Human Development Index (HDI) of Indian States: 2022-23

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Abstract

Assessing Human Development (HD) performance at the subnational level within a country is essential to target areas where states lag behind others. Following the methodology of the National Human Development Report (NHDR) 2001, the paper estimates the Human Development Index (HDI) scores for 29 Indian states for 2022-23. To improve India's HDI ranking in the UNDP, we need to improve the performance of all states. The results show that the HD performance (relative) of states has changed from 2011-12 to 2022-23, and some states have improved their achievement, whereas others have fallen back. The results show that per capita GSDP (PCGSDP) influence HD performance, but the impact of PCGSDP on HD achievement has weakened from 2011-12 to 2022-23.

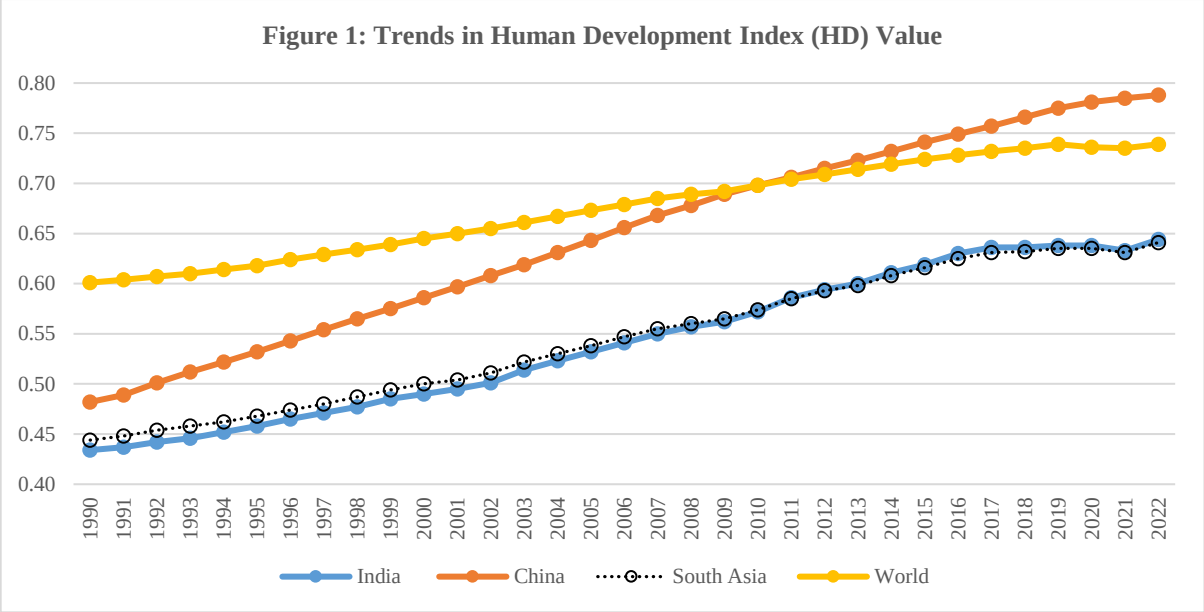
Key Words: Human Development, Indian States, Consumption Expenditure, Health, Education, Income inequality, Consumption inequality, India.

JEL Codes: O15, H75, I.

1. Introduction

Among 193 countries ranked in the UNDP's Human Development Index of 2022, India ranks 134. The UNDP considers four indicators (viz., Life expectancy at birth (years), Expected years of schooling (in years), Mean years of schooling (in years) and Gross National Income (GNI) per capita (in 2017 PPP $)) to capture three dimensions of Human Development, viz., Long and healthy life', 'Knowledge' and 'A decent standard of living'.

Figure 1 shows that India's HDI value is increasing more slowly than China's and the world average. To improve India's HDI ranking, we need to focus on all HDI sub-indices. Moreover, we need to improve the States' HDI performance; therefore, estimating HDI scores at the state level is essential. To our knowledge, no study estimates the HDI scores of states beyond 2011-12. Therefore, the present paper attempts to fill the gap.



Source: Computed based on Data Extracted from https://hdr.undp.org/data-center

Following the methodology presented in the National Human Development Report (NHDR) 2001 (Planning Commission, 2002), we consider Life Expectancy at age 1 and the inverse of the Infant Mortality Rate (IMR) as indicators of Longevity, Literacy Rate for the age group of seven years and above and Intensity of Formal Education as indicators of Educational Attainment, and Per Capita Real Consumption Expenditure adjusted for Inequality as an indicator of Economic Attainment. The reasons for selecting these indicators vis-à-vis the indicators considered by the UNDP for HDI are well presented in the NHDR 2001 (Planning Commission, 2002), and we avoid repeating the same here.

In the next section, we describe the methodology and present the data sources used to construct consumption, education, and health index scores. In section three, we analyse the results, and in section four, we draw conclusions.

2. Methodology and Data Sources

As per the NHDR 2001 methodology, the HDI score for the jth state is given by the average of the normalised values of the three indicators: inflation and inequality-adjusted per

capita consumption expenditure (X_1), the composite indicator on educational attainment (X_2), and the composite indicator on health attainment (X_3). Normalisation is performed by dividing the difference between the ith variable's value for the jth state (i.e., X_{ij}) and the minimum value of X_i across all states by the difference between the maximum and minimum values of X_i across all states.

2.1 Construction of Consumption Index Score

State-wise and region-wise (rural and urban) average Monthly Per Capita Consumption Expenditure (MPCE) data are derived from unit-level records of the National Sample Survey Office (NSSO) Household Consumption Expenditure Survey (HCES) for 2022-23 (August 2022 to July 2023) (Ministry of Statistics and Programme Implementation, 2024). The average MPCE is first adjusted for inequality using the state and region-specific Gini Ratio of consumption inequality. We estimate state-wise Gini Ratio separately for rural and urban areas from the unit-level records of the NSSO's HCES: 2022-23. The inequality adjustment is necessary because a state with a high average MPCE and a lower Gini Ratio is better off than one with a higher average MPCE and a higher Gini Ratio. The inequality-adjusted MPCE is further adjusted for inflation using state-specific poverty lines to make it amenable to intertemporal and interspatial comparisons (Planning Commission, 2002).

Following the methodology suggested by the Tendulkar Committee, the Planning Commission estimated the poverty line based on the NSSO's 68th Round Household Consumer Expenditure Survey for 2011-12 (July 2011 to June 2012) (Planning Commission, 2013). The estimates are based on a mixed reference period (MRP) of average MPCEs for rural and urban areas in 2011-12. Since the official estimate of the poverty line is not yet published based on the NSSO's HCES: 2022-23, we estimate the poverty line separately for rural and urban areas of each state following the methodology presented below:

$$P_{ij2} = P_{ij1} \times \frac{CPI_{ij2}}{CPI_{ij1}}$$

Where P_{ijt} is the poverty line of the i^{th} state, j^{th} region and t^{th} period

CPI_{ijt} is the Consumer Price Index (CPI, Base Year: 2012) for the i^{th} state, and j^{th} region in t^{th} period.

t=1 for 2011-12 and t=2 for 2022-23

We used the state- and region-specific poverty line for 2011-12, as presented by the Planning Commission (2013), and extracted and compiled monthly state- and region-specific CPI (New Series, Base Year = 2012) from the Ministry of Statistics and Programme Implementation's website.[1] Since the NSSO's 68th round of consumer expenditure survey was conducted from July 2011 to June 2012, we compiled average monthly state and region-specific CPI for the same period. The NSSO's HCES: 2022-23 was conducted from August 2022 to July 2023; we compiled average monthly state and region-specific CPI for the same period. The state and region-wise estimated Poverty Line for 2022-23 is presented in Annexure I.

