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GROWTH AND INEQUALITY COMPONENTS OF CHANGES IN RELATIVE DEPRIVATION: A DECOMPOSITION ANALYSIS

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Abstract: Relative deprivation theory assumes an important role to unravel the different facets of economic disparity. In an operational economy persons are engaged with different occupations and thus have different income levels. Obviously a resentment feeling among individuals will emerge from inter-personal shortages of income. These shortages are viewed as relative deprivation and it is inherent in the feeling of a person not having an income though others are having it. An attempt has been made in this paper to analytically decompose the changes in relative deprivation into growth and distribution components in the framework of additive decomposition. More precisely, the effects of changes in growth and distribution parameter (inequality) are analytically isolated. The analytical model, which has been experimented in the Indian economy, is of use in identifying the factors responsible for rising relative deprivation.

Key words: Growth, Inequality, Relative Deprivation.

JEL Classification Number: D63, I32.

1. INTRODUCTION

Persons being engaged with different occupations have different income levels. In fact, income varies from person to person, class-to-class etc., in an operational economy. Income differences are thus the genesis of disparities of welfare and hence deprivation. Conceptualization of deprivation concerns the question of focus on absolute or relative level. At the absolute level, income deprivation reflects the adverse feeling of people below the income representing the minimum living standard people of the country should have. Concept of relative deprivation does not correspond to some stipulated

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living standards. It is concerned with the indignant feeling of people caused by unfair distribution of income. An individual feels relatively deprived when his income is lower than those of others even though they all belong to the same society. In every pair of persons one is subject to deprivation relative to the other.

The idea of relative deprivation was first conceptualized by *Stouffer et. al.* (1949) and it was later elaborated by *Devis* (1959) and *Runciman* (1966). Though the idea was rigorously formalized by *Runciman*¹, *Yitzhaki* (1979) had contributed towards the quantitative measurement. Methodological improvements over *Yitzhaki* were attempted by *Hey and Lambert* (1980), *Chakravarty and Chakraborty* (1984), *Paul* (1991) and *Sen & Pal* (2003) In *Sen & Pal* (2003), relative deprivation is decomposed at the sub-group levels using an additive scheme of decomposition. Decomposition of over time changes in relative deprivation into several explaining factors has not yet been made so far though some studies on the absolute level of poverty are available (*Datt & Ravallion*, 1992; *Tendulkar & Jain*, 1998; *Kakwani & Pernia*, 2000; *Foster & Székely*, 2000; *Lin, Bo. Q.*, 2003; *Kraay*, 2004).

An attempt has been made in this paper to analytically decompose the changes in relative deprivation into growth and distribution components in the framework of additive decomposition. More precisely, the effects of changes in growth and distribution parameter (inequality) are analytically isolated (section 2). The analytical model is however experimented in the economy of India during 1993–2004 using monthly per-capita consumption expenditure data (Section 3). Similar exercises may be made for other Asian countries where growth was most pronounced during 1990–2005 (about 9% per annum in East Asia and 4% in South East Asia) and income inequality was on the rise (*ADB*, 2007; *Ali & Zhuang*, 2007).

2. METHODOLOGICAL FRAMEWORK

Consider an economy having n income units. Let $y = (y_1, y_2, \dots, y_n)$ be a vector of income where $y_1 \leq y_2 \leq \dots \leq y_n$. Incomes are arranged in non-decreasing order.

The function of relative deprivation felt by person i with respect to person j is defined as:

$$\begin{aligned} D(y_i, y_j) &= y_j - y_i && \text{if } y_j > y_i \\ &= 0 && \text{if } y_i \geq y_j \end{aligned} \quad (1)$$

The average level of relative deprivation of individual i is expressed as

$$D(y_i) = \frac{1}{n} \sum_{j \geq i}^n (y_j - y_i) \quad (2)$$

The deprivation function (1) [and hence (2)] is based on the following assumptions:

¹ *Runciman* specifies four conditions for an individual to feel relatively deprived: “we can roughly say that (a person) is relatively deprived of X when i) he does not have X , ii) he sees some other person or persons, which may include himself at some previous or expected time as having X (whether or not this is or will be in fact the case), iii) he wants X , and iv) he sees it as feasible that he should have X ”

- i) If y_i and y_j are the incomes of persons i and j respectively, then person i feels deprived relative to person j only if $y_i < y_j$.
- ii) Deprivation of person i with respect to person j is zero if $y_i \geq y_j$.
- iii) Incomes of all others remaining the same, the deprivation of person i declines with an increase in his own income i.e.,

$$\frac{\partial D(y_i)}{\partial y_i} < 0.$$

- iv) An increase in income of person j causes an increase in the relative deprivation of person i , i.e.,

$$\frac{\partial D(y_i)}{\partial y_j} > 0 \quad ; \quad y_j > y_i$$

- v) Deprivation of person i with respect to himself is zero.

