Three Decades of Human Development across Indian States: Inclusive Growth or Perpetual Disparity?

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Abstract

The importance of strengthening the human development (HD) achievements in a country to augment its growth potential is well known in development literature. Several initiatives to enhance the HD level have been introduced in India in recent past. However, the HD achievements still vary significantly across Indian States. The current paper attempts to observe the HD achievements for 28 Indian States over the last three decades and analyze their influence on growth patterns. The methodology adopted in the National Human Development Report 2001 has been applied for constructing the Human Development Index (HDI) in the current analysis, and the indices for rural and urban areas within each State are calculated separately. The results indicate importance of State-specific HD path and also the presence of high rural–urban disparity.

Key Words: Human Development Index, Consumption Inequality, Developmental Expenditure, Fiscal Space, Indian States, Rural-Urban Disparity

JEL Classification Codes: D6, O15, O18, O23

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1. Introduction

A positive relationship between human development (HD) and economic growth (EG) exist in both directions, implying that while higher growth path augments HD formation in a country, the latter also contributes positively in propelling the former (Srinivasan, 1994; Mukherjee and Chakraborty, 2011). According to the existing literature, countries often experience a virtuous cycle of high EG-high HD scenario (e.g. the Scandinavian countries), or a vicious cycle of low EG-low HD setting (e.g. several African states, Mexico), where the causality between the two prevails (Ranis, 2004; Ranis et al., 2000; Mayer-Foulkes, 2007). The two-way causality between EG and HD are influenced by several factors, the strength of which varies across countries. For instance, while public expenditure on social services and female education strengthen the relationship between HD and EG, investment rate and income distribution augment the relationship between EG and HD (Ramirez *et al*., 1998). In addition, the EG-HD relationship in a country is significantly influenced by the existing governance mechanism and quality of institutions (Amin, undated). Influence of Governance on HD might be stronger than the corresponding effect on EG (Joshi, 2007). Furthermore, higher initial level of HD may in turn augment governance mechanisms (e.g. lesser corruption) and indirectly fuel EG (Costantini and Salvatore, 2008). Finally, in addition to direct effects of EG, social capital formation through developmental efforts has augmented HD in European countries (Christoforou, 2006).

Since the adoption of economic liberalization in early nineties, EG in India has increased significantly. The average annual GDP growth rate increased from 5.57 percent during 1991-2000 to 7.59 percent during 2001-10 (calculations based on World Development Indicator database). However, a corresponding enhancement in the HD situation at the macro level has not been witnessed. It is observed from the UNDP annual publication Human Development Report (HDR) for various years that India remained in the low HD category throughout nineties, and managed to graduate to medium HD category only in 2002. In 2012 it secured a composite HDI score of 0.554, as compared to the corresponding figure of 0.439 in 1990. India's global HDI rank has also fallen from 132 in 1999 to 136 in 2012, although the number of countries covered for HD assessment increased during this period (UNDP, undated).

The weaker EG-HD interrelationship observed at the macro level motivates one to investigate the same at a more disaggregated level. There exist a rich literature on the relationship between EG and HD in India at State level. A two-way causality between EG and HD has been reported, indicating possible existence of vicious cycles (Ghosh, 2006). It has been noted that non-farm growth process has been more pro-poor in States characterized by high initial literacy rate, higher farm productivity, higher rural living standards (relative to urban areas), lower landlessness and lower infant mortality rate (Ravallion and Datt, 2002). The evidence on concentration of extreme poverty in rural areas of northern States and occurrence of dynamic income growth in southern States and urban areas also indicate the EG-HD nexus (Antony and Laxmaiah, 2008). On the other hand, importance of increased investment in human capital formation, particularly towards secondary education, on EG has often been highlighted (Ojha and Pradhan, 2006). There is a need to explore how HD achievements across Indian States

has changed and whether growing per capita income (as an indicator of economic growth) has influenced HD achievement over time.

In this background the current paper intends to analyze how the EG-HD nexus is evolving in India for 28 States over last three decades, by analyzing data for: 1983, 1993, 1999-00, 2004-05, 2009-10 and 2011-12 (i.e., in line with the NSSO Rounds). While 1983 represents the pre-reform period associated with 'Hindu' rate of growth, 1993 was characterized by limited growth experiences in the post-reform phase. 1999-00 on the other hand, despite reforms, witnessed lower EG as several external (e.g. Southeast Asian Crisis) and internal factors (e.g., political turmoil etc.) might have limited the transmission of EG into HD. In comparison, 2004-05 onwards stability of the economy has improved and a number of HD and quality of life augmenting policies has been introduced. Although the policies continued in the subsequent period, since 2008 growth rate started witnessing fluctuations resulting from global recession. 2009-10 and 2011-12 therefore capture the HD performance in post-recession phase and immediately after the fiscal stimulus package was announced by the Government of India. The paper is organized as follows. A brief discussion on the HD initiatives in India is undertaken first, and is followed by description of the methodology adopted in the paper. The temporal results on HD trends and the policy observations are noted in subsequent sections.

2. HD Initiatives in India

The trade and industrial policy related reform measures undertaken over the last three decades have significantly influenced India's growth pattern. The future growth potential of India is crucially linked with the country's ability to ensure HD formation in the current period (through augmentation of health and educational achievements). For instance, the service sector has emerged as a major export earner since late nineties and the increasing importance of the knowledge process outsourcing (KPOs) vis-à-vis the business process outsourcing (BPOs) mark an upward graduation in the value chain. Similarly, in the manufacturing plane India is slowly getting integrated in the international production networks (IPNs) spread across Asian countries, for which also enhanced skill levels are necessary. In particular, attracting FDI in various states of the country both in services as well as manufacturing sector will be difficult unless the HD achievements in those parts cross a threshold level. Therefore, formation of HD through government initiatives in present times is capable of generating positive externalities for EG in the future periods. Conversely, cutting expenditure on HD front may seriously jeopardise long run EG opportunities (Patnaik and Vasudevan, 2002).

Both as part of the Millennium Development Goals (MDGs) commitments and the unilateral efforts for augmenting education and health related achievements, a number of policy measures have been introduced in recent times. First, the *Sarva Shiksha Abhiyan* (SSA) has been initiated for ensuring universal elementary education among children aged 6-14 across the states and the National Programme of Mid-Day Meals in Schools have been an integral part of it. To strengthen the initiatives further, the Indian Parliament has enacted *The Right of Children to Free and Compulsory Education Act* in 2009. In addition, a wide network of schools would be set up at the block level, facilitating access to education at the grassroots. Second, creation of new IITs, IIMs and central universities with public funds has contributed significantly in expanding coverage of tertiary education. A number of private institutes offering higher education have also come up in

recent period, which further enhances the access for the population. In addition, FDI in education has been allowed, which facilitates collaborations of Indian entities with global players. Third, to facilitate learning, provision of computers (both laptops and tablets) free of cost is being provided to the students of various levels in a number of States. Fourth, the National Rural Health Mission (NRHM, 2005-12) has been launched with the objective of reducing Infant Mortality Rate (IMR) and Maternal Mortality Ratio (MMR), ensuring universal access to public health services such as women's health, child health, water, sanitation & hygiene, immunization, and nutrition, preventing and controlling communicable and non-communicable diseases, including locally endemic diseases etc. The National Urban Health Mission (NUHM) which has been launched to help the urban poor, particularly the slum dwellers by enabling them to access essential primary health care services, has similarly benefitted the target households. Fifth, *Pradhan Mantri Swasthya Suraksha Yojana* has been introduced for improving the regional imbalances in provision of health services, especially keeping the vulnerable states in mind. These measures, coupled with other indirect measures like *The National Rural Employment Guarantee Act* (NREGA) (2005) and *The Food Security Act* (2013), have contributed significantly in improving the HD scenario, as they increasingly enabled greater number of households to segregate the livelihood security challenges from the choice of education for their offspring.

Although these HD-related measures undertaken so far have helped India to improve the scenario, it is still falling short of fulfilling several relevant MDG commitments by the stipulated deadline, i.e., 2015. For instance, it is clearly observed from Table 1 that India need to work harder for fulfilling a number of education (e.g. literacy rate, gender disparity in higher education) and health-related (e.g. various mortality rates, attendance of skilled personnel during birth) objectives, which is a matter of grave concern. The modest achievement can be explained by the thinner devolution of funds towards education and health sectors in the country, which looks modest even in comparison to some developing country and LDCs (Annex 1).

