

# Comparative Study on Regional Disparities in Human Development among Indian States

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**Abstract:**

The famous quote about the India is “unity in diversity”. India is a country with 28 states and 8 union territories. Since its independence, the country is struggling with many fundamental problems such as poverty, unemployment, infrastructure, poor health and education. As the development schemes were initiated in the various sectors, different dimension of quality of life got improved. Many people got the fruits of the development. The pace of development became fast after the implementation of 1991 policy changes. In the recent years there are tremendous changes have seen in the country. Human development is a multidimensional phenomenon and depends on various subjective and objective dimensions such as health, education, standard of living, satisfaction etc. So here the question arises whether there is any convergence or divergence in human development across various states and UT for the time period of 2009-2019. This study would try to find out the trends and pattern of human development among the Indian states from 1990 to 2019. The data for the time period of 29 years from 1990 to 2019 has been taken from the global data bank for the present work.

**Key words:** Quality of life, human development, sigma convergence, absolute convergence

**JEL Classification:** C38, I00, R20

**I. Introduction**

Over the past decades, there has been paradigm shift in the human development measurements. Now a day’s Multidimensional concept of well-being of quality of life have become more important. Multidimensional indicators of well-being capture the different aspects of wellbeing such as health, knowledge, income and wealth, security, life satisfaction, environment etc. at various levels. UNDP developed human Development Index in 1990, which measures three important aspects of health, knowledge and standard of living. Human development is considered a multidimensional concept. According to Human Development Report 2020, India has ranked 131 on the Human Development Index out of 189 countries. The country fell in the medium human development category with an HDI value of 0.645. The Human Development Report shows an improvement from .429 to .645 in the value of HDI for India since 1990. It is an increase over 50 percent. There is an increase of 12 years in life expectancy at birth in India, 3.5 years in mean years of schooling and 4.5 years in expected years of schooling. There is around 274% increase has been seen in Gross National Income per capita.

This study intends to identify the trend of different indicators for the various states and UT of India. Though there are major improvements in the level of development in India, but there is large discrepancy in the human development for Indian states. Institute for Management Research Radboud University<sup>1</sup> has published the sub national Human Development Index for the states of the countries. It has estimated the sub national human development index for the Indian states for the period 1990-2019. The index has been calculated on the basis of survey and census datasets by a global data lab. Some adjustments have been made due to the lack of data on some variables. Interpolation methods have been used to get the missing data. The following table shows the human development values for the Indian states from 1990 to 2019.

**Table 1: Human Development Index for Indian States (1990-2019)**

Region	1990	1995	2000	2005	2010	2015	2018	2019
India	0.429	0.461	0.494	0.536	0.579	0.624	0.643	0.646
Andaman and Nicobar Islands	0.678	0.689	0.691	0.718	0.707	0.72	0.738	0.741
Andhra Pradesh	0.422	0.448	0.475	0.528	0.578	0.627	0.646	0.649
Arunachal Pradesh	0.436	0.469	0.5	0.532	0.639	0.66	0.657	0.661

<sup>1</sup>Since 2016 the Area Database of the Global Data Lab (<https://www.globaldatalab.org>) provides a large number of development indicators at the subnational level.

