
$$

We define the pro-poor growth component *PG* as[5]

$$
PG\equiv-\frac{1}{n^2}\left\{\sum_{y_i^0<z,y_i^1\geq z}\left[2n-2r(y_i^0)+1\right]\frac{z-y_i^0}{z}+\sum_{y_i^0<z,y_i^1<z}\left[2n-2r(y_i^0)+1\right]\frac{y_i^1-y_i^0}{z}\right\} \tag{7}
$$

and the downward mobility component *DM* as

$$
DM\equiv\frac{1}{n^2}\sum_{y_i^0\geq z,y_i^1<z}\left[2n-2r(y_i^1)+1\right]\frac{z-y_i^1}{z}-\frac{2}{n^2}\sum_{y_i^0<z,y_i^1<z}\left[r(y_i^1)-r(y_i^0)\right]\frac{z-y_i^1}{z} \tag{8}
$$

The *PG* component is a weighted average of the absolute income changes of those who are initially poor. For an individual, the maximum income change is the poverty gap $z-y_i^0$, which is attained when the individual escapes poverty in period 1. The weights attached to individual incomes are a decreasing function of their ranks in period 0. Thus, for individuals who are poor in period 0 (i.e., the first two groups of individuals in expression (5)), the lower they are down the income ladder, the greater the marginal impact on the SST index of their income changes in period 1. The income changes of initially non-poor individuals (i.e., the third group in expression (5)) do not affect *PG*. If income growth of the poor occurs mostly among individuals at the very bottom of the income spectrum, *PG* will be negative. By contrast, if positive growth is concentrated in the poor whose incomes are close to the poverty line, *PG* tends to be positive. The magnitude and sign of *PG*, therefore, measures the progressivity of income growth. This measure of pro-poor growth is close in spirit to the Ravallion-Chen (2003) PPG rate if the PPG rate is calculated over individuals who are poor in the initial period. Both summarise the absolute gains to the poor.[6] Unlike the PPG rate which weights the absolute income changes by the reciprocal of the period-0 income, our weights are rank-dependent. This reflects Sen's view that the social value of individual welfare is a relative concept and should depend crucially on the welfare levels of others.

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[5] Expressions (7) and (8) can be written in more compact forms if we define **x** as the income vector **y** right-censored at the poverty line *z*, i.e. $x_i=\min\{y_i,z\}$, and let $r(x_i)=n+\frac{1}{2}$ if $x_i=z$.

[6] Incidentally, our pro-poor growth measure also satisfies the focus, monotonicity and transfer axioms.

Directly associated with this 'relativist' view of poverty, the *DM* component summarises changes in the income ranking positions of individuals who are poor in the terminal period. This could be made more manifest if the initial ranks of the new addition to the poor group are set to n+1/2.[7] The *DM* component is then the weighted average shift of individual income ranks, with the weights given by the poverty-gaps in period 1. The poorer an individual is in period 1, the higher is the weight assigned to the change in his income ranks. Since the individuals who end up at the bottom income stratum are more likely to have experienced downward movement in the order of income, i.e., $r(y_i^1) < r(y_i^0)$, the *DM* component reflects the extent of downward mobility between period 0 and period 1. If there is no newly impoverished individual in period 1 and income ranking of those who fail to escape poverty remains the same, *DM* component will be zero. Otherwise, it is always positive, signifying a change in the composition of the poor.[8]

Table 1: Decompositions of poverty trends in hypothetical income distributions

	Incomes in			Growth-Distribution Decomposition		Longitudinal Decomposition	
Scenario	period 1	SST^1	ΔSST	growth	distribution	PG	DM
1	(2, 3, 4)	0.11	-0.29	-0.20	-0.09	-0.29	0.00
2	(1, 3, 2)	0.40	0.00	0.00	0.00	-0.07	0.07
3	(2, 1, 3)	0.40	0.00	0.00	0.00	-0.09	0.09

Notes: (a) The base period income vector is (1, 2, 3). (b) The poverty line is set at 2.5. (c) $SST^0 = 0.40$.