Table 1: Fulfilling MDG Targets – India's Achievements

Indicator	**Year 1990 (Estimated Value)**	**MDG Target (Value)**	**Year**	**Value**	**Year**	**Value**
Proportion of under-weight children below 3 years (%)	52	26	1998-99	43	2005-06	40
Net Enrolment Ratio in primary grade (%)	77	100.0	2004	87.4	2010-11	99.89
Proportion of pupils starting grade 1 who reach grade 5	100				2010-11	82
Literacy rate of 15-24 year olds	61	100.0	1991	61.9	2007-08	86
Ratio of girls to boys in primary education	0.73	1.00	1991	0.76	2010-11	1.01
Ratio of girls to boys in secondary education		1.00	1991	0.60	2010-11	0.88
Ratio of girls to boys in Tertiary education		1.00	1991	0.54	2010-11	0.79

Under five mortality rate (per 1000 live births)	126	42	1992-93	109	2011	55
Infant Mortality rate (per 1000 live births)	80	27	1990	80	2012	42
Maternal mortality ratio (per 100,000 live births)	437	109	1992-93	424	2007-09	212
Proportion of births attended by skilled health personnel (%)		100			2007-08	52

Source: GoI (2013a)

In the new millennium in association with UNDP, the Government of India has started analysing the State-wise HD scenario. The National Human Development Report 2001 (GoI, 2002), brought out by the Planning Commission, and the subsequent State-wise reports are worth mentioning in this regard. However in line with the concerns regarding the shortfall in overall compliance level noted from Table 1, an alarming scenario persists at several States as well. Many States also happen to be struggling on economic front and hence are not in a position to revitalize their financial efforts towards HD augmentation. The failure of the country to reach the MDG target is in turn likely to limit its ability to fulfill the 'Post-2015 Development Agenda' of creating jobs for all, to secure inclusive growth (UNDP, 2013).

3. Methodology and Data[1]

Human Development Index

The present analysis adopts the NHDR 2001 methodology for calculation of the Human Development Index (HDI) for Indian States by considering three variables, namely - per capita consumption expenditure; composite index of educational attainment and health attainment respectively. As per the methodology, the HDI score for the j^{th} State is given by the average of the normalized values of the three indicators, namely - inflation and inequality adjusted per capita consumption expenditure (X_1); composite indicator on educational attainment (X_2) and composite indicator on health attainment (X_3). The normalization is done by dividing the difference between any variable (X_{ij}) within these categories and the minimum value of X_i to the difference between the maximum and the minimum value of X_i.

While the UNDP methodology considers Real GDP Per Capita in PPP for calculating HDI, NHDR 2001 instead adopted inflation and inequality adjusted average monthly per capita consumption expenditure (MPCE) of a State for this purpose. The current analysis follows NHDR 2001 method, as that provides a more realistic picture. The MPCE data, as obtained from National Sample Survey Organization (NSSO)'s quinquennial surveys (38^{th} Round: 1983, 43^{rd} Round: 1987-88, 50^{th} Round: 1993-94, 55^{th} Round: 1999-2000, 61^{st} Round: 2004-05, 66^{th} Round: 2009-10 and 68^{th} Round: 2011-12), is first adjusted for inequality using State-wise *Gini*

[1] This section draws from the methodology described in Mukherjee and Chakraborty (2011).

Ratios of MPCE (also provided in the quinquennial rounds, except for 1987-88).[2] The inequality adjustment is important because a State characterized by high average MPCE with lower Gini Ratio is better off as compared to a State with higher average MPCE with higher Gini Ratio, and that perspective need to be factored in. The inequality adjusted MPCE is further adjusted for inflation, by considering State-specific poverty line, to make it amenable to inter-temporal and inter-spatial comparisons (GoI, 2002).

The aforesaid adjustments are carried out along the following lines. If GR_{ij} is the Gini Ratio for the j[th] State for the i[th] period and $MPCE_{ij}$ is the average monthly per capita consumption expenditure for the j[th] State for the ith period, inequality adjusted average monthly per capita expenditure for the j[th] state for the ith period ($IMPCE_{ij}$) is expressed as $(1-GR_{ij})\,X\,MPCE_{ij}$, where $0 \le GR_{ij} \le 1$. After adjustment for inequality for each of the states, the adjustment for inflation is carried out. If PL_{ij} is the poverty line (in Rs. per capita per month) for the j[th] State for the i[th] period and PL_{1983j} is the poverty line of the j[th] State for 1983, then inflation and inequality adjusted average monthly consumption expenditure for the jth State for the i[th] period ($IIMPCE_{ij}$) is expressed as $(PL_{1983j} / PL_{ij})\,X\,IMPCE_{ij}$.[3] The inflation and inequality adjusted MPCE of a state calculated in this manner is further used as an indicator of consumption (X_1) to construct HDI. This analysis has been carried out for rural and urban areas of each State separately.[4]

The composite indicator on educational attainment (X_2) is derived with the help of two variables, namely: literacy rate for the age group of 7 years and above (e_1) and adjusted intensity of formal education (e_2). The underlying logic is that literacy rate being an overall ratio alone may not reflect the actual scenario, and the drop-out ratio has to be factored in. The data on literacy rate has been considered for four periods – 1981, 1991, 2001 and 2011 - which correspond to the Population Census. The adjusted Intensity of Formal Education data is considered for seven periods– 1978 (GoI, undated a); 1986 (NCERT, 1990), 1993 (NCERT, 1999), 2002 (NCERT, 2006), 2009 (MHRD, undated), 2011-12 (NCERT, 2013) and 2004-05. For 2004-05, the current analysis draws the data on Intensity of Formal Education (IFE) and the Total Enrolment from NCERT (2006) and GoI (undated b) respectively.[5] Except for 2004-05 and 2009, all periods data corresponds to NCERT's All India School Education Survey (AISES).[6] State-wise and residence-wise (rural and urban) population between 6 to 18 age group is either available in AISESs or projected based on age group-wise population data available for 2001 and

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2 For 43rd Round (1987-88), Gini coefficient is estimated (separately for rural and urban areas of each state) by using unit level data.

3 State-specific poverty lines for the three periods (1983, 1993-94 and 1999-00) have been taken from GoI (2002), for 1987-88 we have referred Government of India (1993)and for 2004-05, 2009-10 and 201-12 we referred the data released by the Planning Commission (GoI, 2009, 2012, 2013b).

4 Three new states, namely - Chhattisgarh, Jharkhand and Uttarakhand were created from Madhya Pradesh, Bihar and Uttar Pradesh in 2001. For periods before 2001, it has been assumed that the values of the variables are same for both the new and the existing states.

5 For 2005-06, the current analysis has estimated the adjusted intensity of formal education as on September 30, 2005.

6 Database is available online at http://www.aises.nic.in/home (last accessed on 5 June 2014)

2011 from Population Census and state-wise population projection tables published by the Registrar General of India and Census Commissioner (RGI&CC 2006).[7] In line with NHDR 2001 methodology, weightage of 0.35 and 0.65 are assigned to e_1 and e_2 respectively for estimating X_2.

The Intensity of Formal Education (IFE) is estimated as a ratio between Weighted Average of Enrollment (WAE) of students from class I to class XII (where weights being assigned 1 for Class I, 2 for Class II and so on) to the Total Enrolment (TE) in Class I to Class XII. IFE is multiplied with the proportion of Total Enrolment to Population in the age group 6-18 (P_C) (GoI, 2002). According to the formula, suppose E_i be the number of children (rural and urban combined) enrolled in ith standard in 2002, i = 1 for Class I to 12 for Class XII). Then Weighted Average of the Enrolment (WAE) from Class I to Class XII is calculated as the weighted average of enrolment (E_i) in a particular Class where weights are i = 1 for Class I to 12 for Class XII.

Now, suppose TE_i is the total enrolment of Children from Class I to Class XII in 2002. Then the Intensity of Formal Education (IFE) for children (rural and urban combined) in 2002 becomes WAE expressed as a percentage of TE. Suppose P_C represents the Population of Children (rural and urban combined) in the age group 6 to 18 years in 2001. Then the Adjusted Intensity of formal education (AIFE) for children (for rural and urban areas separately) in 2002 can be determined as the ratio of IFE multiplied by TE and the Population of Children in the age group 6 to 18 years in 2001.

Finally the Composite indicator on health attainment (X_3) is constructed by considering two variables, namely - Life Expectancy (LE) at age one (h_1) and the inverse of Infant Mortality Rate (IMR) (h_2). For h_1, which measures the life expectancy at age 1, the five data periods considered for the current analysis are: 1981-85 (for 1983), 1986-90 (for 1987-88), 1991-95 (for 1993-94), 1996-2000 (for 1999-00), 2001-05 (for 2004-05), 2002-06 (for 2009-10) and 2006-10 (2011-12).[8] Data on Life Expectancy at age 1 is not available for all states, and therefore we have taken Assam as proxy for North-Eastern states (Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura), Maharashtra for Goa, Haryana for Himachal Pradesh and Jammu & Kashmir. For the first two periods data (rural and urban separately) has been obtained from GoI (2002) and for other two periods the data have been taken from Ministry of Health & Family Welfare and the RGI (1999). The data on IMR (per thousand) for rural and urban areas is considered for the following periods – 1981 (for 1983), 1991 for (1993-94), 1999 for (1999-00), 2004 (for 2004-05), 2009 (for 2009-10) and 2011 (for 2011-12). The IMR data for 1981 and 1991 are taken from GoI (2002) and the other data points have been obtained from SRS Bulletins.[9] In line with NHDR 2001 methodology, weightage of 0.65 and 0.35 are assigned to h_1

[7] Since RGI&CC (2006) data does not provide population data for 6-18 age group for rural and urban areas separately, the rural and urban 6-18 age group population ratio in 2001 is used for estimating the projected figures for 2002 and 2005.