Assam	0.408	0.444	0.485	0.528	0.564	0.595	0.61	0.613
Bihar	0.376	0.404	0.433	0.467	0.512	0.554	0.571	0.574
Chandigarh	0.627	0.636	0.633	0.66	0.648	0.732	0.772	0.776
Chhattisgarh	0.554	0.561	0.557	0.583	0.57	0.59	0.608	0.611
Dadra and Nagar Haveli	0.666	0.677	0.678	0.706	0.694	0.661	0.66	0.663
Daman and Diu	0.645	0.657	0.66	0.685	0.676	0.688	0.705	0.708
Goa	0.552	0.581	0.613	0.671	0.737	0.753	0.759	0.763
Gujarat	0.469	0.495	0.525	0.571	0.604	0.649	0.669	0.672
Haryana	0.465	0.504	0.547	0.589	0.633	0.684	0.705	0.708
Himachal Pradesh	0.478	0.528	0.587	0.643	0.666	0.702	0.721	0.725
Jammu and Kashmir	0.493	0.51	0.526	0.586	0.64	0.672	0.685	0.688
Jharkhand	0.554	0.562	0.558	0.584	0.571	0.58	0.595	0.598
Karnataka	0.442	0.477	0.515	0.564	0.604	0.657	0.68	0.683
Kerala	0.545	0.569	0.598	0.679	0.716	<b>0.757</b>	<b>0.778</b>	<b>0.782</b>
Lakshadweep	0.687	0.699	0.7	0.728	0.716	0.73	0.748	0.751
Madhya Pradesh	0.403	0.429	0.455	0.497	0.535	0.581	0.6	0.603
Maharashtra	0.493	0.524	0.556	0.601	0.644	0.678	0.694	0.697
Manipur	0.494	0.525	0.557	0.596	0.681	0.692	0.694	0.697
Meghalaya	0.455	0.467	0.473	0.53	0.619	0.646	0.652	0.656
Mizoram	0.526	0.547	0.568	0.629	0.686	0.695	0.701	0.704
Nagaland	0.533	0.533	0.521	0.555	0.66	0.677	0.676	0.679
New Delhi	0.577	0.619	0.663	0.69	0.709	0.728	0.743	0.746
Orissa	0.397	0.426	0.455	0.491	0.533	0.582	0.602	0.605
Puducherry	<b>0.713</b>	<b>0.724</b>	<b>0.725</b>	<b>0.754</b>	<b>0.742</b>	0.729	0.736	0.74
Punjab	0.496	0.535	0.577	0.614	0.656	0.701	0.72	0.724
Rajasthan	0.401	0.433	0.465	0.507	0.546	0.602	0.625	0.628
Sikkim	0.538	0.545	0.546	0.59	0.632	0.69	0.713	0.717
Tamil Nadu	0.47	0.503	0.54	0.598	0.646	0.688	0.705	0.709
Telangana	0.616	0.624	0.622	0.648	0.636	0.649	0.665	0.669
Tripura	0.444	0.486	0.529	0.559	0.607	0.641	0.655	0.658
Uttar Pradesh	0.393	0.426	0.459	0.5	0.532	0.572	0.591	0.594
Uttaranchal	0.621	0.629	0.624	0.652	0.638	0.661	0.68	0.683
West Bengal	0.439	0.471	0.503	0.537	0.571	0.617	0.638	0.641

Sources: [hdi.globaldatalab.org/area data/shdi/](http://hdi.globaldatalab.org/area/data/shdi/)

The above table shows the changes in the state's performance in India over the period of time. Kerala, Sikkim, Punjab, New Delhi, Mizoram, Himachal Pradesh, Haryana and Goa worked hard to upgrade its HDI value from 1990 to 2019; the HDI value for Kerala is the highest since 2015. Puducherry had the highest HDI value from 1990 to 2010 and showed very slight changes over the year. Though Gujarat state is very recognised in high GDP growth rates but its performance in human development is not as satisfactory. Maharashtra followed a steady path in the HDI. Rajasthan did some improvement and removed itself from bottom five states from 2015. And big states like Uttar Pradesh, Bihar, Madhya Pradesh Orissa and Jharkhand could not make the significant improvement in its HDI value. Tamil Nadu and Karnataka have seen a rise in their HDI rank, while most of the North Eastern states like Nagaland, Meghalaya and Manipur have seen slippages in the HDI rank. Another interesting fact is also discovered that the States that were the worst performing states in HDI during 1990s are presently doing well in the social parameter since 2014. For e.g. Rajasthan, UP, Odisha & MP have seen the largest jump in change in HDI value.

It is very well-known fact that there is high inequality among the Indian states. The data related to poverty and income inequality also reveals the truth up to some extent. There are very interesting factors about the human development patterns among the different states in India. To measure the degree of regional inequality in human development, various measures

of convergence are examined. The basic idea of convergence is defined by Barro and Sala-i-Martin (1996). They stated in their book 'Economic Growth' that "Convergence applies if a poor country tends to grow faster than a rich one, so that the poor country tends to catch up with the rich one in terms of level of per capita income or product". There are main three types of convergence: unconditional  $\beta$ -convergence, conditional  $\beta$ -convergence and  $\sigma$ -convergence

This study applies the concept of  $\sigma$ -convergence and absolute  $\beta$ -convergence in Human Development index and its sub components such as health index, education index and income index to check whether poor countries are catching up the rich countries in terms of average life expectancy, adult literacy rate, per capita income and the Human Development Index or not. For examining  $\sigma$ -convergence the coefficient of variation is used and  $\beta$ -convergence hypothesis has been tested by regressing the average annual growth rate of a variable on the log of its initial value. So, this study would try to find out the trends and pattern of human development among the Indian states from 1990 to 2019. The study would try to find out the basic reasons regional disparity among the Indian states.