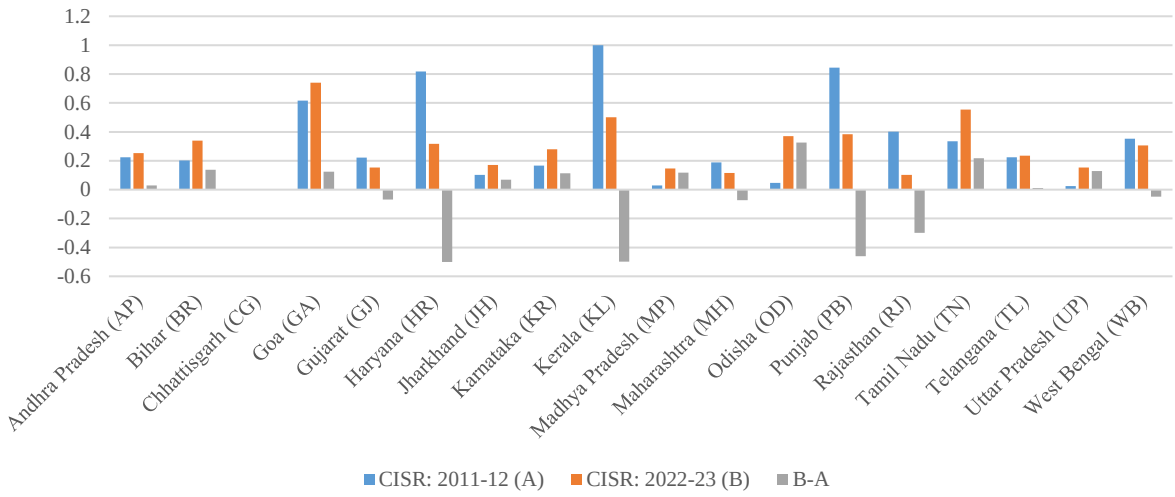
Suppose GR_{ij} is the Gini Ratio for the ith state for the jth region (either rural or urban), and $MPCE_{ij}$ is the average MPCE for the ith state for the jth region. In that case, inequality-adjusted average monthly per capita consumption expenditure for the ith state for the jth

[1] https://cpi.mospi.gov.in/Default1.aspx (last accessed on 22 December 2024).

region (viz., $IMPCE_{ij}$) is expressed as $(1-GR_{ij})\times MPCE_{ij}$, where GR_{ij} lies between zero to one. (i.e., $0 \leq GR_{ij} \leq 1$). Inflation adjustment is applied after the inequality adjustment, separately for each state and region. Suppose PL_{ij1983} is the poverty line (in rupees per capita per month) for the ith state for the jth region in 1983, and $PL_{ij2022\text{-}23}$ is the poverty line of the ith state for the jth region in 2022-23. In that case, inflation and inequality-adjusted average MPCE for the ith state for the jth region ($IIMPCE_{ij}$) is estimated by $(PL_{ij1983}/PL_{ij2022\text{-}23})\times IMPCE_{ij}$[2]. We use $IIMPCE_{ij}$ as an indicator of consumption (X_1) to construct HDI. This analysis is carried out separately for each state's rural and urban areas. However, we combine regional Consumption Index Scores using regional shares of the state's total projected population for 2022-23, as also available from the NSSO's HCES: 2022-23. To maintain consistency with earlier studies and associated HDI estimates (Government of India 2001, Mukherjee et al. 2016), we used state-specific poverty lines from 1983 to adjust for inflation, as available in the NHDR 2001 (Planning Commission 2002). We present the Consumption Index (CI) scores and ranks of the states for 2011-12 and 2022-23 in Annexure II.

We notice that the CI score of rural areas has increased remarkably in Odisha, Tamil Nadu, Bihar, Uttar Pradesh and Goa from 2011-12 to 2022-23 (Figure 2). As a result, Odisha's rank improved from 26th to 9th, Tamil Nadu's from 15th to 4th, Bihar's from 21st to 11th, and Uttar Pradesh's from 28th to 24th. On the other hand, the CI score has fallen remarkably for Haryana, Kerala, Punjab, and Rajasthan from 2011-12 to 2022-23. As a result, Haryana's rank falls from fourth to 13th, Kerala's from first to fifth, Punjab's from second to eighth, and Rajasthan's from 13th to 27th in 2022-23. This shows that even in agriculturally prosperous states (e.g., Punjab and Haryana), the rural consumption index score declined in 2022-23. This may affect the overall HDI scores of these states.

Figure 2: Change in the Consumption Index Score of Rural (CISR) Areas between 2011-12 to 2022-23: Major States



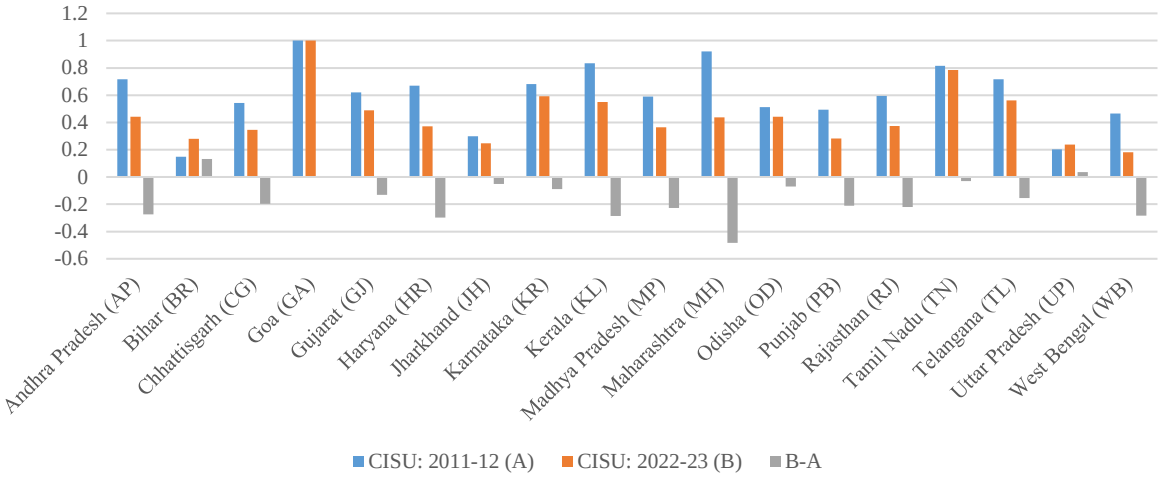
Source: Computed by authors

The urban CI scores for a few States have increased from 2011-12 to 2022-23 (Figure 3). The largest increase is observed in Bihar and Uttar Pradesh. As a result, Bihar's rank in the urban CI score has improved from 28th to 23rd. The CI score of urban areas has also

[2] The reason we used the ratio of poverty lines instead of the Consumer Price Index (CPI) or price levels is that the ratio of poverty lines indirectly incorporates changes in the prices of goods and services essential for survival above the poverty threshold.

fallen for many states. Maharashtra has experienced the largest decline, followed by Haryana, Kerala, West Bengal, and Andhra Pradesh. This has led to a decline in these states' CI scores and is expected to reduce their overall HDI scores.