[8] Except for 2006-10, all data are taken from Registrar General of India (2009). For 2006-10 we have relied on Registrar General of India (2012)

[9] Sample Registration System (SRS) Bulletins, Registrar General of India, Available at http://censusindia.gov.in/vital_statistics/SRS_Bulletins/Bulletins.aspx, Accessed on 12 November 2013.

and h_2 respectively for estimating X_3. Like the other variables, the indicator is constructed for rural and urban areas separately.

Economic Growth (EG)

EG in the current analysis is measured by the Per Capita Gross State Domestic Product (PCGSDP) at factor cost and current prices (2004-05 Series) in Rs., as the data released by the Central Statistics Office (CSO).[10] CSO provides data on Per Capita GSDP for earlier years and GSDP for recent years. First, we have considered state-wise, year-wise projected population and estimated Per Capita GSDP from GSDP data.[11] Second, we have adjusted data for series changes and converted the Per capita GSDP data since 1980-81 to 2012-13 in 2004-05 series. Third, to understand the size of the economy and growth pattern of each of the States, the present analysis classifies states into three categories with respect to their PCGSDP in the following manner: high income States (PCGSDP: greater than 2nd Quartile or median), medium income States (PCGSDP: 1st to 2nd Quartile) and low income States (PCGSDP: less than or equal to 1st Quartile).

To even out the yearly fluctuations in PCGSDP, the current analysis considers three years' average figures in our analysis. For 1981 it is average of 1981-82 to 1983-84, for 1987-88 it is average of 1986-87 to 1988-89, for 1993 it is average of 1992-93 to 1994-95, for 1999-2000 it is average of 1998-99 to 2000-01, 2004-05 it is average of 2003-04 to 2005-06, for 2009-10 it is average of 2008-09 to 2010-11 and for 2011-12 it is average of 2010-11 to 2012-13.

The need for arriving at the inequality-adjusted MPCE figures can be understood from Figure 1, which shows that barring the exception for 1987-88, urban inequality in consumption expenditure has always been higher than the corresponding figure for rural areas. The rural and urban inequality wedge had gone up in 1993. Since 1993, across all income categories, the rural-urban gap in consumption inequality is not showing any signs of decline.

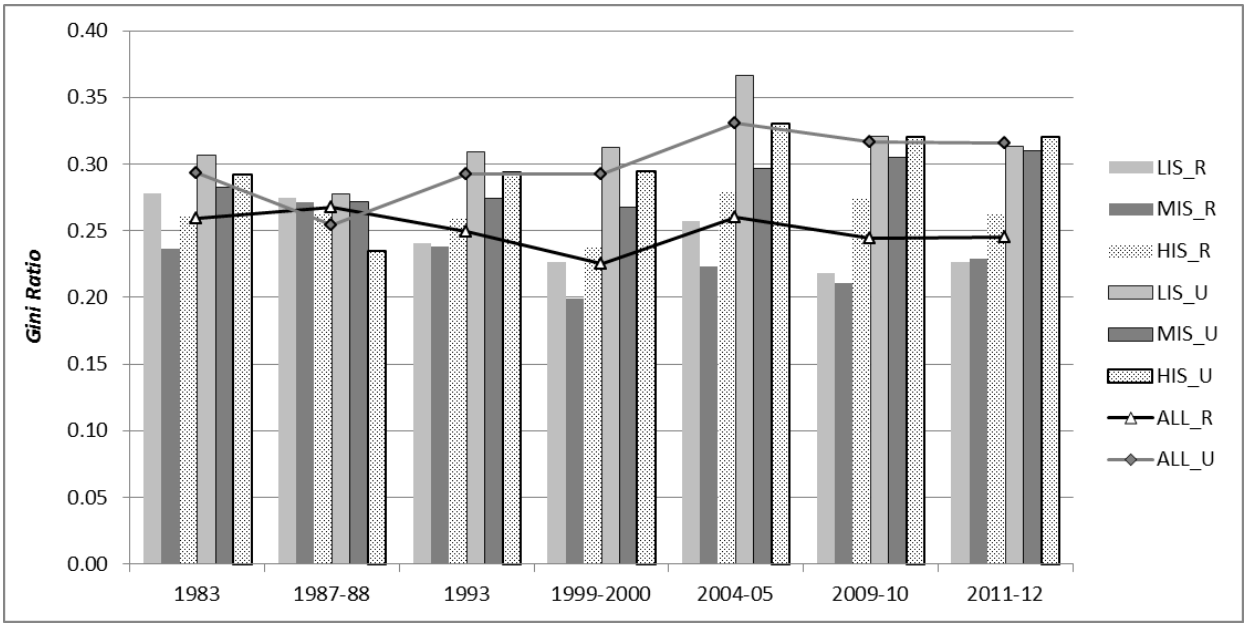
On rural front, for low income states (LIS), the inequality declined since 1983, but the trend was reversed over 1999-00 to 2004-05. The inequality declined again during the next period, but in the closing period 2011-12, the number stands higher than the corresponding 1999-2000 level. For middle income (MIS) and high income states (HIS), inequality declined since 1987-88, had risen over 1999-00 to 2004-05, and oscillated over the next two periods. In urban areas, inequality had increased sharply since 1987-88 for all income groups, barring the exception of MIS over 1993 to 1999-00. Over 1999-00 to 2004-05, inequality increased sharply for all income groups. Since 2004-05, a different path has followed by states, while inequality has declined for LIS and increased for MIS respectively since then, an oscillating trend has been observed for the HIS. In all, after decline in rural inequality in two consecutive periods (1993 and 1999-2000), inequality increased substantially both in rural and urban areas in 2004-05 (as compared to 1999-2000) across all income groups, which was particularly sharp for the HIS. Although over 2004-

[10] State Domestic Product (State Series), CSO, Ministry of Statistics and Programme Implementation. Available at: http://mospi.nic.in/, Accessed on 12 November 2013.

[11] For this we have used rural and urban population figures of two consecutive Population Census of 2001 and 2011 and then estimated the population between 2001 to 2011 by assuming constant exponential growth rate between the Census years.

05 to 2009-10, inequality declined across all income groups barring the exception of MIS, the same has increased once again over 2009-10 to 2011-12 within several income groups.

Figure 1: Gini Ratio of Consumption Expenditure of Indian States according to Per Capita GSDP



Source: Constructed by the authors

The evolving EG scenario across the States is explained with the help of Table 2. The income quartiles for the period under observation are defined at the bottom and the States falling under different income categories during a period are noted in the parenthesis. The table reveals that while Punjab, Haryana, Goa, Gujarat and Maharashtra remained in the high income category throughout the period, Biharand Uttar Pradesh could not graduate from the low income group. Orissa has only in 2011-12 managed to reach the middle income group. Interestingly, the States witnessing higher growth in their service sector in recent period, e.g., Andhra Pradesh, Karnataka, Tamil Nadu and West Bengal are spread over both high-income and mid-income category. A fluctuating trend between various income groups has been noticed for some Northeastern States. Overall an increase in differences of per capita income (between LIS and HIS) is observed across the States (see Inter Quartile Range in Table 2).

Table 2: Per Capita GSDP at Current Prices (2004-05 Series) (Rs.)