## **II. Literature Background**

There are some studies which are looking into the Human Development, Regional Disparities and convergence. These studies have been given as follow:

Dreze and Sen (1995) in their book "Economic Development and Social Opportunity" found the diversities in economic and social development amongst the Indian states. They analysed the issue of basic education, issue of gender and role of women in development. Farhaad Noorbaksh's (1998) work on human development appeared in his paper "The human development index: some technical issues and alternative indices" this paper discusses a modified index for measuring human development. The Suggested index is based on the components of the Human Development Index (HDI) developed by the United Nations Development Programme (UNDP) since 1990. It discusses two categories of technical issues related to the HDI for 1995: those related to the components and those relevant to the structure of the index. The data from the Human Development Report 1995 for 174 countries are used to test the robustness of the suggested index and the results are compared to those of the HDI. The new index is then used to delineate, with some justification, different groups of countries at various levels of human development. He studied Human Development and Regional Disparities in India. His research analyses regional disparities amongst major states in India to find out if they are on a convergence or further divergence course. It compares human development and poverty indices for various states in India and investigates if there has been any reduction in disparities over a decade. The analysis is extended to the evolution of disparities amongst the states with respect to a larger set of socio-economic indicators. Planning commission of India developed state wise human development index in national human development report (2001). This report found the different level of human development among the states of India in the time period of 1981 – 2001. The report also notes that disparities amongst the States with respect to human poverty are quite striking. The report observed that though the level of human development has increased but there are very minimal changes are in in human poverty. Report showed that inter-state disparity as measured in terms of standard deviation in human development index was 0.083 for 1981 which further increased and reached at 0.100 in 1991. Prabhjot Kaur and Dr. Sharanjit Singh Dhillon (2017) used concept of  $\sigma$ -convergence and unconditional  $\beta$ -convergence has been tested in the field of human development and its components. They used average life expectancy to measure health dimension; adult literacy rate to measure education dimension and Per Capita GDP to measure income dimension. They also tested the convergence hypothesis in consolidated Human development Index. They tested the different equations for average life expectancy, adult literacy rate, per capita income and the Human Development Index or not. The results of the study proved  $\sigma$  and  $\beta$  convergence for human development index, health dimension (measured by life expectancy) and education dimension (measured by adult literacy rate). But no convergence is found in per capita GDP. It shows that the poor countries are getting relatively poorer and the rich getting richer in terms of Per Capita income, and the gap between the rich and poor is widening further. The study highlights that poor countries are catching up with the rich in terms of life expectancy, literacy rate and overall human development.

### **Objectives of the study:**

1. To assess the relative performance of Indian states and union territories on human development.
2. To study the status of regional disparities among Indian states and union territories. Whether it is increased or decreased over the time.
3. To examine the presence of convergence or divergence in case of Health index, Education index, income index and Human Development Index in interstate analysis.

### **Data sources and Methodology:**

The study is based on secondary data. To fulfill the objectives of the study the data for thirty-six states and union territories has been compiled from global data lab sub national HDI. The data has been taken for the time period of 1990 to 2019 on Human Development Index and its three indicators.

UNDP has provided the four different categories (VHHD, HHD, MHD & LHD) to measure human development evaluate, this criterion has been used to measure the performance of the Indian states and union territories over the years. The shift of different states from one to other categories shows the change in the performance of the states and UTs from 1990 to 2019.

To measure the regional inequality in HDI among Indian states and union territories coefficient of variance (CV ( $\sigma$ )) has been calculated. If CV declines, regional disparity declines over the time. The concept of  $\sigma$ -convergence is defined as  $\sigma$ -convergence occurs if the coefficient of variation of a variable tends to decrease over time. i.e. if  $\sigma_{t+T} < \sigma_t$ . Where  $\sigma_t$  is the coefficient of variation of  $y_{i,t}$  across  $i$  states;  $t$  is initial year of the respective individual state and  $T$  is the length of the period considered;  $y$  represents the variable selected for investigative convergence.