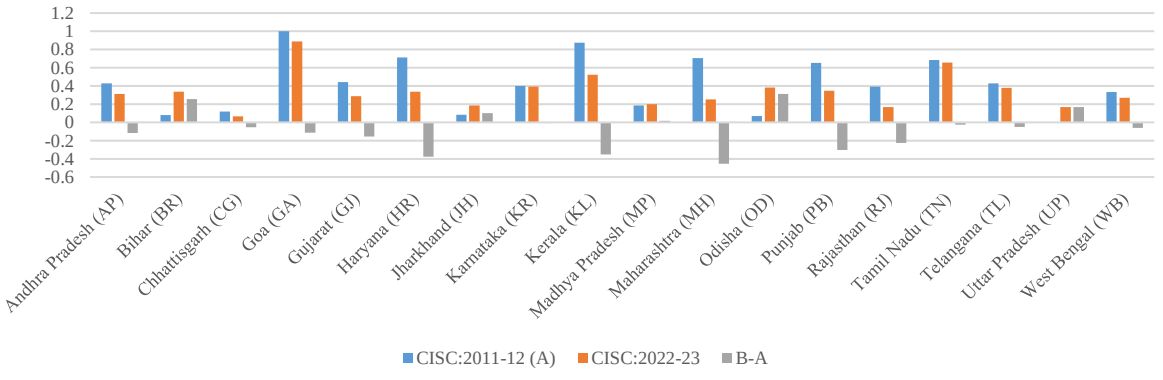
Figure 3: Change in the Consumption Index Score of Urban (CISU) Areas between 2011-12 to 2022-23: Major States



Source: Computed by authors

The combined (rural and urban) CI scores for some States have increased from 2011-12 to 2022-23 (Figure 4). The most significant increase is in Odisha, Bihar, Uttar Pradesh, Jharkhand, and Madhya Pradesh. As a result, Odisha's rank in the combined CI score has improved from 27th to 13th, Bihar's from 26th to 15th, Uttar Pradesh's from 29th to 25th, and Jharkhand's from 25th to 24th. The combined CI score has also fallen for many states. Maharashtra has experienced the largest decline, followed by Haryana, Kerala, Punjab, and Rajasthan. This has resulted in a decline in these states' ranks in the combined CI score and is expected to reduce their overall HDI score.

Figure 4: Change in the Combined Consumption Index Score (CISC) between 2011-12 to 2022-23: Major States



Source: Computed by authors

2.2 Construction of Education Index Score

The composite indicator on educational attainment (X_2) is derived from two sub-indicators: the literacy rate for the age group of seven years and above (e_1) and the adjusted intensity of formal education (e_2). The underlying logic is that the literacy rate,

as an overall ratio, may not reflect the actual situation, and the dropout rate must be factored in. In line with the NHDR 2001 methodology, weightings of 0.35 and 0.65 are assigned to e_1 and e_2, respectively, to estimate the Education Index (EI) score (i.e., X_2).

The intensity of formal education (IFE) is estimated as a ratio between the weighted average of enrolment (WAE) of students from Class I to Class XII (where weights are assigned as 1 for Class I, 2 for Class II, and so on) and the total enrolment (TE) in Class I to Class XII. IFE is adjusted by multiplying by the proportion of total enrolment to the population in the age group 6-18 (P_c). According to the formula, suppose E_i be the number of children (rural and urban combined) enrolled in the ith standard in 2002 (i = 1 for Class I to 12 for Class XII), the weighted average of the enrolment (WAE) from Class I to Class XII is calculated as follows:

$$WAE = \sum_{i=1}^{12} i \times E_i \,/ \sum_{i=1}^{12} i$$

Suppose TE_i is the total enrolment of children from Class I to Class XII in 2002 for the ith state. Then, the IFE for children (rural and urban combined) becomes WAE expressed as a percentage of TE. Suppose P_C represents the population of children (rural and urban combined) aged six to 18 years. Then, the adjusted intensity of formal education (AIFE) for children (separately for rural and urban areas) can be determined as the ratio of IFE multiplied by TE to the population of children aged 6 to 18 years.

$$IFE = \frac{WAE}{TE} \times 100$$

$$AIFE = IFE \times \frac{TE}{P_C}$$

We obtain "Class-wise enrolment - Enrolment by Location, School Category and School Management for Each Class & Level of Education (Report ID: 4002)" and "Projected Population of India by Gender, Age-group and Social Category, 2011 – 2021 (Report ID: 5001)" data from the Unified District Information System for Education Plus (UDISE+): 2021-22 Database of the Department of School Education and Literacy, Ministry of Education, Government of India.[3] It is to be mentioned that the UDISE+ database holds "State-wise Projected Population of age Group 6-17" for 2021 for all states. We find that the Report of the Technical Group on Population Projections - Population Projections for India and States: 2011 – 2036 (July 2020) (National Commission on Population, 2019) presents state-wise projected population for 2021 (as of 1 March 2021) for ages 5 to 23 years. The projected population of the age group 6-18 years for 2021 (Table-20: Projected Population by Sex for Ages 5 to 23 Years as of 1st March: 2011-2036) for 21 States and the combined North East States (Excluding Assam) is compiled from the Technical Group's report (National Commission on Population, 2019).[4]

For States where we have projected population in the age group 6-18 from the National Commission on Population (NCP) data (National Commission on Population, 2019), we take it as is. We also estimate a ratio of the projected population in the age group 6-18 to the age group 6-17 for 2021 based on the NCP and UDISE+ databases, respectively. This is done for all states where data is available from both sources. For the North East States (Excluding Assam), we add the projected population for the age group 6-17 from UDISE+ data. Since the projected population in the age group 6-18 years is not available for

[3] https://dashboard.udiseplus.gov.in/#/reportDashboard/sReport (last accessed on 23 December 2024).

[4] 21 States are Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand, and West Bengal.

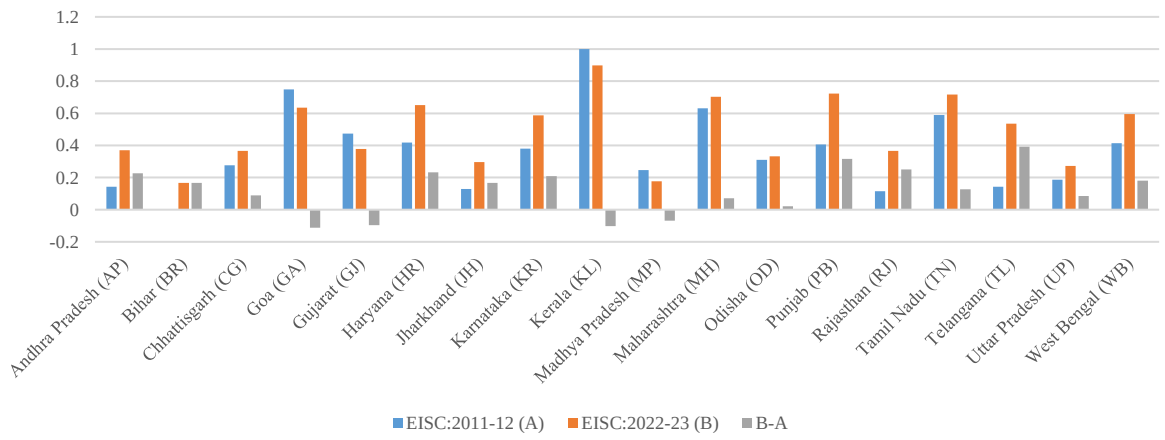
individual North East States from the NCP data, we take the projected population in the age group 6-17 for these states and extrapolate it based on the ratio estimated based on NCP and UDISE+ data for North East States (Excluding Assam).[5] For Goa, we use the average ratio of Maharashtra and Karnataka and extrapolate the population for the age group 6-18.