State / UT	1983		1987-88		1993-94		1999-2000		2004-05		2009-10		2011-12	
Andhra Pradesh	2,342	(M)	3,810	(M)	9,124	(M)	18,559	(H)	28,896	(H)	59,739	(H)	78,703	(H)
Arunachal Pradesh	2,915	(H)	5,138	(H)	10,958	(H)	18,194	(H)	28,576	(H)	55,799	(H)	76,322	(H)
Assam	2,529	(M)	4,212	(M)	7,930	(L)	13,349	(L)	19,166	(L)	31,918	(L)	40,607	(L)
Bihar	1,387	(L)	2,354	(L)	4,170	(L)	6,778	(L)	8,621	(L)	17,065	(L)	24,510	(L)
Chhattisgarh	2,332	(L)	3,788	(L)	9,400	(M)	14,209	(L)	21,636	(L)	42,868	(M)	52,893	(M)
Goa	5,961	(H)	9,544	(H)	22,693	(H)	57,543	(H)	90,660	(H)	204,602	(H)	239,155	(H)
Gujarat	3,555	(H)	5,547	(H)	13,085	(H)	24,192	(H)	39,165	(H)	75,362	(H)	98,464	(H)
Haryana	3,852	(H)	6,321	(H)	13,874	(H)	26,409	(H)	43,177	(H)	90,719	(H)	119,168	(H)
Himachal Pradesh	3,243	(H)	5,258	(H)	11,447	(H)	25,250	(H)	38,548	(H)	73,178	(H)	95,254	(H)
Jammu & Kashmir	3,532	(H)	5,433	(H)	9,200	(M)	17,110	(M)	25,264	(M)	41,149	(L)	52,877	(L)
Jharkhand	1,387	(L)	2,354	(L)	9,439	(M)	14,963	(L)	19,757	(L)	33,156	(L)	44,020	(L)
Karnataka	2,612	(M)	4,399	(M)	10,019	(H)	20,874	(H)	30,270	(H)	59,349	(H)	75,933	(H)
Kerala	2,978	(H)	4,908	(H)	11,046	(H)	23,745	(H)	37,254	(H)	70,378	(H)	91,912	(H)
Madhya Pradesh	2,332	(L)	3,788	(L)	7,932	(L)	14,045	(L)	18,066	(L)	32,736	(L)	43,405	(L)
Maharashtra	3,642	(H)	5,968	(H)	14,879	(H)	27,432	(H)	41,703	(H)	80,695	(H)	106,862	(H)
Manipur	2,774	(H)	4,840	(H)	9,048	(M)	16,469	(M)	21,960	(M)	31,733	(L)	38,657	(L)
Meghalaya	2,546	(M)	4,451	(M)	9,349	(M)	17,548	(M)	26,293	(M)	45,882	(M)	55,164	(M)
Mizoram	2,444	(M)	5,945	(H)	11,510	(H)	20,321	(H)	28,919	(H)	51,537	(M)	66,017	(M)
Nagaland	3,630	(H)	6,582	(H)	14,629	(H)	21,510	(H)	30,488	(H)	53,339	(H)	66,976	(H)
Odisha	2,258	(L)	3,554	(L)	6,892	(L)	12,597	(L)	19,907	(L)	41,467	(M)	52,991	(M)
Punjab	4,231	(H)	7,136	(H)	15,931	(H)	29,185	(H)	38,973	(H)	73,716	(H)	92,490	(H)
Rajasthan	2,419	(M)	3,846	(M)	8,702	(M)	16,348	(M)	21,770	(M)	42,074	(M)	58,232	(M)
Sikkim	2,775	(H)	5,035	(H)	11,263	(H)	19,609	(H)	31,425	(H)	93,906	(H)	142,375	(H)
Tamil Nadu	2,628	(H)	4,762	(H)	11,361	(H)	23,516	(H)	33,983	(H)	69,609	(H)	92,068	(H)
Tripura	2,586	(M)	4,076	(M)	6,836	(L)	16,313	(M)	26,796	(M)	43,668	(M)	56,865	(M)
Uttar Pradesh	2,009	(L)	3,245	(L)	6,580	(L)	11,462	(L)	15,022	(L)	27,123	(L)	34,159	(L)
Uttarakhand	2,009	(L)	3,245	(L)	10,417	(H)	16,441	(M)	28,292	(M)	71,749	(H)	97,241	(H)
West Bengal	2,700	(H)	4,428	(M)	8,061	(L)	17,049	(M)	25,054	(M)	44,957	(M)	59,018	(M)
Minimum	*1,387*		*2,354*		*4,170*		*6,778*		*8,621*		*17,065*		*24,510*	
Quartile 1	*2,339*		*3,804*		*8,542*		*15,975*		*21,736*		*41,387*		*52,889*	
Quartile 2 (median)	*2,620*		*4,607*		*9,729*		*17,871*		*28,434*		*52,438*		*66,497*	
Quartile 3	*3,315*		*5,461*		*11,463*		*23,573*		*34,801*		*72,107*		*93,181*	

Maximum	*5,961*	*9,544*	*22,693*	*57,543*	*90,660*	*204,602*	*239,155*
Inter-Quartile range (IQR)(Q3-Q1)	*976*	*1,657*	*2,921*	*7,598*	*13,064*	*30,719*	*40,292*

Note: (H) implies High Income State (PCGSDP is higher than the second quartile); (M) implies Middle Income State (PCGSDP lies between the first and second quartiles); and (L) implies Low Income State (PCGSDP lies below or equal to the first quartile).
Source: State Domestic Product (State Series), Central Statistical Office, Ministry of Statistics and Programme Implementation, Government of India, New Delhi (http://mospi.nic.in)

4. HDI Results

For arriving at the composite HDI, the sub-components are first arrived at. It is observed from the State-wise Consumption Index (X_1) figures that Goa, Kerala, Tamil Nadu, Himachal Pradesh and Maharashtra are among the topper States in terms of urban consumption in 2011-12, while Manipur, Bihar, Uttar Pradesh Arunachal Pradesh and Nagaland are placed at the bottom. On the rural front, Goa, Kerala, and Punjab are at the top, while Uttar Pradesh, Chhattisgarh and Madhya Pradesh are at the other extreme. The stark difference in terms of consumption pattern within States becomes quite clear from the analysis. For instance in 2011-12, while Maharashtra ranks 5^{th} in terms of urban consumption, it is ranked 17^{th} in terms of rural consumption scores. Conversely in 2009-10, while Jammu and Kashmir ranks 5^{th} in terms of rural consumption; it holds the 15^{th} position in terms of urban consumption scores. Also, a transformation in the relative position of the States during the study period is noted. For instance, while Kerala's ranking has consistently improved over 1983-2012, the same for Haryana has deteriorated.

On the education front (X_2), Himachal Pradesh, Mizoram, Meghalaya and Nagaland are among the toppers in the terms of achievements in urban areas, while Jammu and Kashmir, UP, Bihar and Rajasthan are at the other end of the spectrum. On the rural front, Kerala, Tripura and Himachal Pradesh remain at the top, while Bihar, Andhra Pradesh and Arunachal Pradesh are at the other extreme. The rural-urban disparity for a number of States turns out to be major concern. For example, in 2011-12, Arunachal Pradesh is ranked 5^{th} in terms of urban educational achievements, but holds the 26^{th} position in rural scale.

Sharp intra-state divergence in terms of health Index (X_3) is also noted. For instance in 2011-12, while Jharkhand ranks 24^{th} in terms of urban health achievements, it is ranked 13^{th} in terms of rural health scores. On the whole, in 2011-12, Jammu & Kashmir, Himachal Pradesh, Kerala, and Punjab are among the toppers, while Uttarakhand, UP, Orissa and Bihar are located at the bottom in the urban scale. On the rural front, Kerala, Jammu & Kashmir, Himachal Pradesh and Punjab and Haryana are at the top, while Assam, Meghalaya, Mizoram and Arunachal Pradesh are at the other extreme.

The composite index of HD for the 28 States is presented in Table 3, which reveals that overall HD level has been consistently high for States like Kerala, Goa, Himachal Pradesh etc., but Chhattisgarh, Uttar Pradesh and Bihar remain among the bottom liners. The HD performance of both high as well as low income States has registered interesting movements. For example, although high income States like Punjab and Haryana had an encouraging HD level in 1983, their performance in the urban areas has worsened in the recent period. On the other hand, a high-income State Jammu & Kashmir and a middle-income State West Bengal have enhanced their HD level during the period of analysis. The performance of Tamil Nadu has improved from 11^{th} position in 1983 to 4^{th} position in 2011-12, due to constant efforts of the successive governments. The importance of State-specific factors can be displayed through the example of Jharkhand, which has shown a marginal improvement in HD scores in urban areas after separation from Bihar in 2004-05, and a further marked improvement is noticed in 2011-12. Uttarakhand has witnessed a similar scenario after separation from UP.

The relative HD positions across Indian States over the study period are shown with the help of Figures 2 (rural) and 3 (urban). The Figures indicate that the States placed below the diagonal line have experienced negative HDI growth over 1983 to 2011-12, while those lying above the diagonal have registered positive performance during the same period. The non-uniform distribution of HD achievements also becomes evident from the diagrammatic representation. For example, on a rural HDI scale of *zero* to *one*, the poorly performing States Chhattisgarh, Madhya Pradesh and Bihar have managed little more than the meager score of 0.1, while the best performing state Kerala received almost *one*. Similarly, on an urban HDI scale, Uttar Pradesh has scored less than 0.1, while Kerala and Himachal Pradesh have scored above 0.8.

The EG-HD cross-state relationship during 2011-12 is graphically represented through Figures 4 & 5, where the rural and urban PCGSDP are separately reported and compared with HD scores. A couple of interesting observations can be made on the basis of the figure. First, the positive relationship between EG and HD is confirmed, which otherwise holds good for all five periods. Second, a non-linearity in the EG-HD relationship is witnessed; implying that rising income level is increasingly associated smaller HD achievements. Third, barring the exception of a few States, the urban HDI scenario is generally better than the corresponding rural figures for all the periods in the current analysis. For instance, the high income State Goa experienced higher rural HDI score vis-à-vis the corresponding urban HDI scores for 1983, 1993 and 1999, but an opposite scenario emerged from 2004-05 onwards. Conversely, for high income States like Punjab and Haryana, rural HDI score always remained higher vis-à-vis urban HDI score. However, the rising development wedge becomes evident by looking at Figure 5, which compares EG-HD cross-state relationship during 1983.