In the present study,  $\sigma$ -convergence has been tested by measuring the coefficient of variations across states and UTs of the health index, education index, income index and the Human Development Index. If the coefficient of variation across states tends to decline over time then there will be sigma convergence.

$\beta$ -convergence indicates that the growth rate of poor countries is more than the rich countries. So,  $\beta$ -convergence defines an inverse relationship between the relative growth rate of Per capita variable under consideration and its value at initial level.

Linear Regression between average annual growth rate in human development and initial level of human development is estimated to test absolute convergence by using following equation:

$$\Delta y_{i,t,t+T} = \alpha + \beta \ln Y_{i,t} + \epsilon_{i,t} \dots \dots \dots (1)$$

Where  $\Delta y_{i,t,t+T} = \frac{1}{T} \cdot \ln\left(\frac{Y_{i,t+T}}{Y_{i,t}}\right)$  is the  $i^{\text{th}}$  state's annual average growth rate of a variable Human development index between the period  $t$  and  $t+T$ . If the coefficient on initial level of a variable has a statistically significant negative sign, i.e. if  $\beta < 0$  and is significantly different from 0, then, the data set shows signs of absolute beta convergence.

In the present study, convergence hypothesis ( $\sigma$ -convergence and unconditional  $\beta$ convergence) is tested on all the three indicators of human development index individually as well as on human development index. So, in eq. (1),  $y$  will represent health index measured, education index, income index and also the human development index. Equation (1) is estimated by applying linear regression in which the average growth rate of respective variable is regressed on the log of its initial value. Both STATA and SPSS have been used for the statistical calculations.

**Performance of the Indian States and Union Territories on Human Development**

Following table shows the changes in the categories of Indian states from 1990 to 2019. The four categories have been decided as per the UNDP HDI. These categories are: very high human development (0.8-1.0), high human development (0.7-0.79), medium human development (0.55-.70), and low human development (below0.55). On the basis of the values ranks are given to the state and it was found that no Indian states has achieved the values for category one. As per the UNDP HDI reports India was in the low human development category from 1990 (0.429) to 2000 (0.536), after 2005 India upgraded to medium human development category.

Given table gives a clear picture of the changes in the human development among Indian states. No Indian state has performed so well to jump in first category of VHHD till now. Puducherry was the only Indian state, having high human development since 1990. 11 out of 35 were in the MHD group. Most of the states were in the low human development category in 1990. The situation remained same till 1995 the only change was the shift of Kerala from LHD TO MHD. But the changes were still taking in various states as a result the numbers of the LHD reduced from 23 to 18 in 2000. Lakshadweep reached in HHD. Himachal Pradesh, Kerala, Maharashtra, Manipur, Mizoram, Punjab increased their level of human development and shifted to MHD.

Major changes were seen in 2005; two more states Andaman & Nicobar and DHH were included in the HHD. 22 states were in the MHD group, Gujarat, Haryana, Jammu & Kashmir, Sikkim, Tamilnadu, and Tripura increases their level of well-being. Only ten states were in the lowest human developed category.

In 2010 Goa, Kerala, New Delhi reached in the HHD group and DNH and West Bengal shifted to MHD. Only five states were left in LHD. After that the level of human development continued to increase and No state is in the low human development category in 2015. In 2019 fourteen states have achieved high human development and 22 states are in medium human development.

**Table 2: Distribution of States among the Different Categories of Human Development**

Year	Category 1 (VVHD)	Category 2 (HHD)	Category 3 (MHD)	Category 4(LHD)
1990	0	(1) Puducherry	(11) Andaman & Nicobar, Chandigarh, Chhattisgarh, DNH, Daman, Goa, Jharkhand, Lakshadweep, new Delhi, Telangana, Uttaranchal	(24) Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tamilnadu, Tripura, Uttar Pradesh, West Bengal Andaman & Nicobar, Chandigarh, Chhattisgarh,