The average relative deprivation in the overall economy is

$$\bar{D} = \frac{1}{n^2} \sum_{i=1}^n \sum_{j \geq i}^n (y_j - y_i) \quad (3)$$

Gini co-efficient of income distribution is actually one half of the average value of absolute differences between all pairs of incomes divided by mean income (*Kendal & Stuart, 1963*). Therefore $\bar{D} = \mu G$ i.e., \bar{D} (Average relative deprivation) is the product of mean income (μ) and Gini- coefficient (G) (*Yitzhaki, 1979*). This implies that given μ , there is a linear functional relationship between \bar{D} and G . If μ is constant, high (low) inequality implies high (low) relative deprivation.

2.1. Decomposition of Over Time Changes in Relative Deprivation

Incomes earned by individuals undergo variations over time. This is due to changes in the needs and choices of the individuals, changes in the accessibility of the people to the income sources, changes in the life cycle and above all changes in the policies and priorities of the Govt. All these variations are embodied in income structure of an economy. Relative deprivation level hence changes over time. We have already said of the functional relationship among \bar{D} , μ and G i.e., $\bar{D} = f(\mu, G) = \mu G$. Change in relative deprivation may be attributed either to the change in per-capita income or to the change in Gini-coefficient or to the both. Quantitative estimates of their relative roles can be accounted for by a scheme of algebraic decomposition (over time) of relative deprivation.

For two particular time points 0 and t , relative deprivation is denoted by \bar{D}_0 and \bar{D}_t respectively.

$$\begin{aligned} \bar{D}_t - \bar{D}_0 &= \mu_t G_t - \mu_0 G_0 \\ \text{or } \Delta \bar{D}_0 &= \mu_t G_t + \mu_t G_0 - \mu_t G_0 - \mu_0 G_0 \\ &= \mu_t (G_t - G_0) + G_0 (\mu_t - \mu_0) \\ &= \mu_t \Delta G_0 + G_0 \Delta \mu_0 \end{aligned} \quad (4)$$

$$\begin{aligned} \text{Alternatively, } \Delta \bar{D}_0 &= \mu_t G_t + \mu_0 G_t - \mu_0 G_t - \mu_0 G_0 \\ &= \mu_0 \Delta G_0 + G_t \Delta \mu_0 \end{aligned} \quad (5)$$

It is to be noted that decomposition schemes (4) & (5) are not same. In scheme (4), ΔG_0 is weighted by the current year value of μ (Paasche weight) while $\Delta \mu_0$ is weighted by the base year value (Laspeyres weight). Scheme (5) attaches weight just in the opposite way. In fact, the unique scheme does not exist. Results hence differ. This is clearly due to bias in weights. So in order to minimize such bias, an alternative scheme is formulated by combining (4) & (5) as

$$\Delta \bar{D}_0 = \frac{(\mu_t + \mu_0)}{2} \Delta G_0 + \frac{(G_t + G_0)}{2} \Delta \mu_0 \quad (6)$$

$$\text{and } 100 = \frac{1}{2} \cdot (\mu_t + \mu_0) \frac{\Delta G_0}{\Delta \bar{D}_0} \% + \frac{1}{2} \cdot (G_t + G_0) \frac{\Delta \mu_0}{\Delta \bar{D}_0} \% \quad (7)$$

In (6) weights are in average form i.e., current and previous period values are averaged. Weights are obviously Marshall-Edgeworth weights. Bias is hence reduced. Thus using the above decomposition scheme one can easily determine the percentage distribution of changes in relative deprivation between changes in mean income and income inequality (Gini-coefficient). The decomposition scheme does not include any interactive term.