Source: Authors' calculations.

The decomposition represented by expressions (7) and (8) reveals a different aspect of poverty dynamics than that presented by the growth-distribution decomposition in expression (2). We now use three growth scenarios to show how the assessment of poverty dynamics differs between the two decomposition procedures. These scenarios are detailed in Table 1. Assume that individuals A, B and C are associated with an income vector of (1, 2, 3) in period 0. The first scenario is where the income of every individual increases by one unit. The income vector in period 1 is thus (2, 3, 4). This would lead to a fall in the SST index from 0.40 to 0.11, signifying a reduction in poverty intensity. The growth-distribution decomposition would characterise this as a situation with positive overall income growth (G = –0.2) and favourable distributional changes (D = –0.09), while the longitudinal decomposition would show that income growth among the poor is progressive (PG = –0.29) and there is no downward mobility (DM = 0).

[7] Intuitively, this arrangement could be justified as follows: if poverty is considered strictly inferior to being non-poor, descending into poverty must represent a downward movement of one's welfare status in the society. No matter how high the new poor rank currently, their initial income ranks should still be higher and thus must be given the maximum rank possible.

[8] Although the *PG* and *DM* components can both be redefined in the Shapley value fashion, we feel expressions (7) and (8) better suits our intention of designating these two components as, repectively, a measure of pro-poor income changes and a measure of downward mobility.

In the second scenario, one poor individual switches position with one rich individual in period 1. The income vector in period 1 changes to (1, 3, 2). Using the growth-distribution decomposition, one would conclude that there is no change in the well-being of the poor since the SST index stays the same and the growth and distribution components are all equal to zero. However, the *PG* component of the longitudinal decomposition is negative in this case, suggesting an increase in the welfare of those who are originally poor (the income of individual B increases from 2 to 3). Meanwhile, the *DM* component would be positive and of the same absolute value as the *PG* component, suggesting a welfare loss to the society due to the existence of downward mobility (individual 3 falls into poverty).

The last scenario is where two poor individuals A and B switch positions in period 1. The growth-distribution decomposition again would not identify any welfare changes. The longitudinal decomposition would show that the growth pattern is still pro-poor (since the income change of the poorer is given a higher weight), but there is also a welfare loss in the form of downward mobility which balances out the welfare gain.

The above three examples show that the proposed decomposition in expressions (7) and (8) can convey information contained in the growth-distribution decomposition consistently (as for scenario 1). Its added value, however, lies in its ability to throw light on occasions where cross-sectional stability exists alongside large intra-distribution movements. As in the last two scenarios, such movements are much less visible via the growth-distribution decomposition. It is not difficult to conjure up real-life situations where this type of zero-sum scenarios might be played out. For example, when a firm moves its operation from one city to another city in the same province, the relocation might reduce poverty in the local community of the new site at the cost of increased poverty in the old site while leaving total poverty in the province largely unchanged. Or, when in an effort to alleviate poverty in certain places of the country the central government grants tax concessions to new investments in the those areas, this policy may reduce poverty in the targeted areas but inadvertently increase poverty in some other parts of the country. In these cases, although the headline poverty index may not change, the society is unlikely to be indifferent to the outcomes. Ignoring the changes in the composition of the poor can thus lead to erroneous assessment of poverty trends and evaluation of poverty reduction policy.

3 Decomposition of poverty trends in China

In this section, we apply the longitudinal decomposition to examine poverty trends in China from the late 1980s to the mid 1990s. A quick review of China's record of growth, poverty reduction and economic reform suggests that this might be a period of longitudinal flux. While significant progress against poverty accompanied rapid economic growth in the earlier years, poverty reduction nearly halted in the late 1980s and early 1990s and only recovered in the mid 1990s when growth remained robust

throughout (Ravallion and Chen 2004). In the meantime, the economy underwent profound structural changes, resulting in changing fortunes for different regions, industries and social groups.[9] Might the balancing effect of large numbers of transitions into and out of poverty, as well as 'seat-switching' among the poor, partly explain the weak responsiveness of poverty reduction to growth in this period?