				DNH, Daman, Goa, Jharkhand, Lakshadweep, new Delhi, Telangana, Uttaranchal
1995	0	(1) Puducherry	(12) all above including Kerala	(23) all above except Kerala
2000	0	(2) Puducherry, Lakshadweep	(16) Andaman& Nicobar, Chandigarh, Chhattisgarh, DNH, Daman, Goa, Jharkhand, New Delhi, Telangana, Uttaranchal, Himachal Pradesh, Kerala, Maharashtra, Manipur, Mizoram ,Punjab	(18) Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu & Kashmir, Karnataka, Madhya Pradesh, Meghalaya, Nagaland , Orissa, Rajasthan , Sikkim, Tamilnadu, Tripura, Uttar Pradesh, West Bengal
2005	0	(4) Andaman& Nicobar, DNH, Puducherry , Lakshadweep	(22) Chandigarh, Chhattisgarh, Daman, Goa, Gujarat, Haryana, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Nagaland, New Delhi, Telangana, Uttaranchal, Himachal Pradesh, Maharashtra, Manipur, Mizoram ,Punjab, Sikkim, Tamilnadu, Tripura,	(10) Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Madhya Pradesh, Meghalaya, Orissa, Rajasthan ,Uttar Pradesh, West Bengal
2010	0	(6) Andaman& Nicobar ,Goa, Kerala, New Delhi, Puducherry , Lakshadweep	(25) Andhra Pradesh, Arunachal Pradesh, Assam, Chandigarh, DNH,Chhattisgarh, Daman, Gujarat, Haryana, Jammu & Kashmir, Jharkhand, Karnataka, Nagaland, Meghalaya, Telangana, Uttaranchal, Himachal Pradesh, Maharashtra, Manipur, Mizoram ,Punjab, Sikkim, Tamilnadu, Tripura, West Bengal	(5) Bihar, Madhya Pradesh, Orissa, Rajasthan ,Uttar Pradesh,
2015	0	(9) Andaman& Nicobar , Chandigarh, Goa, Himachal Pradesh, Kerala, New Delhi, Puducherry , Lakshadweep Punjab	(27) Andhra Pradesh, Arunachal Pradesh, Assam, DNH,Chhattisgarh, Daman, Gujarat, Haryana, Jammu & Kashmir, Jharkhand, Karnataka, Nagaland, Meghalaya, Telangana, Uttaranchal, Maharashtra, Manipur, Mizoram , Sikkim, Tamilnadu, Tripura, West Bengal, Bihar, Madhya Pradesh, Orissa, Rajasthan ,Uttar Pradesh,	0
2018& 2019	0	(14) Andaman& Nicobar , Chandigarh, Daman &Diu Goa, Haryana, Himachal Pradesh, Kerala, Mizoram New Delhi, Puducherry , Lakshadweep Punjab, Sikkim, Tamilnadu,	(22) Andhra Pradesh, Arunachal Pradesh, Assam, DNH,Chhattisgarh, , Gujarat, , Jammu & Kashmir, Jharkhand, Karnataka, Nagaland, Meghalaya, Telangana, Uttaranchal, Maharashtra, Manipur, , Tripura, West Bengal, Bihar, Madhya Pradesh, Orissa, Rajasthan ,Uttar Pradesh,	

Sources: [hdi.globaldatalab.org/area data/shdi/](http://hdi.globaldatalab.org/area data/shdi/)

**Convergence in Human Development across Indian States and UTs:**

The coefficient of variation measures the sigma convergence. The estimated CV is presented in the following table. The values for years 1990, 1995, 2000,2005,2010,2015 and 2019 have been used for calculating the CV. It can be seen in the table that the coefficient of variation for HDI and its components have been continuously declining over the period of time. Hence the sigma convergence has been found among Indian states during three decades.

**Table: 3 Coefficient of Variation and Standard Deviation (1990-2019)**

Years	Statistics	1990	1995	2000	2005	2010	2015	2019
<b>HDI</b>	MEAN	0.514	0.538	0.559	0.599	0.632	0.662	0.681
	SD	0.094	0.086	0.077	0.074	0.062	0.055	0.055
	CV	0.183	0.161	0.138	0.124	0.098	0.082	0.081
<b>HEALTH INDEX</b>	MEAN	0.672	0.702	0.722	0.746	0.767	0.781	0.795
	SD	0.084	0.076	0.069	0.06	0.048	0.039	0.038
	CV	0.125	0.108	0.095	0.081	0.062	0.049	0.048
<b>EDUCATION INDEX</b>	MEAN	0.427	0.444	0.453	0.505	0.537	0.582	0.595
	SD	0.133	0.114	0.092	0.094	0.075	0.063	0.064
	CV	0.311	0.256	0.203	0.186	0.139	0.109	0.108
<b>INCOME INDEX</b>	MEAN	0.48	0.504	0.536	0.574	0.615	0.64	0.669
	SD	0.074	0.076	0.079	0.074	0.072	0.067	0.07
	CV	0.153	0.151	0.147	0.129	0.117	0.105	0.104

Calculated from data available on [hdi.globaldatalab.org/area data/shdi/](http://hdi.globaldatalab.org/area/data/shdi/)

Figure one shows the coefficient of variation across the Indian states and UTs tends to decline over time in terms of human development index. The value of CV decreased from .183 in 1990 to .081 in 2019. Thus, it shows that there is sigma convergence in Indian states from 1990 to 2019.

