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Inequality Adjusted Per Capita Income of Indian States in 2004-05 and 2011-12

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Abstract. *As a measure of social well-being, per capita real income has a serious limitation as it reflects only the average level of income in the society disregarding whether the total income is distributed with high or low inequality among the members of the society. To address this limitation, present paper has made an attempt to calculate an inequality adjusted per capita income in India, which may be a better reflector of general wellbeing in the society. The basic methodology for calculating the inequality adjusted per capita income has been developed in line with the UNDP's inequality adjusted human development index. The household income data of India Human Development Survey-I and II enable us to compute the inequality in per capita income in the different states of India for the two years of 2004-05 and 2011-12. For the present exercise, the inequality in per capita incomes has been captured by calculating Atkinson's measures of inequality of the observed disparities in per capita income in the states. The purpose of the exercise is to see whether ranking of states change dramatically from their ranking by per capita income after the states are penalized because of inequality in their distributions of income. The exercise does not indicate any systematic relation between per capita income and inequality in the states of India. But the fact that some states have been able to achieve high per capita income levels while reducing their inequality implies that it is not necessary to sacrifice equity for higher growth. With adoption of naturally distributing growth patterns, it is possible to achieve higher growth with reduced inequalities.*

Key words: IHDS, PCNSDP, Rank, Atkinson's Measure of Inequality

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Introduction. The most widely used measure of economic progress has been the level and growth of per capita real income. However, per capita real income has some limitations as a measure of the well-being of the population of a state or a country (Jones et al. 2016; UNDP, 1997). For any given level of per capita income higher inequality will mean that the benefits of high level of per capita income are concentrated among the richer sections of the society. As a result of which the efficacy of per capita income as a reflector of well-being of the society is reduced. On the other hand, with the same level of per capita income, if inequality is reduced although than the average level of income is a better reflector of well-being of the society as total income is more equitably distributed. Given these limitations of per capita income as a measure of well-being of the society the present paper has made an attempt to calculate an inequality adjusted per capita income (IAPCI) which may be a better reflector of general wellbeing in the society and the progress in improvement in wellbeing in the society. The basic methodology for calculating the inequality adjusted per capita income is taken in line of the UNDP's inequality adjusted human development index. However, for the Indian states it has been possible to calculate this inequality adjusted per capita income only at two points of time namely 2004-05 and 2011-12 (Desai, et al. 2010, 2015). In these two years the household income data of India Human Development Survey-I and II enable us to compute the inequality in per capita income in the different states of India. For the present exercise the

inequality in per capita incomes has been captured by calculating Atkinson's measures of inequalityof the observed disparities in per capita income in the states. The per capita income data in the current prices have been converted to comparable per capita in constant prices by taking 2004-05 as the base year. The purpose of the exercise is to see whether ranking of states change dramatically from their ranking by per capita income after the states are penalize because of inequality in the distribution of income.

The paper has been organized in five sections. A brief review of relevant literature has been presented in section two. Section three outlines the study area, data source and analytical methods applied. Results are presented and discussed in section four. Conclusions of the study are summed up in the final section.

Review of Literature. In the early days of development economy, per capita income was commonly used as a measure of economic development of the country or a region concerns (Kuznets, 1955). However, imperfections or inadequacy of per capita income in capturing development attainment in the form of level of living of the masses has been well-known and well accepted. The most striking limitation of per capita income in this regards its inability to reflect the extent of economic inequality within the country. Higher levels of per capita income may not amount to development, if it is achieved at the costs of growing inequality resulting in non-improvement of standard of living of the masses. Meier (1976) therefore attempts to define development as prolonged increase in per capita income with non-increasing inequality in the distribution of income. Singer and Ansari (1977) define development in terms of decrease of poverty. Todaro (1977) defined the definition of economic development in terms of better human life. The main goal of economic development is the improvement in the standard of living of the people which depends not only on per capita income but also on social and welfare services, satisfaction, self-reliance, self-esteem and economic freedom. Dis-satisfaction with per capita income as a wholesome measure of development resulted in defining of alternative measures such as physical quality of life index (Morris, 1979). Physical quality of life index goes to the other extreme of not including income as one of the components in the composite measure of development. With the coming of the Human Development Index income has been brought back into the composite index of development as one of the components. However, income enters in the HDI with an imposition of diminishing returns to its contribution to development. UNDP in its subsequent reports has attempted to improvise upon the HDI by moderating the index for gender disparity, inequality etc. Taking a que from inequality adjusted HDI introducing human development report of 2010 (UNDP, 2010), an attempt has made in this paper to moderate per capita income by degree of inequality in the distribution so that the inequality adjusted PCI can be accepted as an improved measure of economic development. While the conceptual and methodological aspects of these measures are discussed in section 3. The calculated values for major Indian states are presented and discussed in section 4.