Mean income reflects the level of economic development whereas Gini coefficient reveals the welfare nature of development (as judged by the degree of inequality in income distribution). It thus follows that a change in \bar{D} may be attributed either to the distributional change (distribution-effect) or to developmental change (growth-effect) or to the both. Growth effect is attributable to the change in real per-capita income whereas distribution effect is attributable to the change in Gini-coefficient. Growth effect as well as distribution effect may be positive or negative or may be nil over time. Positive growth effect implies an increase in real per-capita income and vice-versa. Similarly, a positive distribution effect implies an increase in the degree of inequality in the income distribution of the economy. The distribution effect may be more pronounced than the growth effect or the reverse may happen. Or it may so happen that the two effects are identical. The magnitude and the direction of these effects of course vary from period to period or from region to region or from country to country. Thus over time increase or decrease in relative deprivation depends on the direction and the relative strength of growth effect and distribution effect.

3. AN EXERCISE

Estimation of the level of deprivation requires data on income at individual level. But in developing countries like India, income data (at individual level) is not available. Consequently, some proxy variable for income is usually used in estimation. At the household level, consumption expenditure and savings are the two components of income. In developing countries like India more than 70% of total income is spent on consumption. Consequently, household consumption expenditure is viewed as a good

proxy of income. We have used Monthly Consumption Expenditure Data (based on uniform reference period) for 1993–94 (50th Round) and 2004–05 (61st Round) for India and its major constituent states (National Sample Survey Organization, 50th Round, 1993–94 and 61st Round, 2004–05). We have changed the data at the constant price of 1993 using deflators derived from state specific poverty-lines (*Planning Commission, India*). It is to be noted that during the reform period a significant reduction in poverty in all the Indian states has occurred in both rural and urban areas (*Pal & Sen, 2005*). Let us examine what has happened in case of relative deprivation.

3.1. Relative Deprivation in India

Real per capita consumption expenditure (RPCE) has increased in India and in its states during the period irrespective of rural and urban areas (Table 1 & Table 2). More than 20% increase in RPCE is observed in the rural areas of Kerala, Haryana and Assam. Percentage change in consumption expenditure (urban area) is highest in Punjab (41.1%) followed by Kerala (30.9%), Tamil Nadu (33.5%) and West Bengal (30.6%). Relative deprivation has increased in both rural and urban India (Rs. 79.29 to Rs. 95.88 in rural area and Rs. 155.79 to Rs. 205.05 in urban area during 1993–2005) and in almost all the states except rural Madhya Pradesh. In case of rural area over time changes in relative deprivation is pronounced in Kerala (73.7%), Assam (41.1%), Haryana (35.5%), and Orissa (34.3%). In 12 states out of 15, increase in relative deprivation in urban areas is more than 40%. It is interesting to note that during the reform period absolute poverty has declined in almost all the states but relative deprivation has increased. During the period under study inequality in consumption expenditure in India has increased in both rural and urban areas. In case of rural area, however, a decline in inequality is observed

Table 1. Relative Deprivation in Rural India, 1993–94 and 2004–05

States	1993–94			2004–05		
	μ (Rs)	G	\bar{D} (Rs)	μ (Rs)	G	\bar{D} (Rs)
Andhra Pradesh	289.03	0.285	82.37	325.85	0.288	93.84
Karnataka	269.29	0.266	71.63	292.73	0.264	77.28
Tamil Nadu	293.69	0.307	90.16	336.34	0.315	105.9
Kerala	390.46	0.289	112.8	574.37	0.341	195.9
West Bengal	279.00	0.251	70.03	324.12	0.273	88.48
Bihar	218.20	0.222	48.44	249.73	0.208	51.94
Gujarat	303.38	0.236	71.6	340.39	0.268	91.22
Haryana	384.92	0.301	115.9	486.39	0.323	157.1
Madhya Pradesh	252.37	0.277	69.91	258.66	0.269	69.58
Maharashtra	272.66	0.315	85.89	305.53	0.310	94.71
Orissa	219.72	0.243	53.39	237.57	0.302	71.75
Punjab	432.96	0.264	114.3	482.39	0.278	134.1
Rajasthan	322.64	0.260	83.89	340.54	0.248	84.45
UttarPradesh	276.90	0.285	78.92	310.12	0.287	89.00
Assam	257.90	0.176	45.39	325.16	0.197	64.06
India	281.17	0.282	79.29	322.82	0.297	95.88

Data Source: Consumer Expenditure Data, 50th & 61st Round, National Sample Survey Organization, India