Since the projected age group of 6-18 is not available separately for rural and urban areas, we cannot estimate the Education Index (EI) score for each area.

We estimate the literacy rate for the 7 years and above age group in 2021 using the 2001 and 2011 Census of India databases. We estimate state-wise decadal growth in literacy rates and apply the rates to the 2011 literacy rate. Here, we assume that state-wise literacy has improved at the same pace as it was prevalent from 2001 to 2011.[6]

The combined (rural and urban) EI scores for many States have increased from 2011-12 to 2022-23. The most significant increase is in Telangana, Punjab, Rajasthan, Haryana, and Andhra Pradesh (Figure 5). As a result, Telangana's rank in the combined EI score has improved from 25th to 16th, Punjab's from 15th to 7th, Rajasthan's from 28th to 20th, Haryana's from 13th to 11th and Andhra Pradesh's from 25th to 18th. The combined EI score has also fallen for many states. Goa has experienced a remarkable fall, followed by Kerala, Gujarat, Madhya Pradesh, and Odisha. This has resulted in a decline in these states' ranks in the combined EI score and is also expected to reduce their overall HDI score.

Figure 5: Change in the Combined Education Index Score (EISC) between 2011-12 to 2022-23: Major States



Source: Computed by authors

2.3 Construction of Health Index Score

The composite indicator of health attainment (X_3) is constructed by considering two variables: life expectancy (LE) at age one (h_1) and the inverse of infant mortality rate (IMR) (h_2).

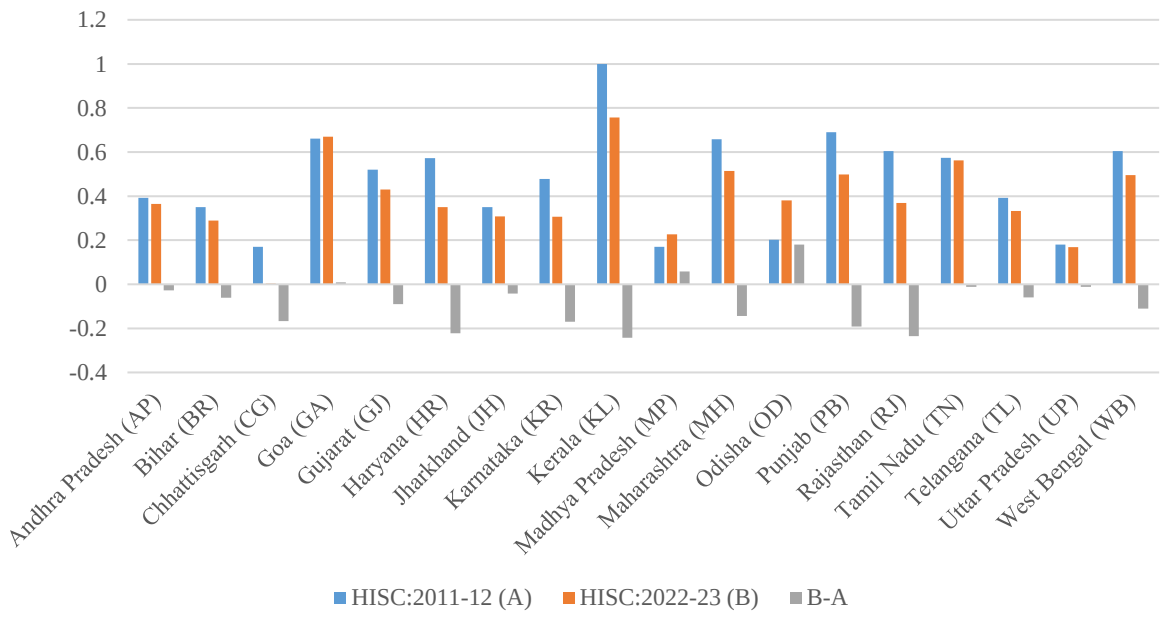
[5] We find that projected population in the age group 6-18 in Meghalaya and Mizoram is lower than Total Enrolment of Students between Class I to XII.
[6] For Tripura the estimated literacy rate becomes 104 in 2021, so we keep it at 99.

The expectancy of Life at age 1 for 2016-20 is taken from Statement 5 of the SRS-Based Abridged Life Tables 2016-20 (MHA, 2022). Except for Assam, there is no information on the Expectancy of Life at age 1 for 2016-20 for other North-Eastern States. We use the Assam value for other North-Eastern States. For Goa, we use the Maharashtra value. Since the Expectancy of Life at age 1 is not available separately for rural and urban areas within states, we are unable to construct the Health Index (HI) score for rural and urban areas within states.

The state-wise infant mortality rate for 2020 is taken from Table 1 of the SRS Bulletin (Office of the Registrar General & Census Commissioner, 2022).

The combined (rural and urban) HI scores for a few States have increased from 2011-12 to 2022-23 (Figure 6). The most significant increase is in Odisha, followed by Madhya Pradesh and Goa. As a result, Odisha's rank in the combined HI score has improved from 17th to 13th, and Goa's from 5th to 3rd. The combined HI score has also fallen for many states. Kerala has experienced the sharpest decline, followed by Rajasthan, Haryana, Punjab, and Karnataka. This has resulted in a decline in these states' ranks in the combined HI score and is also expected to reduce their overall HDI score.

Figure 6: Change in the Combined Health Index Score (HISC) between 2011-12 to 2022-23: Major States



Source: Computed by authors

Following the NHDR 2001 methodology, we combine the scores of three sub-indices (Consumption, Education, and Health) by averaging them to obtain the overall HDI score for each state.

3. Results and Discussion

3.1 Human Development Index of Indian States

Between 2011-12 and 2022-23, there were changes in the relative positions of states in the HD ranking. Some states have improved their position by increasing their HDI score, whereas others have fallen back. Sikkim has improved its HDI ranking from 18th place in

2011-12 to third place in 2022-23. Studies show that Sikkim's increased industrialisation/urbanisation has significantly reduced poverty and unemployment (Singha et al., 2024). This is reflected in the state's Consumption Index (CI) score for 2022-23. Sikkim has scope to improve its scores in the Education Index (EI) and the Health Index (HI), as it ranks 9th and 12th among all states, respectively. Tripura is another state that has improved its HDI ranking from 15th in 2011-12 to 7th in 2022-23. However, Tripura needs to focus on HI to further improve its HDI score.

Chhattisgarh has slipped from 23rd place in 2011-12 in the HDI ranking to the last position in 2022-23. Except for ranking in the EI score, Chhattisgarh is last among states in the CI and HI scores in 2022-23. This state needs consistent efforts and investments to improve the HD score.

It is worth noting that Kerala's HDI score and ranking fell in 2022-23 compared to 2011-12. The state must focus on improving its CI score to raise its overall HD score. Similarly, Goa needs to focus on improving its EI score.