Coverage, Data and Methodology. The analysis in the present papers covered 17 major states of India — Andhra Pradesh (including Telangana), Assam, Bihar (including Jharkhand), Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir (including Ladakh), Karnataka, Kerala, Madhya Pradesh (including Chhattisgarh), Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh (including Uttarakhand) and West Bengal. These 17 states jointly account for 97.05 percent (by 2011 census) of the total population of India and 93.97 percent of India's total land area. The small but highly developed states like Delhi and Goa are not included because their development processes are not comparable with the geographically bigger states of the country. Besides Delhi and Goa, the Hill states of Northeast India have also been left out as inclusion of such states have been found to distort results (Rao, Shand & Kalirajan, 1999).

To calculate inequality adjusted per capita incomes of the 17 Major Indian states, the Per Capita NSDP (PCNSDP) data at factor cost for the year 2004-05 and 2011-12 have been collected from Reserve Bank of India (RBI) database[i], which sources the data from the Central Statistics Office (CSO), Ministry of Statistics and Program Implementation (MOSPI), Government of India. PCNSDP data have been used to combined with Atkinson's measure of inequality (Atkinson, 1970) of distribution of income calculated using the unit level data of nationally representative surveys of India Human Development Survey- I and II.

Atkinson's measure of inequality, with tolerance parameter α put at 1[ii], is given by:

$$A = \left[1 - \frac{\text{Geometric Mean of Income Distribution}}{\text{Arithmetic Mean of Income Distribution}}\right]$$

After obtaining the per capita income at constant prices of the states and having calculated the Atkinson's measures of inequality, the adjustment factor for inequality is defined as:

$$I = 1 - A^{iii}$$

Finally, inequality adjusted per capita incomes have been calculated using the formula:

Inequality Adjusted Per Capita Income= Per Capita Income × (1-A)

If income is distributed with perfect equality, i.e. the geometric mean will be equal to the arithmetic mean and A will be 0. In that case the inequality adjusted Per Capita NSDP will be exactly equal to the Per Capita NSDP. However higher the inequality of the distribution, smaller will be the geometric mean than the arithmetic mean, hence higher will be the value of A. Accordingly smaller will be the adjusted Per Capita NSDP than the actual Per Capita NSDP. The results are presented in Tables 1 and 2.

Results and Discussion. To show whether ranking of states changes or not from their ranking by per capita income after the states are penalize because of inequality in the distribution of income, table 1 and 2 are used for the year 2004-05 and 2011-12 to correspond the rankings between per capita NSDP with and without adjusted for inequality.

Table 1: Per Capita Income and Inequality Adjusted Per Capita Income of States with Ranks in 2004-05 (In Rs. at 2004-05 Prices)

States	Per Capita NSDP	Ranks	Inequality Adjusted Per Capita NSDP	Ranks	Change in Ranks (iii)-(v)
(i)	(ii)	(iii)	(iv)	(v)	(vi)
Andhra Pr.*	25321	9	16570	8	1
Assam	16782	14	10842	13	1
Bihar$	10510	17	6428	17	0
Gujarat	32021	6	18273	7	-1
Haryana	37972	1	25637	1	0
Himachal Pr.	33348	3	22516	4	-1
J & K	21734	11	14902	10	1
Karnataka	26882	8	15246	9	-1
Kerala	32351	5	21165	5	0
Madhya Pr.@	16241	15	10703	14	1
Maharashtra	36077	2	23414	2	0
Odisha	17650	13	10423	15	-2
Punjab	33103	4	23094	3	1
Rajasthan	18565	12	12556	12	0
Tamil Nadu	30062	7	19999	6	1
Uttar Pr.**	13522	16	8304	16	0
West Bengal	22649	10	14138	11	-1

Notes: 1. * Including Telengana, $ including Jharkhand, @ including Chhattisgarh and **including Uttarakhand.