Table 3: State-wise Human Development Index (HDI) Scores and Ranks: 1983 to 2011-12 (Rural & Urban Combined)

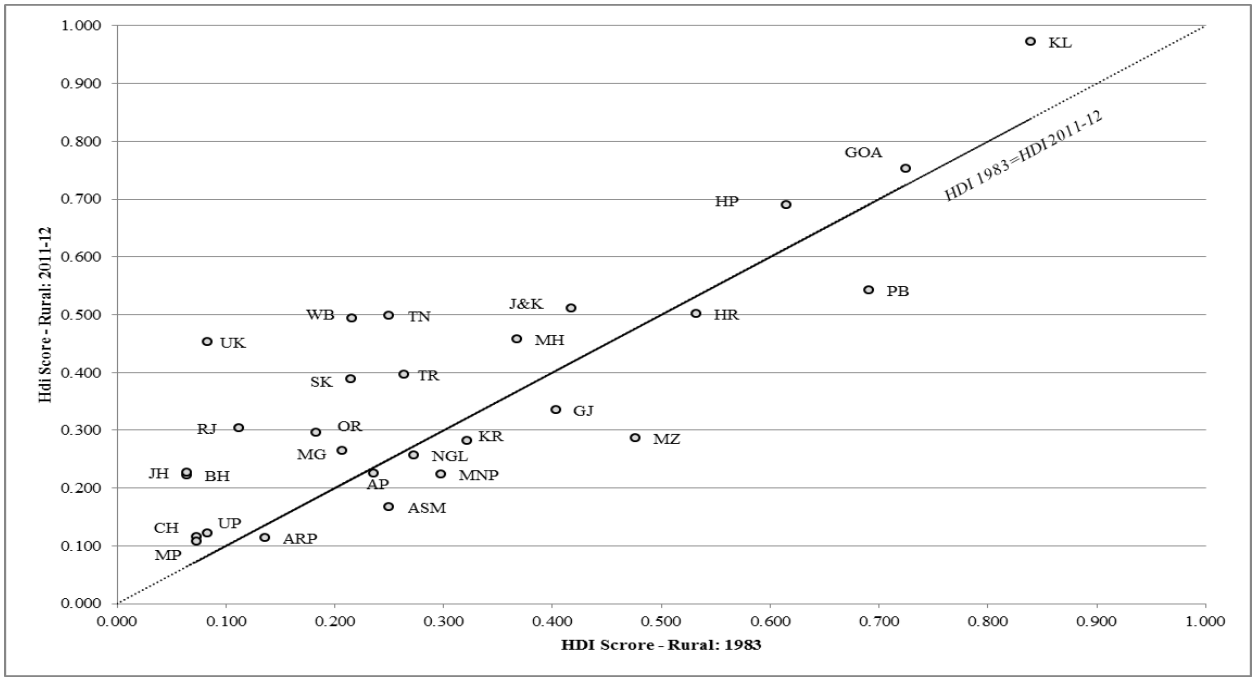
State	1983		1987-88		1993		1999-2000		2004-05		2009-10		2011-12	
Andhra Pradesh	0.290	(14)	0.185	(16)	0.217	(18)	0.288	(14)	0.298	(16)	0.286	(16)	0.309	(17)
Arunachal Pradesh	0.116	(24)	0.066	(24)	0.110	(22)	0.168	(21)	0.234	(21)	0.175	(23)	0.124	(27)
Assam	0.242	(17)	0.123	(20)	0.147	(21)	0.144	(25)	0.234	(22)	0.176	(22)	0.138	(26)
Bihar	0.071	(27)	0.024	(27)	0.061	(27)	0.074	(28)	0.050	(28)	0.050	(28)	0.158	(25)
Chhattisgarh*	0.129	(22)	0.077	(22)	0.069	(23)	0.155	(23)	0.142	(27)	0.114	(27)	0.180	(24)
Goa	0.774	(2)	0.540	(2)	0.700	(2)	0.701	(2)	0.781	(2)	0.796	(2)	0.803	(2)
Gujrat	0.502	(8)	0.301	(12)	0.362	(10)	0.390	(11)	0.429	(12)	0.461	(8)	0.477	(10)
Haryana	0.556	(5)	0.415	(7)	0.396	(8)	0.490	(7)	0.544	(7)	0.516	(7)	0.493	(7)
Himachal Pradesh	0.622	(4)	0.461	(5)	0.430	(7)	0.550	(5)	0.605	(4)	0.655	(3)	0.647	(3)
Jammu & Kashmir	0.443	(9)	0.289	(13)	0.316	(13)	0.406	(10)	0.493	(9)	0.443	(11)	0.479	(9)
Jharkhand*	0.071	(27)	0.024	(27)	0.061	(27)	0.077	(27)	0.145	(26)	0.160	(26)	0.222	(21)
Karnataka	0.416	(10)	0.342	(10)	0.326	(12)	0.379	(12)	0.436	(11)	0.457	(9)	0.420	(12)
Kerala	0.818	(1)	0.722	(1)	0.805	(1)	0.815	(1)	1.000	(1)	0.963	(1)	0.911	(1)
Madhya Pradesh	0.129	(22)	0.077	(22)	0.069	(23)	0.152	(24)	0.182	(23)	0.172	(24)	0.186	(23)
Maharashtra	0.504	(7)	0.408	(8)	0.446	(5)	0.506	(6)	0.583	(6)	0.602	(5)	0.629	(5)
Manipur	0.305	(13)	0.205	(14)	0.259	(15)	0.271	(16)	0.256	(19)	0.217	(21)	0.199	(22)
Meghalaya	0.215	(18)	0.124	(19)	0.225	(16)	0.260	(18)	0.340	(14)	0.259	(18)	0.246	(20)
Mizoram	0.547	(6)	0.449	(6)	0.613	(3)	0.576	(4)	0.529	(8)	0.449	(10)	0.408	(13)
Nagaland	0.272	(15)	0.476	(4)	0.438	(6)	0.467	(8)	0.403	(13)	0.262	(17)	0.257	(19)
Odisha	0.187	(20)	0.141	(18)	0.159	(19)	0.175	(20)	0.174	(24)	0.248	(19)	0.261	(18)
Punjab	0.691	(3)	0.519	(3)	0.562	(4)	0.578	(3)	0.640	(3)	0.584	(6)	0.538	(6)
Rajasthan	0.181	(21)	0.081	(21)	0.155	(20)	0.265	(17)	0.278	(18)	0.240	(20)	0.324	(16)
Sikkim	0.211	(19)	0.160	(17)	0.217	(17)	0.236	(19)	0.299	(15)	0.377	(15)	0.324	(15)
Tamil Nadu	0.359	(11)	0.345	(9)	0.387	(9)	0.462	(9)	0.587	(5)	0.621	(4)	0.633	(4)
Tripura	0.258	(16)	0.205	(15)	0.280	(14)	0.285	(15)	0.288	(17)	0.421	(12)	0.354	(14)
Uttar Pradesh	0.102	(25)	0.058	(25)	0.066	(25)	0.142	(26)	0.167	(25)	0.168	(25)	0.122	(28)
Uttarakhand*	0.102	(25)	0.058	(25)	0.066	(25)	0.162	(22)	0.247	(20)	0.378	(14)	0.426	(11)
West Bengal	0.324	(12)	0.318	(11)	0.353	(11)	0.371	(13)	0.462	(10)	0.409	(13)	0.483	(8)

Note: Figure in the parenthesis shows the ranks

*-prior to 2004-05, HDI score and rank is same as the mother state.

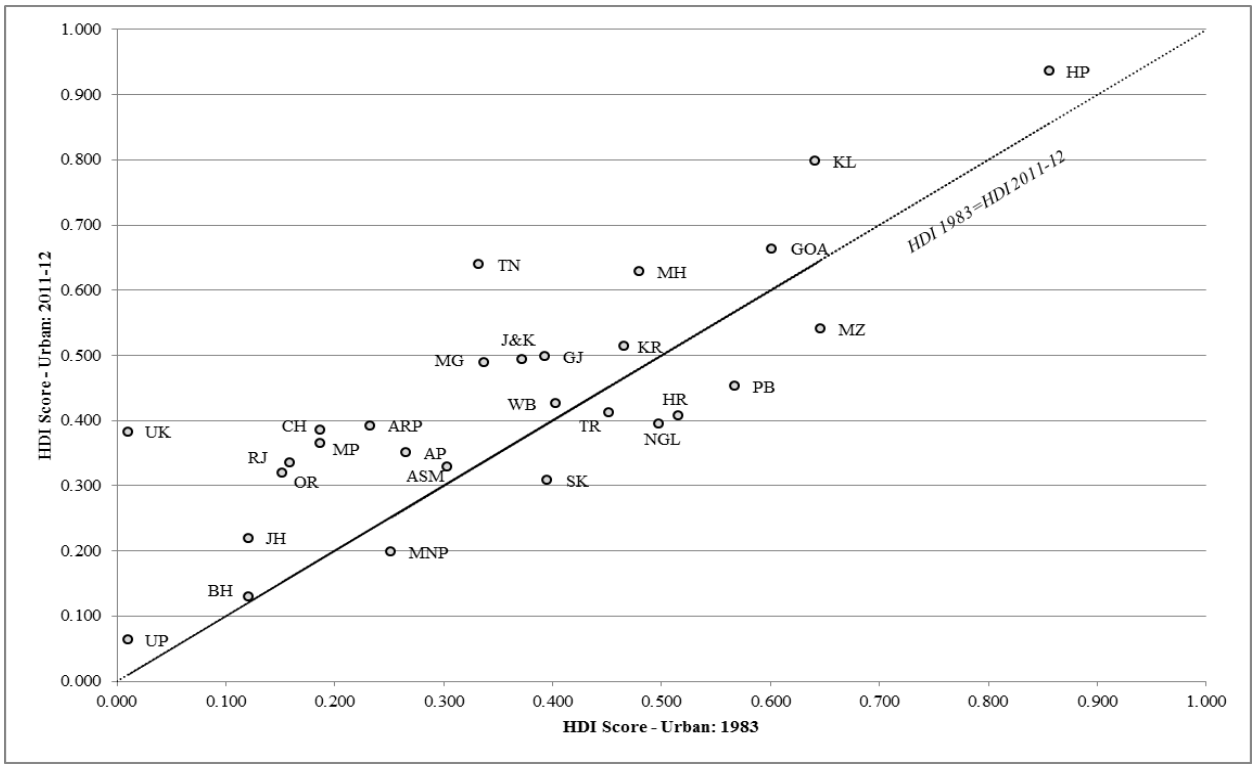
Source: Constructed by authors

Figure 2: Rural HDI performance of the Indian states (comparison between 1983 and 2011-12)