**Figure 1: Coefficient of Variation of HDI**

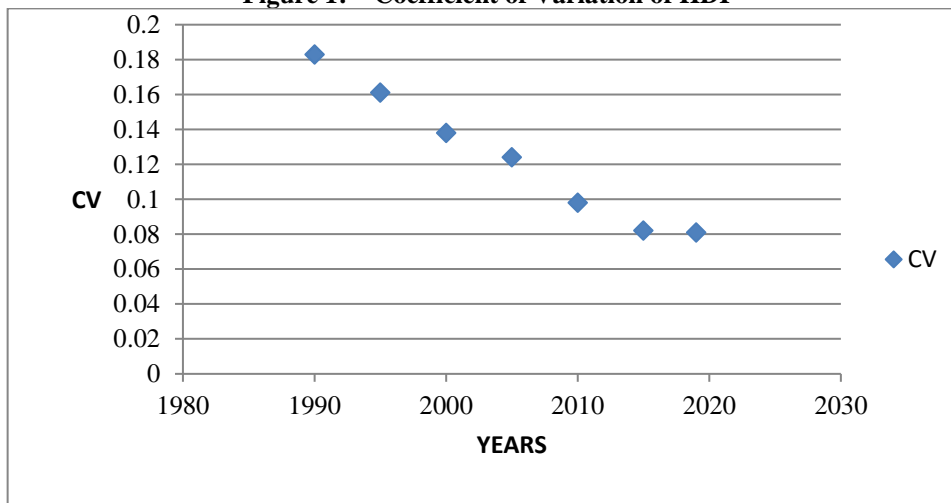
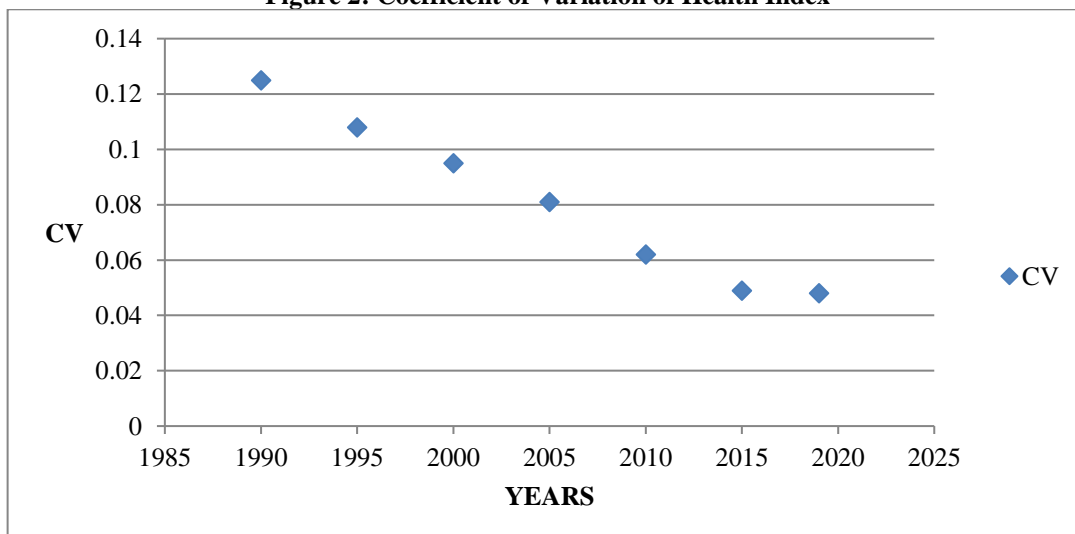