2. Rank 1 is for the state with highest Per Capita Income.

Source: Author's calculations using IHDS-I unit level data and PCNSDP data from RBI

Table 1 shows that in 2004-05 the rankings are not altered after adjustment at the top and the bottom of the spectrum. Haryana occupies the top rank and Bihar the lowest rank by both actual and inequality adjusted PCNSDP. But it is interesting to note that the three relatively developed states of Gujarat, Himachal Pradesh and Karnataka and two relatively poorer states of Odisha and West Bengal get relegated after adjustment of PCNSDP for inequality. The group of states that get promoted in ranking after the adjustment process also includes both relatively developed states namely Tamil Nadu and Punjab, and relatively poorer states such as Assam, Madhya Pradesh and Jammu & Kashmir. A notable result is that Andhra Pradesh, which was a middle level Per Capita income state in 2004-05, improves its rank by 1 places after adjustment for inequality.

By 2011-12 the situation changes noticeably. Bihar, though, continues to occupy the bottom position by both adjusted and actual PCNSDP. But the top PCNSDP state of Haryana goes down by 3 places. The relatively high per capita state of Punjab and the low PCNSDP states of Madhya Pradesh and Rajasthan now join Gujarat and West Bengal in the group of states slip down the ranking by adjusted PCNSDP. Maharashtra, Kerala and Odisha now join Tamil Nadu and Jammu & Kashmir in moving up the ranking by the adjusted PCNSDP. Assam's rank now remains unchanged as those of Karnataka and Uttar Pradesh. Again, Andhra Pradesh stands out in improving its rank by per capita income and occupies an even higher ranking by inequality adjusted per capita income.

Table 2: Per Capita Income and Inequality Adjusted Per Capita Income of States with Ranks in 2011-12 (In Rs. at 2004-05 Prices)

States	Per Capita NSDP	Ranks	Inequality Adjusted Per Capita NSDP	Ranks	Change in Ranks (iii)-(v)
(i)	(ii)	(iii)	(iv)	(v)	(vi)
Andhra Pr*.	42119	8	31015	6	2
Assam	21741	15	14139	15	0
Bihar$	16017	17	9895	17	0
Gujarat	56634	4	31880	5	-1
Haryana	61716	1	36493	4	-3
Himachal Pr.	49203	6	30480	7	-1
J & K	28790	12	19683	10	2
Karnataka	41492	9	26043	9	0
Kerala	52808	5	39343	3	2
Madhya Pr.@	25067	13	14972	14	-1
Maharashtra	61276	2	41164	1	1
Odisha	24542	14	15230	13	1
Punjab	46325	7	30455	8	-1
Rajasthan	29612	11	19283	12	-1
Tamil Nadu	57093	3	40935	2	1
Uttar Pr.**	19777	16	12363	16	0
West Bengal	32164	10	19356	11	-1

Notes: 1. * Including Telengana, $ including Jharkhand, @ including Chhattisgarh and **including Uttarakhand.