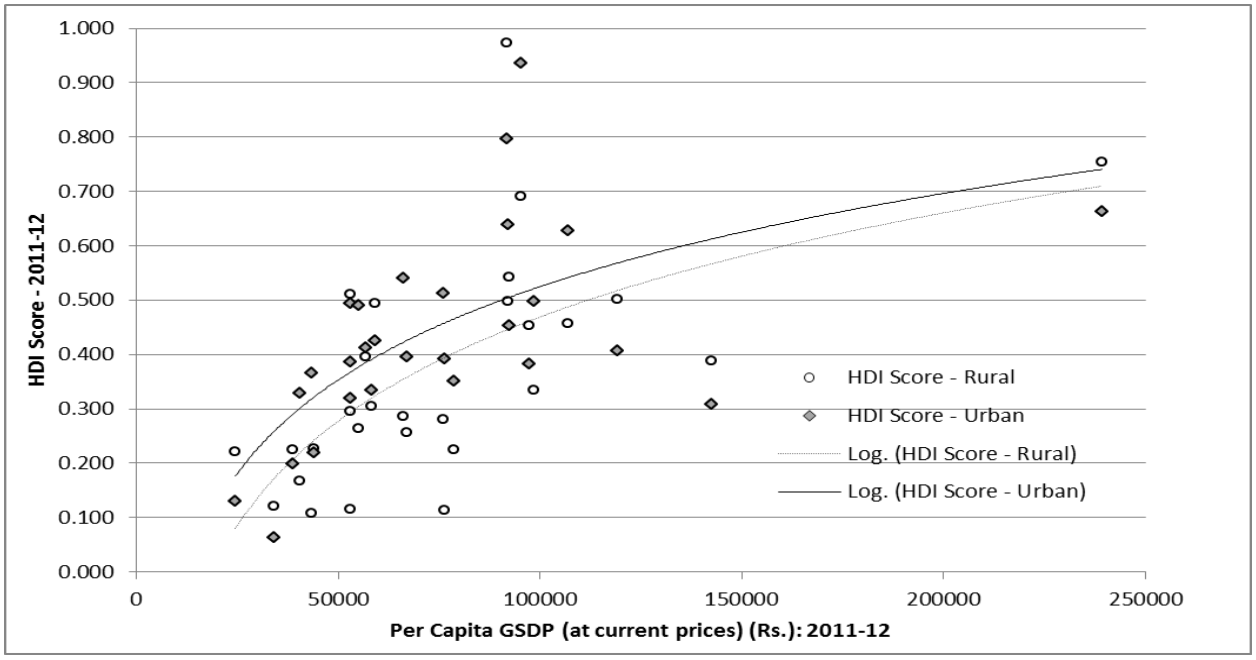
Source: Constructed by authors

Figure 3: Urban HDI performance of the Indian states (comparison between 1983 and 2011-12)



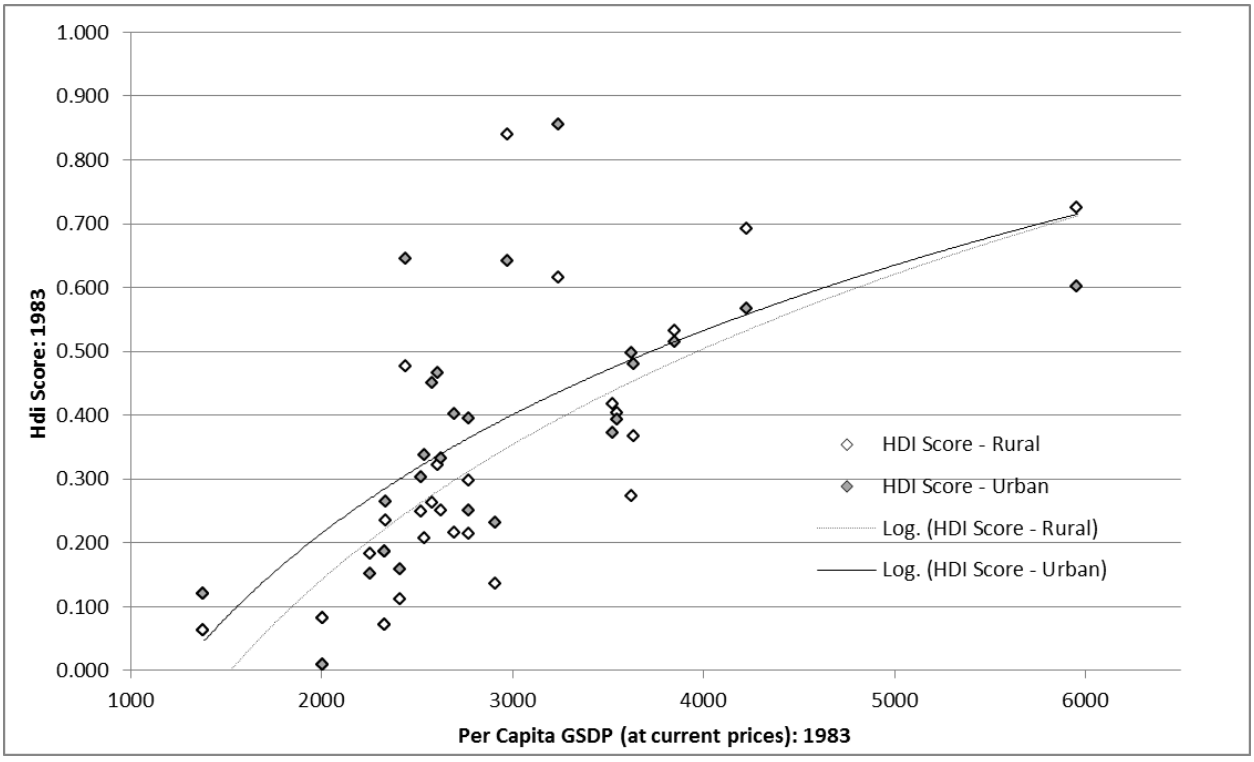
Source: Constructed by authors

Figure 4: Relationship between HDI and PCGSDP across Indian States (2011-12)



Source: Constructed by authors

Figure 5: Relationship between HDI and PCGSDP across Indian States (1983)



Source: Constructed by authors

5. Regression Analysis

Finally, in order to understand the relationship between EG and HD, a regression analysis has been undertaken, involving the logarithm of the HDI score as dependent variable and the logarithm of the per capita income (Per Capita GSDP) of the states as independent variable. In addition, the existing literature has confirmed that higher budgetary devolution by the States for developmental activities may lead to greater HD-related achievements (Mukherjee and Chakraborty, 2011). Hence the influence of per capita developmental expenditure (PCDE) on HDI formation has also been analyzed.[12] In the following, an empirical analysis has been undertaken to estimate the relationship in a panel data framework in STATA software covering 7 data periods, namely – 1983, 1987-88, 1993-94, 1999-00, 2004-05, 2009-10 and 2011-12. In addition, to capture the rural-urban divergence, separate regression models are estimated for the two groups. We run fixed effect models to capture the State specific effects. Finally, models are also run separately for different categories of states for understanding the strength of the relationship within each group. The descriptive statistics for the variables in the regression models are summarized in Table 4.

Table 4: Summary of Descriptive Statistics

Criteria	Low Income States	Middle Income States	High Income States	All States
Average HDIR*	0.152	0.266	0.432	0.320
Average HDIU*	0.238	0.383	0.506	0.408
Average HDIT*	0.149	0.278	0.467	0.340
Average PCGSDP*(Rs.)	16,064	22,802	38,953	29,193
Average PCDE* (Rs.)	2,939	4,372	6,139	4,898
Average TAXGSDP*	5.25	4.54	6.03	5.472
Average GINIR*	0.250	**0.253**	0.249	0.250
Average GINIU*	0.305	**0.317**	0.288	0.300
Average IIMPCER* (Rs.)	100.48	98.34	102.77	101.09
Average IIMPCEU* (Rs.)	142.35	144.01	141.62	142.40

Note: *-implies mean equality test (Welch F-test) is significant.

