Centre for Social and Economic Progress | CSEP

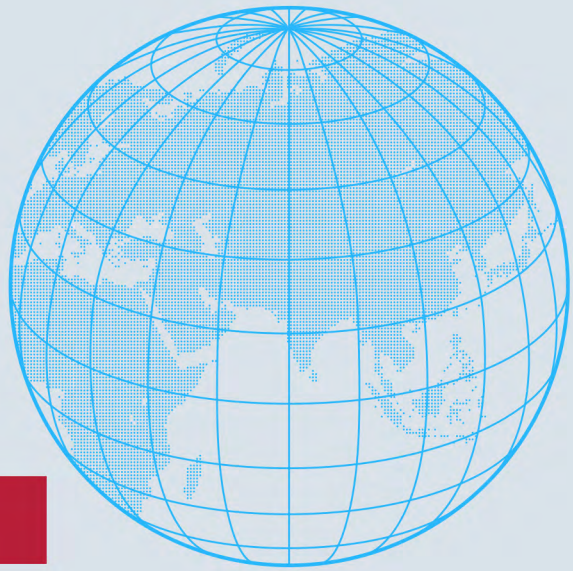
Independence | Integrity | Impact

WORKING PAPER - 108
DECEMBER 2025

India's Human Development

How Do Quality-Adjusted Elements Change the Picture?

Janak Raj
Indramani Tiwari



CSEP RESEARCH

Centre for Social and Economic Progress (CSEP)
CSEP Research Foundation
6, Dr Jose P. Rizal Marg, Chanakyapuri,
New Delhi - 110021, India

Recommended citation:
Raj, J., and Tiwari, I. (2025). *India's Human Development: How Do Quality-Adjusted Elements Change the Picture?* (CSEP Working Paper 108). New Delhi: Centre for Social and Economic Progress.

The Centre for Social and Economic Progress (CSEP) conducts in-depth, policy-relevant research and provides evidence-based recommendations to the challenges facing India and the world. It draws on the expertise of its researchers, extensive interactions with policymakers as well as convening power to enhance the impact of research. CSEP is based in New Delhi and registered as a company limited by shares and not for profit, under Section 8 of the Companies Act, 1956.

Designed by Umesh Kumar
Cover Design by Mukesh Rawat

India's Human Development
How Do Quality-Adjusted Elements Change the Picture?

Janak Raj
Senior Fellow
Centre for Social and Economic Progress
New Delhi, India

Indramani Tiwari
Research Analyst
Centre for Social and Economic Progress
New Delhi, India

The authors would like to thank Laveesh Bhandari, Sandhya Venkateswaran, and Meru Gokhale for their useful comments and suggestions on the earlier version of this paper. We also sincerely thank our colleagues at CSEP for their helpful suggestions during an internal seminar.

Table of Contents

List of Tables

List of Figures

Abbreviations

ASER	Annual Status of Education Report
DALY	Disability-adjusted Life Years
EI	Education Index
ESCWA	Economic and Social Commission of Western Asia
GDI	Gender Development Index
GEM	Gender Empowerment Measures
G-HDI	Gender Quality-adjusted Human Development Index
GII	Gender Inequality Index
GINI	Gini Coefficient
GSDP	Gross State Domestic Product
GoI	Government of India
HDI	Human Development Index
HI	Health Index
HLE	Healthy Life Expectancy
HLY	Healthy Life Years
IHDI	Inequality-adjusted Human Development Index
IHME	Institute for Health Metrics and Evaluation
II	Income Index
LEB	Life Expectancy at Birth
MoSPI	Ministry of Statistics and Programme Implementation
MoWCD	Ministry of Women and Child Development
MSI	Multi-dimensional Synthesis of the Indicator
NAS	National Achievement Survey
NCERT	National Council of Educational Research and Training
NE	North-Eastern
NFHS	National Family Health Survey
NIEPA	National Institute of Educational Planning and Administration
NSSO	National Sample Survey Office
OECD	Organisation for Economic Co-operation and Development
PCME	Per Capita Monthly Expenditure
PLFS	Periodic Labour Force Survey
PPP	Purchasing Power Parity
Q-EI	Quality-adjusted Education Index
Q-HDI	Quality-adjusted Human Development Index
Q-HI	Quality-adjusted Health Index
Q-II	Quality-adjusted Income Index
RBI	Reserve Bank of India
RTE	Right to Education
SHDI	Sustainable Human Development Index
UNDP	United Nations Development Program
WHO	World Health Organisation

Executive Summary

The concept of human development, which includes improving people's lives, opportunities, and well-being, has gradually evolved over the years. The United Nations Development Programme (UNDP) introduced the Human Development Index (HDI) in 1990. This ground-breaking index included elements of education and health, in addition to the commonly accepted measure of income for human development. However, the HDI focuses only on the quantitative aspects such as life expectancy, years of education, and per capita income, ignoring qualitative aspects. For instance, more years of education may not always translate into meaningful learning, and higher incomes might not generate enough jobs or result in lower economic inequality.