Himachal Pradesh's ranking slipped from 3rd place in 2011-12 to 5th in 2022-23. The state must focus on the CI score to improve the HDI score.

Maharashtra's ranking has slipped from 4th in 2011-12 to 10th in 2022-23. Maharashtra needs to improve scores across all sub-indices to raise its overall HDI score in the coming years. The highest priority must be on improving the CI score. Gujarat's relative position has slipped from 9th in 2011-12 to 17th in 2022-23. The state needs to focus on all sub-indices to improve its overall HDI ranking. The highest priority must be improving the CI score, followed by EI and HI.

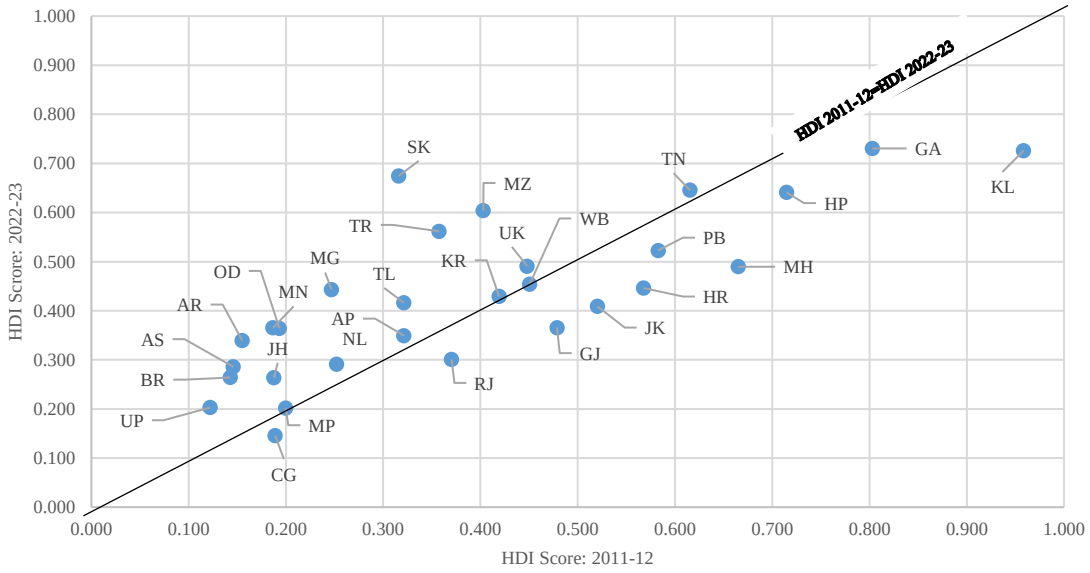
In June 2014, a new state of Telangana was created from Andhra Pradesh. The ranking of Andhra Pradesh has slipped from 16th position in 2011-12 to 2oth in 2022-23. Meanwhile, Telangana's ranking is 15th in 2022-23. In October 2019, the earlier state of Jammu and Kashmir was divided into Ladakh – a United Territory (without a legislative assembly) and Jammu & Kashmir - a United Territory (with a legislative assembly). The ranking of Jammu & Kashmir (UT) has slipped from 8th position in 2011-12 to 16th in 2022-23. This state needs to focus on CI and EI scores to improve the overall HDI score in the coming years.

Tamil Nadu improved its position from 5th in 2011-12 to 4th in 2022-23. However, it must focus on improving its EI score to raise its overall HDI.

Bihar's relative ranking improved from 28th place in 2011-12 to 25th in 2022-23. The CI score has improved in Bihar, driving the overall score despite a fall in the HI score during 2022-23.

Figure 7 shows that among 29 states, the HDI score fell for 10 states in 2022-23 compared to 2011-12. The HDI score of three states (viz., MP, KR, and WB) either remained constant or improved marginally. In the remaining states, we saw an improvement in the HDI score in 2022-23 compared to 2011-12.

Figure 7: Comparative HDI Score of States - 2011-12 and 2022-23



Source: Computed by authors

Table 1: State-wise HDI Score and Rank – 2011-12 & 2022-23

State	CI Score 2011-12		EI Score 2011-12		HI Score 2011-12		HDI Score (A) 2011-12		CI Score 2022-23		EI Score 2022-23		HI Score 2022-23		HDI Score (B) 2022-23		B-A
Andhra Pradesh (AP)	0.429	(11)	0.143	(25)	0.392	(13)	0.321	(16)	0.313	(16)	0.370	(18)	0.365	(15)	0.349	(20)	0.028
Arunachal Pradesh (AR)	0.279	(20)	0.186	(23)	0.001	(26)	0.155	(26)	0.459	(7)	0.335	(22)	0.223	(25)	0.339	(21)	0.184
Assam (AS)	0.165	(23)	0.273	(20)	0.000	(29)	0.146	(27)	0.293	(19)	0.364	(21)	0.201	(27)	0.286	(24)	0.140
Bihar (BR)	0.079	(26)	0.000	(29)	0.350	(16)	0.143	(28)	0.336	(15)	0.167	(29)	0.290	(22)	0.264	(25)	0.121
Chhattisgarh (CG)	0.120	(24)	0.277	(19)	0.170	(20)	0.189	(23)	0.067	(29)	0.367	(19)	0.003	(29)	0.146	(29)	-0.043
Goa (GA)	1.000	(1)	0.748	(4)	0.661	(5)	0.803	(2)	0.887	(2)	0.635	(12)	0.669	(3)	0.731	(1)	-0.072
Gujarat (GJ)	**0.442**	**(10)**	**0.474**	**(12)**	**0.520**	**(11)**	**0.479**	**(9)**	**0.288**	**(20)**	**0.379**	**(17)**	**0.430**	**(11)**	**0.366**	**(17)**	**-0.113**
Haryana (HR)	**0.712**	**(3)**	**0.418**	**(13)**	**0.573**	**(10)**	**0.568**	**(7)**	**0.336**	**(14)**	**0.652**	**(11)**	**0.351**	**(17)**	**0.446**	**(12)**	**-0.121**
Himachal Pradesh (HP)	0.652	(6)	0.718	(5)	0.774	(3)	0.715	(3)	0.474	(6)	0.852	(3)	0.596	(4)	0.641	(5)	-0.074
Jammu & Kashmir (JK)	0.566	(9)	0.157	(24)	0.838	(2)	0.520	(8)	0.306	(17)	0.231	(27)	0.690	(2)	0.409	(16)	-0.111
Jharkhand (JH)	0.083	(25)	0.130	(27)	0.350	(15)	0.188	(24)	0.186	(24)	0.296	(25)	0.309	(20)	0.263	(26)	0.076
Karnataka (KR)	0.400	(13)	0.379	(17)	0.478	(12)	0.419	(12)	0.393	(8)	0.587	(15)	0.307	(21)	0.429	(14)	0.010
Kerala (KL)	**0.876**	**(2)**	**1.000**	**(1)**	**1.000**	**(1)**	**0.959**	**(1)**	**0.523**	**(5)**	**0.898**	**(2)**	**0.757**	**(1)**	**0.726**	**(2)**	**-0.232**
Madhya Pradesh (MP)	0.184	(22)	0.246	(21)	0.170	(21)	0.200	(21)	0.200	(23)	0.177	(28)	0.227	(24)	0.202	(28)	0.002
Maharashtra (MH)	**0.706**	**(4)**	**0.631**	**(6)**	**0.658**	**(6)**	**0.665**	**(4)**	**0.252**	**(22)**	**0.703**	**(10)**	**0.514**	**(7)**	**0.490**	**(10)**	**-0.176**
Manipur (MN)	0.030	(28)	0.527	(10)	0.004	(22)	0.187	(25)	0.142	(27)	0.597	(13)	0.358	(16)	0.365	(18)	0.179
Meghalaya (MG)	0.356	(16)	0.385	(16)	0.000	(28)	0.247	(20)	0.305	(18)	0.815	(4)	0.208	(26)	0.443	(13)	0.196
Mizoram (MZ)	0.338	(17)	0.870	(2)	0.001	(27)	0.403	(13)	0.342	(13)	0.924	(1)	0.546	(6)	0.604	(6)	0.201
Nagaland (NL)	0.270	(21)	0.485	(11)	0.002	(23)	0.252	(19)	0.126	(28)	0.296	(24)	0.452	(10)	0.291	(23)	0.039
Odisha (OD)	**0.069**	**(27)**	**0.310**	**(18)**	**0.201**	**(17)**	**0.193**	**(22)**	**0.381**	**(9)**	**0.331**	**(23)**	**0.381**	**(13)**	**0.364**	**(19)**	**0.171**
Punjab (PB)	0.652	(7)	0.407	(15)	0.690	(4)	0.583	(6)	0.348	(12)	0.722	(7)	0.499	(8)	0.523	(8)	-0.060
Rajasthan (RJ)	0.392	(14)	0.115	(28)	0.604	(8)	0.370	(14)	0.168	(26)	0.365	(20)	0.369	(14)	0.301	(22)	-0.070
Sikkim (SK)	**0.366**	**(15)**	**0.581**	**(8)**	**0.001**	**(24)**	**0.316**	**(18)**	**0.920**	**(1)**	**0.708**	**(9)**	**0.395**	**(12)**	**0.675**	**(3)**	**0.359**
Tamil Nadu (TN)	**0.683**	**(5)**	**0.589**	**(7)**	**0.574**	**(9)**	**0.615**	**(5)**	**0.658**	**(4)**	**0.717**	**(8)**	**0.562**	**(5)**	**0.645**	**(4)**	0.030
Telangana (TL)	0.429	(11)	0.143	(25)	0.392	(13)	0.321	(16)	0.380	(10)	0.535	(16)	0.333	(19)	0.416	(15)	0.095
Tripura (TR)	**0.321**	**(19)**	**0.751**	**(3)**	**0.001**	**(25)**	**0.357**	**(15)**	**0.703**	**(3)**	**0.750**	**(6)**	**0.232**	**(23)**	**0.562**	**(7)**	**0.204**
Uttar Pradesh (UP)	0.000	(29)	0.186	(22)	0.180	(19)	0.122	(29)	0.170	(25)	0.272	(26)	0.168	(28)	0.203	(27)	0.081
Uttarakhand (UK)	0.605	(8)	0.558	(9)	0.181	(18)	0.448	(11)	0.370	(11)	0.753	(5)	0.350	(18)	0.491	(9)	0.043
West Bengal (WB)	0.333	(18)	0.414	(14)	0.605	(7)	0.451	(10)	0.271	(21)	0.595	(14)	0.495	(9)	0.454	(11)	0.003