The data we use come from the China Health and Nutrition Survey (CHNS), a joint project run by the Carolina Population Center at the University of North Carolina, the National Institute of Nutrition and Food Safety, and the Chinese Centre for Disease Control and Prevention. Five rounds of CHNS were conducted in 1989, 1991, 1993, 1997 and 2000. However, the data from the 2000 round are still pending cleaning up. In addition, there are significant differences in reported household sizes between the 1991 round and the 1989 and 1993 rounds, casting serious doubts on the reliability of the 1991 data. Thus, only data from the 1989, 1993 and 1997 rounds are used to form a balanced panel of 2664 households. Of these, 740 are urban households and 1924 are rural households. The income data in these surveys refer to the year immediately before the survey year. Nominal income figures have been converted to their 1988 values using local cost-of-living indices provided in the CHNS data set.[10] For the lack of a better alternative, we use the US$1-per-day poverty line, the 1988 PPP value of which stands at RMB391.7 per year.

Before turning to examine the empirical results, two caveats to bear in mind are in order. First, the CHNS is not a nation-wide survey. In each round, only 7 or 8 provinces were covered. Although these provinces are arguably representative of China's economic geography, the same cannot be said for the assembled panel, for the attrition rates are likely to have differed considerably among the various survey sites. The results reported below, therefore, pertain only to the sample in question. They may or may not mirror the situation of the entire country. Second, the unit of analysis is the household. The analysis should ideally be conducted at the individual level. However, the CHNS identification system does not uniquely identify individuals who changed household between two survey years.[11] Because not all households in the panel maintained their sizes and compositions over the sample period, some of the poverty dynamics do not reflect changes in household poverty experience.

Table 2 presents the values of the SST index and the decomposition results based on the entire sample and for the rural and urban sub-samples separately. It can be seen that

[9] For example, many opportunities opened up in the coastal region and the export industries, whereas lay-offs and unemployment increased in some historically well-off inland provinces and heavy industries.

[10] Readers interested in obtaining more information about the CHNS are referred to the website www.cpc.unc.edu/projects/china.

[11] A new identification system now allows tracking individuals through different surveys up to the 1993 round.

throughout the sample period poverty intensity in the rural area is significantly higher than that in the urban area (refer to figures in the second column of the second and third panels). For the combined rural and urban sample, poverty maintains a downward trend, though at a much slower rate between 1992 and 1996 than that between 1998 and 1992 (refer to figures in the fifth column). This continued decline of overall poverty intensity is driven by the developments in the rural sub-sample both because rural households make up over 70 percent of the combined sample and because the magnitude of poverty changes in the rural sample is several times greater than that in the urban sample. Among the urban households, there is actually a modest increase in poverty intensity between 1988 and 1992. During 1992-96, rising urban poverty is halted but far from reversed. These results by and large concur with the poverty trends based on national survey data in Ravallion and Chen (2004).

Table 2: Decomposition of poverty trends in China

		Standard			Growth-Distribution Decomposition		Longitudinal Decomposition	
Year	SST	error	Period	ΔSST	growth	distribution	PG	DM
1988	136.00	6.32	1988-92	-45.75	-51.30	5.55	-74.51	28.76
1992	90.25	5.07	1992-96	-24.88	-22.66	-2.22	-43.95	19.07
1996	65.37	4.46	1988-96	-70.63	-71.58	0.95	-89.84	19.20
					rural			
1988	175.07	8.80	1988-92	-67.95	-59.05	-8.90	-103.80	35.85
1992	107.12	6.99	1992-96	-33.14	-25.56	-7.58	-55.97	22.83
1996	73.98	5.59	1988-96	-101.09	-83.76	-17.33	-123.45	22.37
					urban			
1988	26.77	5.26	1988-92	18.34	-24.48	42.82	2.31	16.03
1992	45.11	7.75	1992-96	-2.48	-13.24	10.76	-13.48	11.00
1996	42.63	7.37	1988-96	15.86	-30.79	46.65	2.96	12.91