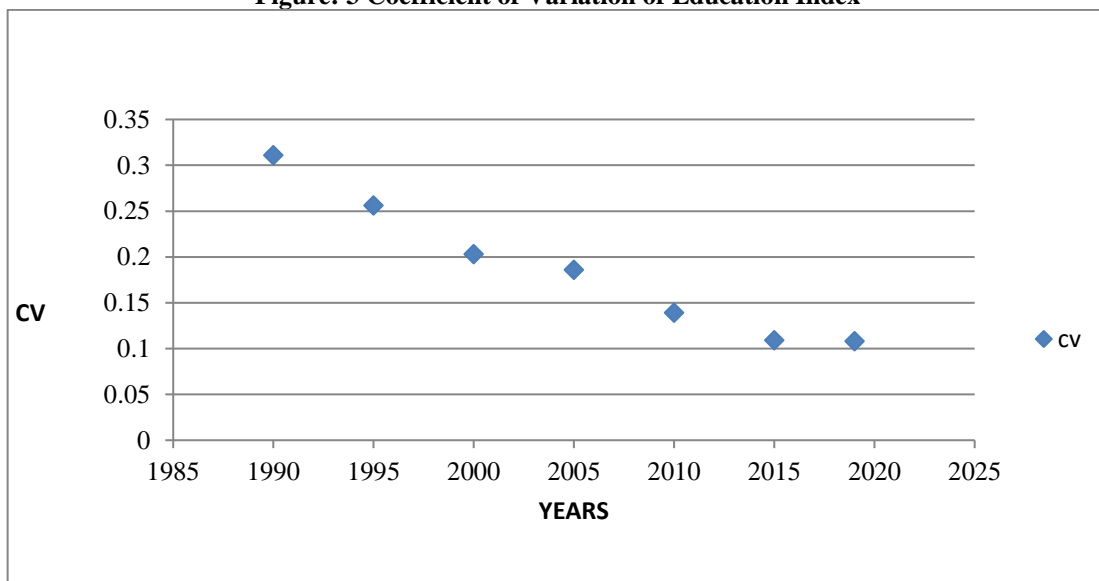
Figure two shows the trend of CV of health index, measured by life expectancy and evidences of sigma convergence are found. The value of CV was .125 in 1990 which declined to .048 in 2019.

**Figure 2: Coefficient of Variation of Health Index**



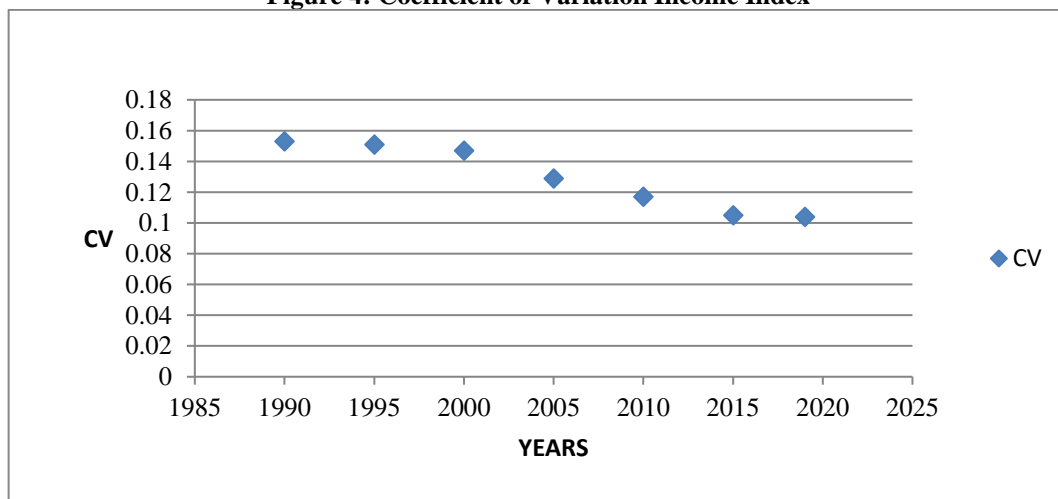
Following figure further shows the proof of sigma convergence in case of education index from 1990 to 2019. The value of CV declines from .311 to .108.

**Figure: 3 Coefficient of Variation of Education Index**



Following figure shows the sigma convergence in income index for Indian states and UTs. The value of CV was .153 in 1990, which got down to .104 in 2019.