Note: Figures in the parenthesis show the ranks.

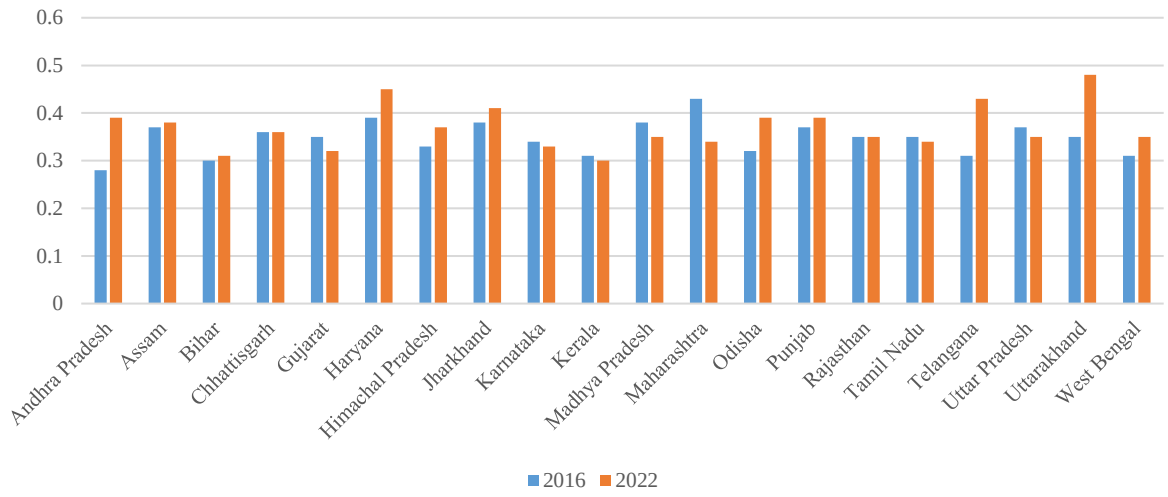
Source: Estimated by the authors

We observe that the elasticity of the Human Development Index (HDI) score with respect to per capita income (PCI), measured by per capita nominal GSDP, has declined in 2022-23 compared to 2011-12. In 2022-23, a 10 per cent increase in per capita income results in an HDI score increase of 5.18 to 5.38 per cent for India overall, 5.72 per cent for major states, and 4.54 per cent for minor states. In contrast, in 2011-12, the corresponding figures were higher: 8.54 per cent for India overall and 9.70 per cent for major states. For minor states, the per capita income elasticity of the HDI score was insignificant in 2011-12 but became significant in 2022-23.

This suggests that the relationship between per capita income growth and improvements in HDI has weakened over time, particularly for India as a whole and for major states. However, in minor states, income growth now significantly affects HDI improvements in 2022-23, unlike in 2011-12.

Rising income inequality across most Indian states could explain the declining PCI elasticity of the HDI score (Figure 6). In the absence of any official estimates of income elasticity, we took state-wise income inequality figures for 2016 and 2022 from Jadhav and Mukherjee (2024). The study estimates state-level income inequality using CMIE's Income Pyramids Household Survey (IPHS) data.