Notes: (a) There are altogether 2664 households in the panel, of which 1924 are rural households and 740 are urban households. (b) The standard errors are calculated from 500 bootstrap iterations. (c) The figures reported in the table are the estimated values multiplied by 1000.

Source: Authors' calculations.

The contrast between the rural and the urban poverty trends naturally raises the question as to what accounts for the difference. The growth-distribution and longitudinal decompositions each offers some insights from different standpoints. The growth-distribution results show that in the rural area growth is the dominant factor for poverty reduction and favourable distributional changes play an aiding yet secondary role (refer to figures in the sixth and seventh columns). In sharp contrast, in spite that average income growth is also positive over the period, its poverty reducing effects are either

outweighed (in the case of 1988-92) or almost completely offset (in the case 1992-96) of by the effects of adverse distributional changes.

The longitudinal decomposition results (refer to figures in the last two columns) reveal that income growth among the rural poor is always progressive. Furthermore, it seems that greater growth in average rural income is, the more pro-poor the rural growth pattern will be. In other words, the poorest rural residents tend to gain more when the average rural income is growing fast. The flip side of this is that they will also be hit more hard in bad times. Again, the results for the urban sub-sample depict a nearly diametrically opposite scenario. Not only is the growth pattern among the urban poor regressive in 1988-92 (the *PG* term is positive), the progressivity of growth is also negatively related to average urban income growth. This implies that the poorest urban residents benefit less from rapid urban income growth, but they also suffer less when average income growth is slow. If we compare the relative magnitudes of the *DM* component to the *PG* component in rural and urban areas, it is easily seen that downward mobility is a more important factor arresting progress against poverty in the urban area than it is in the rural area.[12] Therefore, the adverse distributional changes observed in the urban sub-sample arise partly from negative income growth among the poorest urban residents, and partly from long-range downward movements along the income ranking order among the poor.[13]

4 Concluding remarks

A widely-used device for analysing poverty dynamics is decomposing changes in poverty trends into a growth component and a distributional component. While the growth-distribution decomposition framework provides information on the relative importance of average growth and distributional changes in poverty reduction, it cannot reflect changes in the composition of the poor over time. Such changes include new additions to the poor and shifts in the positions of the poor in the income ranking. We have argued that knowledge of these changes helps understand what underlies the distributional changes and that ignoring such changes may lead to incorrect assessment of poverty trends and poverty reduction policy.

The longitudinal poverty decomposition proposed in this paper offers a framework for incorporating those changes into the analysis of poverty dynamics. It is shown that changes in the SST index over time can be decomposed into two components: one component reflects the progressivity of income growth among the original poor, the other measures the extent of downward mobility experienced by the incumbent poor.

[12] Between 1988 and 1992, for instance, the *DM* component is about seven times the magnitude of the *PG* component for the urban sub-sample, whereas the same ratio is just above one-third for the rural sub-sample.

[13] The greater the difference between the income ranks of the initial and terminal periods, the longer the range of the movement.

The decomposition scheme is then applied to appraising poverty developments in China between 1988 and 1996 using a panel assembled from the CHNS data. By combing the results from the growth-distribution and longitudinal decompositions, it is found that the rise in urban poverty intensity in 1988-92 is attributable to adverse distributional changes, which in turn are caused by negative income growth and large downward mobility among the poorest urban residents. The sustained decline in rural poverty intensity is primarily a result of income growth that has a pro-poor pattern. Therefore, the information revealed by the longitudinal decomposition complements that from the growth-distribution decomposition, and can further our understanding of poverty dynamics.

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