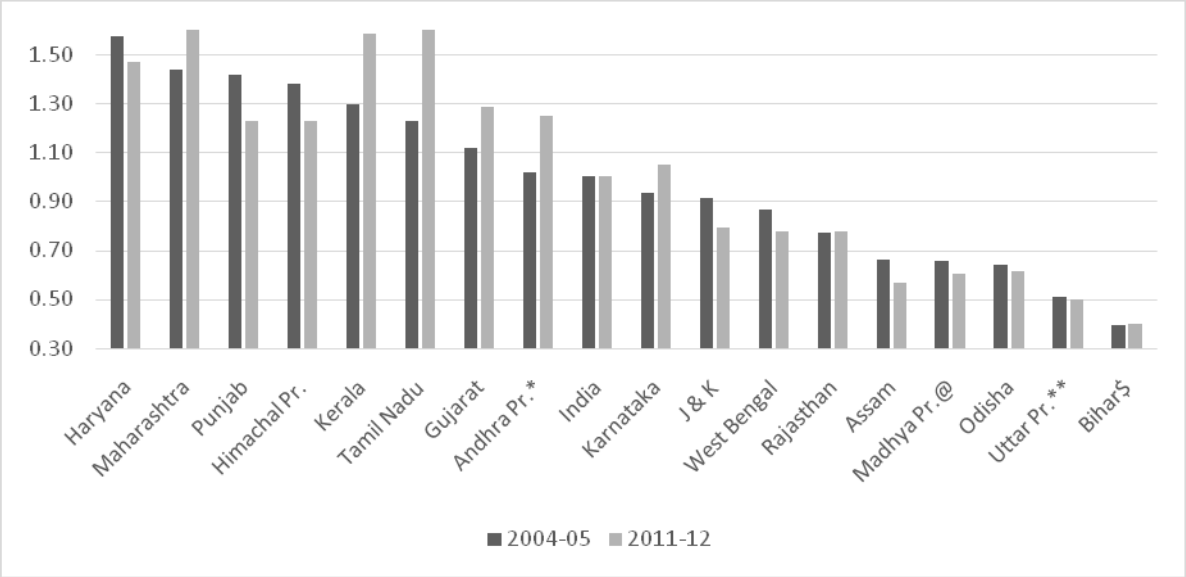
2. Rank 1 is for the state with highest Per Capita Income.

Source: Author's calculations using IHDS-I unit level data and PCNSDP data from RBI.

In short, states promoted and relegated in ranking by inequality adjusted PCNSDP from their ranks by actual PCNSDP include both relatively more developed and relatively less developed States.

Change of situations in states by 2010-11 compared to 2004-05 can be seen from Figure 1, where inequality adjusted per capita income of states have been shown as proportion of all-India level adjusted per capita income. The data are presented in descending order of the states as per situation in 2004-05.

Figure 1: Inequality adjusted Per Capita Income of Indian States as a ratio of All India Level in the year 2004-05 and 2011-12



Source: Author's calculation and construction from data sources mentioned above

Figure 1 shows that the states which have lower inequality adjusted PCNSDP than all-India per capita income in the initial year of 2004-05, such as Bihar, Uttar Pradesh, Odisha, Madhya Pradesh, Assam, Rajasthan, West Bengal, Jammu and Kashmir, and Karnataka remained below the all-India level in the year 2011-12 except Karnataka.

On the other hand, the higher inequality adjusted PCNSDP states of 2004-05, such as Haryana, Maharashtra, Punjab, Himachal Pradesh, Kerala, Tamilnadu, Gujarat and Andhra Pradesh continued to remain above the all-India inequality adjusted per capita income in 2011-12. States of Maharastra, Kerala, Tamilnadu, Gujarat, Andhra Pradesh and Karnataka improves their relative inequality adjusted PCNSDP in the year 2011-12 in coparison to the year 2004-05. However relative inequality adjusted PCNSDP deteriorates in the states of Haryana, Punjab, Himachal Pradesh, Jammu and Kashmir, West Bengal, Assam and Odisha. Relative Inequality adjusted PCNSDP more or less same in the year 2004-05 and 2011-12 in the states of Rajasthan, Uttar Pradesh and Bihar.

Conclusion. From the above analysis it is clear that high inequality reduces the efficacy of per capita income in reflecting well-being of population in Indian states. This reduction of efficacy is high in some cases of both high per capita income states and low per capita income states. The above exercise therefore does not indicate any systematic relation between per capita income and inequality in the states of India. But the fact that some states have been able to achieve high per capita income levels while reducing their inequality in distribution of income implies that it is not necessary to sacrifice equity for higher growth. With adoption of naturally distributing growth patterns, it is possible to achieve higher growth with reduce inequalities.

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[ii] The value of tolerance parameter α being put to 1 indicates a moderate degree of intolerance of inequality. The value have been chossen as per practice followed in Human Development Reports of UNDP (2020)

[iii] Higher the inequality as captured by A, greater should be the penalty that is greater should be the downward adjustment of the per capita income. Since A lies between 0 and 1, higher the value of A smaller will be the fractional adjustment factor 1-A. Thus as per capita income is multiplied by 1-A. The adjusted per capita income will be proportionately smaller for higher inequality states.