Figure 8: State-wise Gini Index (Income Based)

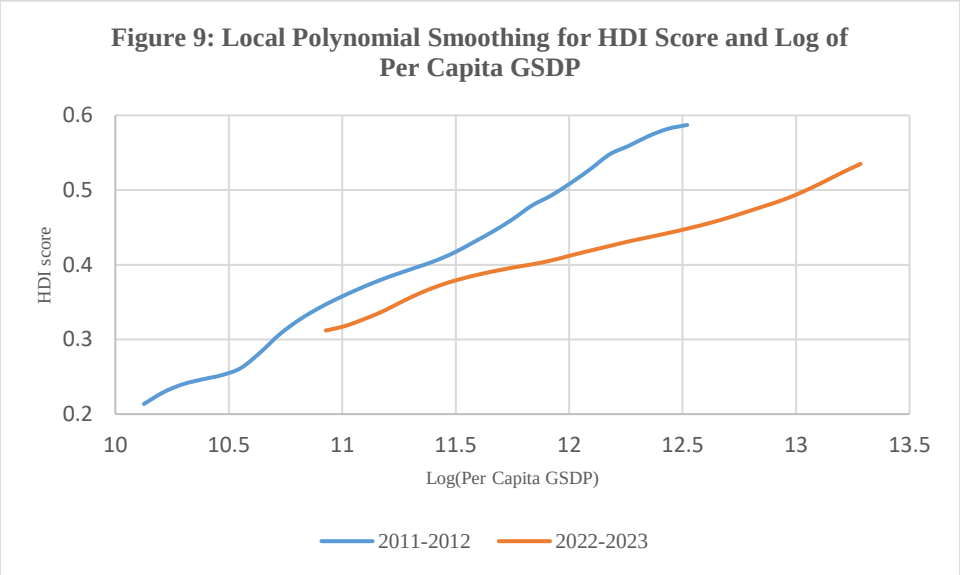


Source: Compiled from Jadhav and Mukherjee (2024, Page No. 20)

3.2 Per capita GSDP and HDI

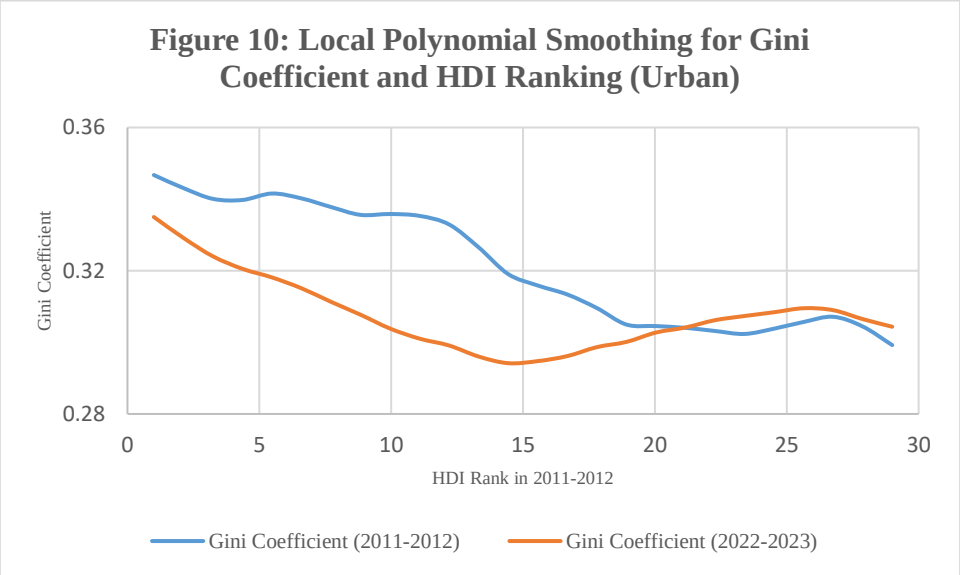
Figure 9 shows the local polynomial smoothing plot for the log of per capita GSDP and the HDI score for the years 2011-2012 (blue line) and 2022-2023 (orange line). Both lines show a positive relationship, indicating that higher income levels are associated with higher HDI scores. However, the slope of the curve for 2011-2012 is steeper compared to 2022-2023, highlighting that high-income states (in terms of per capita GSDP) had higher HDI in the earlier period, whereas in the later period, rich states in per capita GSDP terms witnessed a relative decline in HDI improvement. Additionally, the orange line for 2022-2023 flattens at higher income levels, suggesting diminishing returns to per capita GSDP in driving human development outcomes. The gap between the HDI scores for the two periods widens at higher income levels and narrows at lower income levels, indicating

that low-income states have experienced more rapid improvements in HDI compared to rich states.



Source: Computed by authors

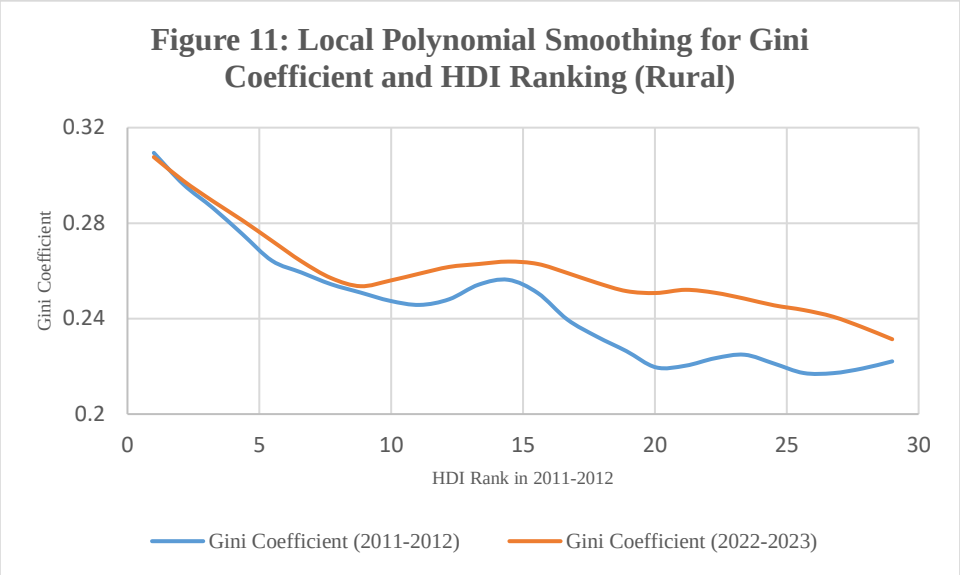
The observed trend can be partially attributed to changes in inequality across states, as illustrated in the urban (Figure 10) and rural (Figure 11) graphs of the Gini coefficient of consumption inequality. In urban areas, states with lower HDI rankings in 2011-12 experienced a significant reduction in inequality by 2022-23. Conversely, states with higher HDI rankings in 2011-12 witnessed a slight increase in urban inequality over the same period.



Source: Computed by authors

In rural areas, both low- and high-HDI-ranked states of 2011-12 showed an increase in inequality by 2022-23. However, this rise was more pronounced in states with higher HDI rankings in 2011-12 compared to those with lower HDI rankings. The relatively higher levels of inequality observed in both rural and urban areas of high-HDI-ranking states in

2022-23 likely exerted downward pressure on their HDI scores in 2011-12 via inequality-adjusted consumption.



Source: Computed by authors

4. Conclusions

The study flags significant changes in HDI performance across Indian states between 2011-12 and 2022-23, with notable shifts in rankings and magnified regional disparities. Although overall HDI scores have improved, the results underscore the crucial role of inequality in shaping human development outcomes. States like Sikkim and Tripura have significantly improved their HDI rankings, reflecting targeted progress in consumption, education, and health. In contrast, traditionally top-ranked states like Kerala, Maharashtra, and Gujarat have experienced relative declines, mainly because of rising inequality.

Analysis shows that inequality can be an important factor in human development in many high-income countries, where both rural and urban areas have seen rising inequality. In rural areas, inequality increased in high- and low-ranking states, but the surge was sharper in states with higher HDI rankings in 2011-12. In urban areas, states with higher HDI rankings in the past saw small gains in inequality, while states with lower HDI rankings saw declines in urban inequality, which helped them improve their HDI scores. These patterns indicate that inequality-adjusted consumption has emerged as an increasingly important determinant of HDI outcomes, because rising inequality limits the potential of economic growth to translate into broader gains in health, education, and the standard of living.