To address such concerns, the UNDP implemented several qualitative refinements to the HDI. In 2006, gender-related dimensions were incorporated through the Gender Development Index (GDI) and the Gender Inequality Index (GII). To account for asymmetries in the distribution of the sub-indices, the Inequality-adjusted Human Development Index (IHDI) was also developed (UNDP, 2010). Furthermore, in 2021, the United Nations Economic and Social Commission for Western Asia (UNESCWA) introduced the Quality-adjusted Human Development Index (Q-HDI) for several countries, including India. This framework was aimed at incorporating qualitative dimensions into the traditional HDI by adjusting each of its component for quality considerations. Notably, these quality adjustments were limited to the national level with no coverage at the subnational (state or regional) level.

To address the missing qualitative aspect at the state level, this study computes a Quality-Adjusted Human Development Index (Q-HDI) at the state level in India. The quality-adjusted index goes beyond measurable accomplishments and incorporates qualitative aspects in all three constituents of HDI, *viz,* the income, health, and education. The income factor has been adjusted for inequality in income. By taking diseases and disabilities into account, the health dimension provides a deeper understanding of health. In education, instead of the number of years of schooling, the focus is on learning outcomes. This study uses eighth-grade students' abilities in mathematics and reading to assess the quality of education. Furthermore, the composite Q-HDI, incorporating quality-adjusted health, education, and income, was further adjusted for gender inequality. The study was conducted for the three years, *viz,* 2011–12, 2017–18, and 2021–22.

The analysis across Indian states reveals significant divergences between quality-adjusted HDI and traditional HDI indices. Quality-adjusted values of income, education, health, and the composite HDI were significantly lower than those of the traditional income, education, health, and composite HDI values, respectively. Income inequalities were more pronounced in economically advanced states like Maharashtra, Karnataka, and Haryana.

Divergences between quality-adjusted and traditional education indices were large in all states. Even states with the highest HDI scores, such as Kerala and Himachal Pradesh, showed significant divergences in quality-adjusted *vis-à-vis* traditional education indices in all three years studied. Large divergences in quality-adjusted and traditional education indices were also observed in north-eastern states such as Meghalaya, Manipur, and Mizoram. The divergences between the quality-adjusted health index and traditional health index were insignificant for 2011–12 and 2017–18, but significant for 2021–22 in all states, especially Sikkim and West Bengal, due mainly to the COVID-19 pandemic.

Of the three years considered in the study, the divergence between the Q-HDI and traditional HDI widened from 2011–12 to 2017–18, but narrowed between 2017–18 and 2021–22. Thus, the overall divergence between Q-HDI and HDI reduced between 2011–12 and 2021–22, though the extent of reduction was not significant.

The study highlights the need to focus on qualitative dimensions of health, education and income as much as, if not more, their quantitative aspects to gauge human development in a true sense. Furthermore, the significant inter-state variations suggest that there is a need for state-specific strategies to improve qualitative aspects.

1. Introduction

Human development is about the all-round advancement of human beings. Economic advancement is only a part of the story, not the whole (Sen, 1999). Economic well-being provides material comfort to human beings, while human development comprises other aspects also such as the quality and experiences of human life. Human development focusses on individuals' possibilities and their freedom to make choices, rather than only on economic growth (UNDP, 2002).

The Human Development Index (HDI) by the UNDP in 1990 has become a widely used tool for measuring and comparing human development based on multiple indicators, extending beyond purely economic measurements. The HDI reflects a more holistic approach to understand human well-being and societal progress by incorporating health and education alongside economic growth. The HDI addresses the shortcomings of using GDP alone to gauge development (Haq, 1995; Sen, 1999).

The UNDP has been publishing the HDI for all economies since 1990. It captures the three most essential aspects of a better human life: (a) a long and healthy life, (b) education, and (c) income required for a decent standard of living. The initial indicators corresponding to the three aspects of the HDI were (i) life expectancy at birth; (ii) the literacy rate among adults combined with primary, secondary, and tertiary gross enrolment ratio; and (iii) estimated income in purchasing power parity (PPP) in US dollars.

The HDI, however, was criticised due to the negligence of qualitative aspects of human development. This is because the HDI encapsulates only the quantitative aspects of human development and ignores the qualitative aspects such as the quality of education, quality of life, and income equality. For instance, an increase in years of schooling does not mean that it translates into the skills required for the current labour market. The quality of life also plays a very important role in leading a better life. For example, population ageing is a positive sign of development, but it could be burdensome if older people are not enjoying healthy and dignified lives. Similarly, economic growth (income level) does not mean that it generates enough jobs and reduces income inequality and poverty. Without qualitative aspects of human development, the HDI fails to capture the whole story, and this reduces the relevance of the index for policy purposes.