In the first set of regressions, the left hand side of the panel estimates the relationship between HDI and PCGSDP of the states. The results show that PCGSDP is a significant determinant of human development. Two major conclusions emerge from the Table 5. First, income elasticity of human development is higher for rural areas as compared to urban areas

[12] State-wise data on Developmental Expenditure is obtained from 'Finances of State Governments in India' Database of EPWRF where Developmental Expenditure includes Revenue Expenditure and Capital Disbursements (Capital Outlay as well as Loans and Advances by State Governments). State-wise Population is projected based on Census of India data on Population of 1981, 1991, 2001 and 2011.

across all income groups. In other words, impact of per capita income in achievement of human development is felt more intensively in rural areas as compared to urban areas, which underlines the importance of the schemes like NREGA in no uncertain terms. Second, income elasticity of human development is higher for lower income states as compared to higher income states. The results confirm that economic growth (as measured by per capita income) influences human development and the degree of association is higher for rural areas and that also in low income states. The absence of significant relationship between per capita income and human development in urban areas of MIS should be an area of concern for policy makers.

On the left hand side, the panel estimates the influence of PCDE on human development. The results strongly underline the positive role of supporting financial mechanism in augmenting the process of human capital formation across Indian states. The empirical results are similar to the PCGSDP-HDI relationship, which highlights the crucial role of development expenditure in securing growth for LIS and in rural areas in particular.

The second set of regression results attempt to analyze the factors that influence per capita developmental expenditure in a cross state framework. Table 6 shows that fiscal space (as measured by own-tax revenue as percentage of GSDP, TAXGSDP) of the States significantly influence the per capita developmental expenditure, apart from per capita income. It is observed that the lower is the income of the States; the higher is the coefficient signifying association between fiscal space and per capita developmental expenditure. In other words, low income states are largely dependent on their own-tax revenue to finance their developmental expenditure as compared to their higher income counterparts. Two points need to be borne in mind in this context. First, all states are not equally capable to generate their own resources due to their locational disadvantages (e.g. hilly terrains). Second, all states not equally dependent on their own resources to finance their developmental expenditures. For non-special category states, the table shows that the association between fiscal space and per capita developmental expenditure is higher for middle income states as compared to their low and high income counterparts. Similar association is observed for special category states as well. For special category states, overall trends are not very different from non-special category states, except that values of the coefficients are lower as compared to the latter category.

Table 7 summarizes the robustness results. To check the robustness of the estimated regression models, first we have spliced the dataset into two groups, non-special and special category states and estimated the models by considering rural, urban and overall HDI values separately. Second, we have taken one period lag of the dependent variable as a regressor and estimated the model. The results reinforces the relationship between per capita income and human development (i.e., LHDI) and it is evident from the Table 7 that income elasticity of human development is higher for special category states as compared to non-special category states. For non-special category states, income elasticity of human development is higher for urban areas, which provides newer insight. For special category states, income elasticity of human development is higher in rural areas as compared to their urban counterparts. For special category states, both the slope and intercept terms are different from overall regression results (third panel of results in Table 7). This implies that income elasticity of human development is higher for special category states and that also for rural areas.

The fourth panel of the table also shows that initial level of human development positively and significantly influences achievement in human development, i.e., existence of a virtuous cycle. The results not only reinforce the robustness of the estimated regression models, but also establish the fact that unless there are continuous efforts to improve the performance in all dimensions of human development, it become difficult for a state not only to maintain the present form but also to improve its performance in all India canvas.

Table 5: Relationship between HDI, PCDE and PCGSDP

	Dependent variable:	HDI Score - Rural		HDI Score - Urban		HDI Score - Overall		*Dependent variable:*	HDI Score - Rural		HDI Score - Urban		HDI Score - Overall	
All States	LPCGSDP	0.159	***	0.112	***	0.14	***	LPCDE	0.153	***	0.111	***	0.137	***
		(0.019)		(0.024)		(0.019)			(0.019)		(0.024)		(0.019)	
	Constant	-2.898	***	-2.145	***	-2.658	***	Constant	-2.548	***	-1.917	***	-2.368	***
		(0.184)		(0.23)		(0.181)			(0.149)		(0.184)		(0.146)	
	No. of observations	196		196		196		No. of observations	196		196		196	
	No. of groups	28		28		28		No. of groups	28		28		28	
	R2 - within	0.2993		0.1192		0.2529		R2 - within	0.2809		0.117		0.2453	
	F stat	71.33		22.59		56.53		F stat	65.25		22.12		54.29	
	Prob>F stat	0.000		0.0001		0.000		Prob>F stat	0.0000		0.0001		0.0000	
Low Income States	LPCGSDP	0.298	***	0.243	***	0.272	***	LPCDE	0.276	***	0.23	***	0.256	***
		(0.043)		(0.08)		(0.061)			(0.042)		(0.075)		(0.057)	
	Constant	-4.8	***	-3.958	***	-4.584	***	Constant	-4.057	***	-3.389	***	-3.939	***
		(0.4)		(0.736)		(0.561)			(0.306)		(0.549)		(0.418)	
	No. of observations	49		49		49		No. of observations	49		49		49	
	No. of groups	12		12		12		No. of groups	12		12		12	
	R2 - within	0.5679		0.205		0.3577		R2 - within	0.5467		0.2062		0.3569	
	F stat	47.32		9.28		20.05		F stat	43.42		9.35		19.97	
	Prob>F stat	0.0000		0.0043		0.0001		Prob>F stat	0.0000		0.0042		0.0001	
Middle Income States	LPCGSDP	0.208	***	0.052		0.154	***	LPCDE	0.190	***	0.054		0.141	***
		(0.048)		(0.033)		(0.043)			(0.048)		(0.032)		(0.043)	
	Constant	-3.438	***	-1.505	***	-2.847	***	Constant	-2.910	***	-1.43	***	-2.467	***
		(0.459)		(0.319)		(0.409)			(0.376)		(0.251)		(0.331)	
	No. of observations	49		49		49		No. of observations	49		49		49	
	No. of groups	14		14		14		No. of groups	14		14		14	
	R2 - within	0.3579		0.0661		0.2753		R2 - within	0.311		0.0763		0.2428	
	F stat	18.95		2.4		12.91		F stat	15.34		2.81		10.9	

	Dependent variable:	HDI Score - Rural		HDI Score - Urban		HDI Score - Overall		*Dependent variable:*	HDI Score - Rural		HDI Score - Urban		HDI Score - Overall	
	Prob>F stat	0.0001		0.1302		0.001		Prob>F stat	0.0004		0.1029		0.0023	
High Income States	LPCGSDP	0.107	***	0.039	**	0.102	***	LPCDE	0.110	***	0.044	**	0.107	***
		(0.024)		(0.019)		(0.022)			(0.026)		(0.019)		(0.023)	
	Constant	-2.027	***	-1.141	***	-1.887	***	Constant	-1.849	***	-1.101	***	-1.74	***
		(0.245)		(0.185)		(0.222)			(0.209)		(0.157)		(0.188)	
	No. of observations	98		49		49		No. of observations	98		98		98	
	No. of groups	18		18		18		No. of groups	18		18		18	
	R2 - within	0.1945		0.0542		0.2098		R2 - within	0.1885		0.0612		0.2139	
	F stat	19.08		4.53		20.97		F stat	18.35		5.15		21.5	
	Prob>F stat	0.0001		0.0365		0.0000		Prob>F stat	0.0001		0.0259		0.0000	

Notes: Figure in the parenthesis shows the standard error of the estimated coefficient
***, ** and * implies estimated coefficient is significant at 0.01, 0.05 and 0.10 level respectively.

Table 6: Analyzing the determinants of PCDE across Indian States

	Dependent variable:	*LPCDE - All States*		*LPCDE-Non-special Category States*		*LPCDE-Special Category States*	
All States	LPCGSDP	0.945	***	0.957	***	0.945	***
		(0.01)		(0.011)		(0.02)	
	LTAXGSDP	0.468	***	0.548	***	0.496	***
		(0.037)		(0.047)		(0.056)	
	Constant	-2.062	***	-2.339	***	-2.067	***
		(0.1)		(0.114)		(0.208)	
	No. of observations	181		112		69	
	No. of groups	28		28		27	
	R2 - within	0.9859		0.9914		0.9833	
	F stat	5272.33		4717.62		1180.03	
	Prob>F stat	0.0000		0.0000		0.0000	
Low Income States	LPCGSDP	1.023	***	1.003	***	Inadequate observations	
		(0.023)		(0.064)			
	LTAXGSDP	0.505	***	0.482	***		
		(0.072)		(0.087)			
	Constant	-2.969	***	-2.728	***		
		(0.204)		(0.615)			
	No. of observations	42		37			
	No. of groups	11		26			
	R2 - within	0.9891		0.981			
	F stat	1315.88		232.11			
	Prob>F stat	0.0000		0.0000			
Middle Income States	LPCGSDP	0.95	***	0.962	***	0.924	***
		(0.026)		(0.023)		(0.065)	
	LTAXGSDP	0.426	***	0.744	**	0.581	***
		(0.08)		(0.199)		(0.107)	
	Constant	-1.928	***	-2.694	***	-1.895	**
		(0.246)		(0.308)		(0.64)	
	No. of observations	46		22		22	
	No. of groups	13		16		16	
	R2 - within	0.9807		0.9982		0.9825	
	F stat	787.56		1139.17		112.53	
	Prob>F stat	0.0000		0		0.0003	
High Income States	LPCGSDP	0.907	***	0.955	***	0.965	***
		(0.011)		(0.016)		(0.034)	
	LTAXGSDP	0.307	***	0.45	***	0.26	
		(0.054)		(0.121)		(0.32)	

	Constant	-1.439	***	-2.144	***	-1.901	**
		(0.147)		(0.228)		(0.683)	
	No. of observations	93		53		36	
	No. of groups	17		28		26	
	R2 - within	0.9884		0.9942		0.9913	
	F stat	3158.24		1972.58		456.94	
	Prob>F stat	0.000		0.0000		0.0000	

Notes: Figure in the parenthesis shows the standard error of the estimated coefficient
***, ** and * implies estimated coefficient is significant at 0.01, 0.05 and 0.10 level respectively.