Low-income states, such as Odisha, Bihar, and Uttar Pradesh, have significantly improved their HDI rankings by focusing on improvements in consumption and education indices, although health outcomes remain a challenge. On the other hand, agriculturally rich states like Punjab and Haryana, as well as more industrialised states like Maharashtra and Gujarat, have recorded declining HDI scores due to the negative impacts of growing inequality.

The findings highlight the critical need for policies that address structural inequalities and ensure equitable access to education, health care, and basic services. Policymakers must work to reduce disparities between rural and urban areas while ensuring that economic growth benefits all sections of society. High-income states must prioritise inequality reduction to sustain human development gains.

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Annexure I

State-wise and Region-wise Poverty Line based on Tendulkar's Methodology

State	Poverty Line (Tendulkar): 2011-12*		Poverty Line (Tendulkar): 2022-23**	
	Monthly Per Capita (Rs.)		Monthly Per Capita (Rs.)	
	Rural	Urban	Rural	Urban
Andhra Pradesh	860	1,009	1,635	1,916
Arunachal Pradesh	930	1,060	1,805	2,057
Assam	828	1,008	1,566	1,886
Bihar	778	923	1,418	1,659
Chhattisgarh	738	849	1,331	1,520
Goa	1,090	1,134	1,928	2,016
Gujarat	932	1,152	1,703	2,087
Haryana	1,015	1,169	1,884	2,136
Himachal Pradesh	913	1,064	1,589	1,859
Jammu and Kashmir	891	988	1,725	1,915
Jharkhand	748	974	1,376	1,765
Karnataka	902	1,089	1,692	2,023
Kerala	1,018	987	1,947	1,893
Madhya Pradesh	771	897	1,429	1,661
Maharashtra	967	1,126	1,831	2,109
Manipur	1,118	1,170	2,231	2,349
Meghalaya	888	1,154	1,536	1,956
Mizoram	1,066	1,155	2,117	2,299
Nagaland	1,270	1,302	2,452	2,530
Odisha	695	861	1,294	1,602
Punjab	1,054	1,155	1,918	2,091
Rajasthan	905	1,002	1,677	1,828
Sikkim	930	1,226	1,859	2,498
Tamil Nadu	880	937	1,709	1,819
Telangana	860	1,009	1,747	2,037
Tripura	798	920	1,572	1,865
Uttar Pradesh	768	941	1,439	1,737
Uttarakhand	880	1,082	1,614	1,967
West Bengal	783	981	1,529	1,894
All India	**816**	**1,000**	**1,534**	**1,864**

Sources: *-Planning Commission (2013), **-Estimated by authors.

Annexure II

State-wise Consumption Index Score and Rank

State	Consumption Index Score: 2011-12						Consumption Index Score: 2022-23					
	Rural		Urban		Combined		Rural		Urban		Combined	
Andhra Pradesh (AP)	0.225	(18)	0.716	(6)	0.429	(11)	0.254	(19)	0.443	(12)	0.313	(16)
Arunachal Pradesh (AR)	0.422	(12)	0.293	(24)	0.279	(20)	0.448	(7)	0.508	(9)	0.459	(7)
Assam (AS)	0.299	(17)	0.230	(25)	0.165	(23)	0.297	(16)	0.260	(24)	0.293	(19)
Bihar (BR)	0.202	(21)	0.148	(28)	0.079	(26)	0.340	(11)	0.280	(23)	0.336	(15)
Chhattisgarh (CG)	**0.000**	**(29)**	**0.543**	**(14)**	**0.120**	**(24)**	**0.000**	**(29)**	**0.345**	**(19)**	**0.067**	**(29)**
Goa (GA)	0.616	(7)	1.000	(1)	1.000	(1)	0.741	(3)	1.000	(1)	0.887	(2)
Gujarat (GJ)	0.222	(20)	0.620	(10)	0.442	(10)	0.154	(23)	0.489	(10)	0.288	(20)
Haryana (HR)	0.817	(4)	0.669	(9)	0.712	(3)	0.316	(13)	0.371	(16)	0.336	(14)
Himachal Pradesh (HP)	0.835	(3)	0.796	(5)	0.652	(6)	0.464	(6)	0.567	(5)	0.474	(6)
Jammu & Kashmir (JK)	0.715	(6)	0.548	(13)	0.566	(9)	0.297	(17)	0.334	(20)	0.306	(17)
Jharkhand (JH)	0.103	(25)	0.299	(23)	0.083	(25)	0.172	(22)	0.247	(25)	0.186	(24)
Karnataka (KR)	0.167	(24)	0.681	(8)	0.400	(13)	0.280	(18)	0.591	(4)	0.393	(8)
Kerala (KL)	**1.000**	**(1)**	**0.834**	**(3)**	**0.876**	**(2)**	**0.501**	**(5)**	**0.549**	**(8)**	**0.523**	**(5)**
Madhya Pradesh (MP)	0.029	(27)	0.591	(12)	0.184	(22)	0.145	(25)	0.364	(18)	0.200	(23)
Maharashtra (MH)	0.189	(23)	0.921	(2)	0.706	(4)	0.116	(26)	0.438	(14)	0.252	(22)
Manipur (MN)	0.199	(22)	0.000	(29)	0.030	(28)	0.194	(21)	0.000	(29)	0.142	(27)
Meghalaya (MG)	0.528	(9)	0.315	(22)	0.356	(16)	0.308	(14)	0.285	(21)	0.305	(18)
Mizoram (MZ)	0.328	(16)	0.351	(19)	0.338	(17)	0.323	(12)	0.366	(17)	0.342	(13)
Nagaland (NL)	0.487	(10)	0.172	(27)	0.270	(21)	0.102	(28)	0.195	(27)	0.126	(28)
Odisha (OD)	0.046	(26)	0.512	(16)	0.069	(27)	0.370	(9)	0.442	(13)	0.381	(9)
Punjab (PB)	0.845	(2)	0.495	(17)	0.652	(7)	0.383	(8)	0.283	(22)	0.348	(12)
Rajasthan (RJ)	0.401	(13)	0.594	(11)	0.392	(14)	0.102	(27)	0.374	(15)	0.168	(26)
Sikkim (SK)	**0.535**	**(8)**	**0.335**	**(20)**	**0.366**	**(15)**	**1.000**	**(1)**	**0.708**	**(3)**	**0.920**	**(1)**
Tamil Nadu (TN)	**0.335**	**(15)**	**0.815**	**(4)**	**0.683**	**(5)**	**0.553**	**(4)**	**0.784**	**(2)**	**0.658**	**(4)**
Telangana (TL)	0.225	(18)	0.716	(6)	0.429	(11)	0.236	(20)	0.562	(6)	0.380	(10)
Tripura (TR)	0.483	(11)	0.318	(21)	0.321	(19)	0.742	(2)	0.555	(7)	0.703	(3)
Uttar Pradesh (UP)	0.024	(28)	0.201	(26)	0.000	(29)	0.152	(24)	0.238	(26)	0.170	(25)
Uttarakhand (UK)	0.763	(5)	0.539	(15)	0.605	(8)	0.348	(10)	0.453	(11)	0.370	(11)
West Bengal (WB)	0.353	(14)	0.465	(18)	0.333	(18)	0.305	(15)	0.182	(28)	0.271	(21)

Note: Figures in the parenthesis show the rank.
Source: Estimated by authors

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