**Figure 4: Coefficient of Variation Income Index**



**Results of Absolute Beta Convergence:**

The absolute convergence equation for HDI, Income Index, Health Index and Education Index is estimated separately by using linear regression. The total time period to 29 years from 1990 to 2019 has been divided in to three time periods with ten-year gap (1990-2000, 2000-2010 and 2010 to 2019) for the analysis. The growth rate of each variable is regressed on the natural log of initial year’s value to measure absolute  $\beta$  convergence for three continuous time periods.

Following table shows the results of the estimated  $\beta$  coefficient for the time period to 1990 to 2000.  $\rho$  value is shown in the brackets below the coefficients. Each row shows the results of linear equations.  $\beta$  coefficients found negative and significant for HDI, Health and Education. It proves the existence of beta convergence for the given time period. But income index does not any convergence as  $\beta$  coefficient is found negative but not significant. Thus, it can be stated that poor states have performed better in terms of HDI, health and education but could not catch up in income.

**Table 4: Regression Results for the Period of 1990-2000**

Independent Variables	Constant	$\beta$	R <sup>2</sup>	Adjusted R <sup>2</sup>	n
HDI 1990	-.0096239 (0.002 )	-.0273661 (0.000 )	0.5697	0.5570	36
Income Index (1990)	.0063042 (0.090 )	-.006433 (0.186)	0.0510	0.0230	36
Health Index (1990)	-.0073095 (0.023)	-.0365778 (0.000)	0.4290	0.4122	36
Education Index (1990)	.0021343 (0.645)	-.0108157 (0.033 )	0.1266	0.1009	36

Sources: Stata Output

Following table shows the results of the convergence equation for the time period of 2000-2010.  $\beta$  coefficient is negative and significant for all the variables. It gives the strong evidence of the absolute convergence in HDI, health index, income index and education index among all the Indian states and UTs from 2000 to 2010.

**Table 5: Regression results For the Period of 2000-2010**

Independent Variables	Constant	$\beta$	R <sup>2</sup>	Adjusted R <sup>2</sup>	n
HDI (2000)	-.0098239 (0.020)	-.0381393 (0.000)	0.4911	0.4761	36
Income Index (2000)	-.0072163 (0.203)	-.0334776 (0.000)	0.3104	0.2901	36
Health Index (2000)	-.0073866 (0.000)	-.0412895 (0.000)	0.6677	0.6579	36
Education Index (2000)	-.0171515 (0.006)	-.0433637 (0.000)	0.5252	0.5113	36

Sources: Stata Output

Following table depicts the convergence results for the latest time period from 2010 to 2019. It shows the negative and significant relation between the growth rate of each index and the initial level of the index value. It means poor states are catching up the rich states in terms of all indicators of human development.

**Table 6: Regression Results for the Period of 2010-2019**

Independent Variables	Constant	$\beta$	R <sup>2</sup>	Adjusted R <sup>2</sup>	n
HDI (2010)	-.0053937 (0.106)	-.0299426 (0.000)	0.3601	0.3412	36
Income Index (2010)	-.0018311 (0.635)	-.0231193 (0.004)	0.2165	0.1935	36
Health Index (2010)	-.0057099 (0.007)	-.0368272 (0.000)	0.4305	0.4137	36
Education Index (2010)	-.0145245 (0.014)	-.0417604 (0.000)	0.4052	0.3877	36

Sources: Stata Output

The above results proved the presence of sigma and absolute convergence for human development index and its sub-indices. All the Indian states and UTs are performing better in terms of human development indicators. Income index did not show absolute convergence in initial time period but later it also gave the evidences for absolute convergence.

**Conclusion**

This study has tried to examine the performance of human development of Indian states and UTs and it was observed that all the Indian states and UTs have been improving their level of human development. Further two concepts of convergence  $\sigma$ -convergence and unconditional  $\beta$  convergence across states and UTs have been tested here.  $\sigma$ -convergence and unconditional  $\beta$ -convergence have been tested to the sub-indices of human development index and HDI itself. The results of the study show that the coefficient of variation among Indian states tends to decline over time in terms of human development index, health index, education index and income index. It confirms the presence of “sigma” convergence for all the aspects of human development index. The study found negative and significant  $\beta$  coefficient for human development index, health index, education index for all the three time periods. And for income index,  $\beta$  coefficients found negative and significant for two time periods. It so, there is existence of  $\sigma$  and  $\beta$  convergence in human development index, health index, education index and income index for all the Indian states and UTs.

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