Table 7: Robustness Check of the Regression analysis

	Dependent Variable:	LHDIR		LHDIU		LHDIT	
Non-Special Category States	LPCGSDP	0.104	***	0.129	***	0.074	***
		(0.02)		(0.03)		(0.016)	
	Constant	-2.278	***	-2.346	***	-1.914	***
		(0.195)		(0.303)		(0.161)	
	No. of observations	119		119		119	
	No. of groups	28		28		28	
	R2 - within	0.2402		0.1685		0.1916	
	F stat	28.45		18.23		21.33	
	Prob>F stat	0.000		0.0000		0	
Special Category States	LPCGSDP	0.247	***	0.181	***	0.259	***
		(0.041)		(0.056)		(0.041)	
	Constant	-3.819	***	-2.732	***	-3.908	***
		(0.38)		(0.526)		(0.379)	
	No. of observations	77		77		77	
	No. of groups	28		28		28	
	R2 - within	0.4316		0.1765		0.4582	
	F stat	36.45		10.29		40.59	
	Prob>F stat	0.0000		0.0024		0	
	LPCGSDP	0.106	***	0.134	***	0.076	***
		(0.021)		(0.028)		(0.02)	
	spl*lpcgsdp	0.198	***	0.009		0.238	***
		(0.046)		(0.061)		(0.045)	
	spl	-2.042	***	0.053		-2.447	***
		(0.432)		(0.574)		(0.422)	
	Constant	-2.299	***	-2.407	***	-1.946	***
		(0.224)		(0.291)		(0.218)	
	No. of observations	196		196		196	
	No. of groups	28		28		28	
	R2 - within	0.4369		0.1452		0.4686	
	F stat	120.31		30.11		125.04	
	Prob>F stat	0.0000		0.0000		0.0000	
	LHDI(-1)	0.295	***	0.141	**	0.239	***
		(0.079)		(0.069)		(0.078)	
	LPCGSDP	0.173	***	0.057	**	0.197	***
		(0.026)		(0.027)		(0.024)	
	Constant	-2.656	***	-1.423	***	-2.939	***
		(0.335)		(0.309)		(0.303)	
	No. of observations	168		168		168	
	No. of groups	28		28		28	

	R2 - within	0.4567	0.0878	0.4615
	F stat	58.01	6.64	59.14
	Prob>F stat	0.0000	0.0018	0.0000

Notes: Figure in the parenthesis shows the standard error of the estimated coefficient
***, ** and * implies estimated coefficient is significant at 0.01, 0.05 and 0.10 level respectively.

6. Conclusion

The linear association between EG and HD, as observed from Figures 4 and 5, holds important policy implications. As reported earlier, the existence of vicious or virtuous cycles becomes clear from this relationship. Although the Indian economy has witnessed a structural transformation with growing prominence of the service sector in the GDP, the same has been constrained by the fact that potentials in two major components of HD, namely - health and education sector, is still not fully harnessed. Once the HD challenges faced by the economically backward States are adequately met, the healthy and educated population will be able to contribute more significantly in the EG process in a more productive manner. Such growth will not be limited to the service sector but also spread to the agricultural and manufacturing segment as well. Therefore, the positive relationship noticed between EG and HD is heartening, but the continuation of several States at the bottom (e.g. UP, Bihar, Madhya Pradesh, Chhattisgarh etc.) as well as persisting rural-urban disparities, deserve specific policy actions so as to remove any adverse effects caused by the existing vicious cycles there. Otherwise, a classic low-level equilibrium trap would prevail across the States characterized by low and stable EG-HD combinations.

Firstly, the policymakers need to ensure greater effectiveness of the existing social sector schemes on the HD formation process. Leakage in the schemes in terms of reaching out to the target groups is often noted, which must be avoided. Secondly, level of governance mechanism needs to be bettered by channelizing efficient utilization of allocated funds. For instance, while PCDE is higher in Andhra Pradesh and Chhattisgarh vis-à-vis UP, these States have performed quite differently (Mukherjee and Chakraborty, forthcoming). For instance, Andhra Pradesh has improved its HD position to some extent, while the performance of Chhattisgarh has not been so impressive during 2004-05 to 2009-10. Thirdly, rural-urban disparity within a State needs to be improved. For instance, Chhattisgarh has improved its HD performance in the urban belt in the recent period, but the rural areas still remain among the laggards both in terms of EG and HD, which causes instability and insurgencies and hence contributes to continuation of low EG. Unless the States are able to create a balanced HD atmosphere, benefits of positive EG-HD growth spiral will not be fully realized. Fourthly, the States need to realize the importance of the EG process not only in isolation, but also as a means for securing a higher fiscal base through taxation, which provides them more options for financing HD-related initiatives. However, low per capita income States, who are having larger outstanding debt vis-à-vis their high and middle income counterparts, are more likely to experience eroded fiscal space as a major part of their revenue would be utilized for debt-financing (Chakraborty et al., 2009). Finally, although several centrally sponsored schemes exist for augmenting the HD-EG evolutionary process, it has been noted that transferred funds under centrally sponsored schemes to States may turn out to be regressive (Chakraborty et al., 2010). The States need to be cautious about this unintended

outcome and try to efficiently utilize their own initiatives. Finally, the positive relationship between PCDE and HD suggests that states will have to ensure greater budgetary devolution towards HD initiatives as well as securing efficient utilization of the allocated funds so as to extract maximum benefits from such initiatives. In addition to the publicly funded initiatives, the low HD base of laggard States demands intense private participation in these areas, either through stand-alone model or through public-private partnerships (PPP). Only then the States will be able to continue on a long-term sustainable development path. Therefore, careful policy choice and governance delivery will be instrumental for transforming the States both on the EG as well as on HD front.

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Annex 1: HDI and Devolution of Funds Scenario for Select Countries

					Health expenditure, public (% of government expenditure)		Health expenditure, public (% of GDP)		Public spending on education, total (% of government expenditure)		Public spending on education, total (% of GDP)	
Country Name	2005 HDI	2005 HDI Rank	2012 HDI	2012 HDI Rank	2005	2012	2005	2012	2005	2012	2005	2012
Norway	0.948	1	0.955	1	19.1	17.8	8.0	7.7	16.8		7.0	
Australia	0.927	2	0.938	2	16.7	17.8	5.7	6.1	13.6		4.9	
United States	0.923	3	0.937	3	19.3	19.9	7.0	8.3	14.6		5.1	
Malaysia	0.742	59	0.769	64	5.2	6.2	1.7	2.2				
Brazil	0.699	74	0.73	85	4.7	7.6	3.3	4.3			4.5	
Sri Lanka	0.683	85	0.715	92	7.6	6.4	1.8	1.3		8.8		1.7
China	0.637	98	0.699	101	9.9	12.5	1.8	3.0				
Thailand	0.662	92	0.69	103	12.4	14.2	2.3	3.0	20.2		4.2	
Philippines	0.63	100	0.654	114	8.9	10.3	1.5	1.7	12.4		2.4	
Indonesia	0.575	112	0.629	121	4.4	6.9	0.8	1.2	15.3		2.9	
South Africa	0.604	106	0.629	121	12.6	12.9	3.4	4.2	19.9		5.3	
India	0.507	120	0.554	136	6.8	9.4	0.9	1.3	10.7		3.1	
Lao People's Democratic Republic	0.494	124	0.543	138	4.1	6.1	0.7	1.5	13.7		2.4	
Bangladesh	0.472	128	0.515	146	7.5	7.7	1.1	1.2				
Madagascar	0.467	130	0.483	151	11.6	12.8	2.5	2.5	18.0	18.2	3.8	2.7
Nigeria	0.434	138	0.471	153	8.3	6.7	1.9	1.9				
Nepal	0.429	139	0.463	157	10.3	10.4	1.6	2.2	23.8		3.4	
Uganda	0.408	145	0.456	161	11.2	10.2	2.3	1.9		14.0		3.3
Zambia	0.399	149	0.448	163	15.0	16.4	3.9	4.2			2.0	
Ethiopia	0.316	160	0.396	173	10.9	11.1	2.5	1.9				
Afghanistan	0.322	158	0.374	175	1.1	7.1	0.8	1.8				
Niger	0.269	168	0.304	186	14.8	10.3	3.0	2.8				
Total No. of Countries under HDI	169		187									

Source: Compiled by authors from various sources