Table 2. Relative Deprivation in Urban India, 1993–94 and 2004–05

States	1993–94			2004–05		
	μ (Rs)	G	\bar{D} (Rs)	μ (Rs)	G	\bar{D} (Rs)
Andhra Pradesh	409.21	0.320	131.11	521.84	0.370	193.08
Karnataka	423.26	0.315	133.37	521.88	0.365	190.49
Tamil Nadu	438.22	0.344	150.62	585.03	0.358	209.44
Kerala	494.47	0.338	167.23	647.39	0.400	258.96
West Bengal	473.80	0.334	158.39	619.00	0.376	232.74
Bihar	353.64	0.307	108.64	453.76	0.339	153.82
Gujarat	453.79	0.287	130.06	612.50	0.304	186.2
Haryana	473.56	0.280	132.45	584.73	0.361	211.09
Madhya Pradesh	407.93	0.327	133.27	502.69	0.397	199.57
Maharastra	530.39	0.351	186.17	566.56	0.371	210.19
Orissa	402.45	0.304	122.39	427.34	0.355	151.71
Punjab	511.16	0.276	141.23	721.45	0.393	283.53
Rajasthan	425.33	0.290	123.52	483.79	0.367	177.55
UttarPradesh	389.36	0.323	125.76	458.71	0.370	169.72
Assam	458.35	0.286	131.18	593.23	0.314	186.27
India	458.07	0.340	155.79	549.72	0.373	205.05

Data Source: Consumer Expenditure Data, 50th & 61st Round, National Sample Survey Organization, India

Table 3. Decomposition of Over time Changes in Relative Deprivation in Rural India: Distribution Effect and Growth Effect

States	Distribution Effect (%)	Growth Effect (%)	Total	Changes in Relative Deprivation (Rs)
Andhra Pradesh	8.0	92.0	100	11.47
Karnataka	-9.9	109.9	100	5.65
Tamil Nadu	16	84	100	15.74
Kerala	30.3	69.7	100	83.1
West Bengal	36	64	100	18.45
Bihar	-94	194	100	3.5
Gujarat	52.5	47.5	100	19.62
Haryana	23.2	76.8	100	41.2
Madhya Pradesh	620	-520	100	-0.33
Maharastra	-16	116	100	8.82
Orissa	73.5	26.5	100	18.36
Punjab	32	68	100	19.8
Rajasthan	-711	811	100	0.56
UttarPradesh	5.8	94.2	100	10.08
Assam	32.8	67.2	100	18.67
India	27.3	72.7	100	16.59

in four states (Rajasthan, Maharastra, M. P. and Bihar).

3.2. Decomposition of Relative Deprivation: Growth Effect and Distribution Effect

Growth effect and distribution effect both are positive in rural India (Table 3). Growth effect is relatively stronger than the distribution effect. Considering the case of major

Table 4. Decomposition of Over time Changes in Relative Deprivation in Urban India: Distribution Effect and Growth Effect

States	Distribution Effect (%)	Growth Effect (%)	Total	Changes in Relative Deprivation (Rs)
Andhra Pradesh	37.4	62.6	100	61.97
Karnataka	41.4	58.6	100	57.12
Tamil Nadu	12.3	87.7	100	58.82
Kerala	38.6	61.4	100	91.73
West Bengal	30.9	69.1	100	74.35
Bihar	28.5	71.5	100	45.18
Gujarat	16	84	100	56.14
Haryana	55	45	100	78.64
Madhya Pradesh	48.1	51.9	100	66.3
Maharashtra	45.7	54.3	100	24.02
Orissa	72	27	100	29.32
Punjab	50.7	49.3	100	142.3
Rajasthan	64	36	100	54.03
Uttar Pradesh	45.3	54.7	100	43.96
Assam	26.7	73.3	100	55.09
India	34	66	100	49.26

states we find that distribution effect is negative in only four states—Karnataka, Bihar, Maharashtra and Rajasthan. Moreover, growth effect is positive in all the states except Madhya Pradesh. Relative deprivation has increased due to stronger positive growth effect. Distribution effect is more pronounced than growth effect in absolute term in Gujarat, Madhya Pradesh and Orissa.

In case of urban India also, growth effect and distribution effect are positive and growth effect is more pronounced than distribution effect (Table 4). Relative deprivation has increased in all the states due to positive growth effect and positive distribution effect. Distribution effect is more pronounced than growth effect in Haryana, Orissa, Punjab and Rajasthan (Table 4).

4. CONCLUDING REMARKS

The analytical model is of use in identifying the factors responsible for rising relative deprivation. Every growth process is associated with some process of distribution. It is to be examined whether in the process of relative deprivation the growth effect is stronger than the distribution effect or the reverse. The model may be exercised for the groups of ASEAN and SAARC countries so as to make a comparative analysis which would obviously have profound policy implications.

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