A logical and feasible solution is to adjust all three elements comprising the HDI by incorporating proper adjustments in quality (United Nations, 2021). The HDI developed by the UNDP has undergone several improvements over the years. While one set of modifications/revisions were carried out to refine the various elements of the HDI and the way the composite HDI was computed, the second set of refinements centred on incorporating certain qualitative aspects. To address gender inequalities, the Gender Development Index (GDI) and Gender Inequality Index (GII) were also developed by the UNDP in 2006. Subsequently, several other qualitative improvements were also introduced. In 2010, inequalities in health, education, and income distribution were also considered, and a separate Inequality-Adjusted Human Development Index (IHDI) was introduced. This, however, mainly dealt with the distributional asymmetries and could not capture the qualitative aspects of human development.

In 2021, The United Nations Economic and Social Commission for Western Asia (UNESCWA) constructed a quality-adjusted HDI (Q-HDI) at the national level, including India. The study discounted each element of HDI by considering quality indicators for each dimension, for example, life expectancy at birth (LEB) was replaced with healthy life expectancy (HLE) at birth; educational attainment, as measured by mean and expected years of schooling, was discounted using the harmonised test scores indicator; and GNI per capita was adjusted to account for income inequality. The Q-HDI introduced a new narrative of development, as a huge rank difference (between Q-HDI and HDI) was observed for many countries. The study found that the ranking of India improved after the adjustment by 9 positions from 117 to 108. However, such a quality-adjusted HDI was not computed at the state level.

For assessing the overall prosperity of citizens, the Indian government also adopted the HDI as a measure of human development. However, questions were raised about the HDI's usefulness in a nation with such extreme regional and socio-economic disparities, the indicators used, and the reliability of the data (Raghuvanshi and Verma, 2024). To explain the externalities occurring due to HDI, Suryanarayana *et al.* (2011) considered the inequalities across different Indian states in all three elements of HDI. They assessed the distributional disparities in the existing

elements, *viz,* income index, education index, and health index. They found that of all three elements, inequalities in education were highest at the state as well as national levels. The state-wise HDI rankings brought to light severe disparities in development outcomes across the Indian states. The study suggested targeted interventions for addressing the disparity in health, education, and living standards within the country (Suryanarayana *et al.,* 2011).

There has not been any study which has adjusted all three elements of HDI for the qualitative aspects at the state level in India. This study is aimed at filling this gap. The income index is adjusted for income inequality, the education index is adjusted based on students' reading and arithmetic abilities and the health index is adjusted for the prevalence of disabilities. Furthermore, the composite Q-HDI, incorporating quality-adjusted health, education, and income, was further adjusted for gender inequality for all three years, *viz,* 2011-12, 2017-18, and 2021-22.

The study finds that the quality-adjusted income, education, health indices, and the composite Q-HDI were lower than their traditional counterparts across the states. The divergences between quality-adjusted income and the traditional income index were relatively more pronounced in economically well-off states than in economically weaker states. Likewise, the divergences between the quality-adjusted education and traditional education indices were particularly large in states with a higher literacy rate, such as Kerala, Karnataka, and Himachal Pradesh. On the other hand, states with lower literacy rates, such as Bihar, showed lower divergences between the quality-adjusted and traditional education index. Though the divergences between the quality-adjusted and traditional health index were not significant in 2011-12 and 2017-18, they widened in 2021–22, driven by COVID-related diseases. Even though all the states showed significant divergences between Q-HDI and HDI, the gap was lower in the case of some states, such as Bihar, Gujarat, and Tripura. Reflecting this, marked changes were observed in the ranking of states when adjusted for quality *vis-à-vis* traditional ranking.

The paper is organised into five sections. Section 2 reviews the relevant literature on this subject. Section 3 explains the methodology used to adjust all three elements of the HDI for quality as well as the composite HDI. Section 4 analyses the results, while Section 5 sums up the key findings and spells out the policy implications.

2. Review of Literature

Anand and Sen (1994) and Ranis, Stewart, and Samman (2006) criticised the traditional HDI because it neglected many other crucial dimensions like political participation, security, and human rights. The index was also questioned by others on the grounds that it failed to sufficiently consider social and political factors that affect human development such as governance, gender equality, and environmental sustainability (Cobb & Rixford, 1998; Ranis, Stewart, and Samman, 2006). Resce (2021) found that many countries' performance in terms of HDI reduced when the income indicator was replaced with wealth, which meant that some part of human development in top-performing countries was because of the wealth factor. The HDI values adjusted for wealth improved for South Asian and Sub-Saharan African countries, but declined for North American economies.

The United Nations Economic and Social Commission for Western Asia (UNESCWA), 2021, adjusted all three indicators for quality. The health indicator was adjusted for healthy life expectancy, the education indicator was changed from a simple average of mean and expected years of schooling to harmonised test scores, and the income indicator for equality conditions of the specific countries. Following these revisions, the extremely low HDI countries did not show any notable change, but the HDI values of economically well-off countries such as the United States, Saudi Arabia, Brazil, and South Africa declined significantly after the quality adjustments. Hicks (1997) used a Gini coefficient-based discounting factor to adjust all three sub-indicators of the HDI for their distributional inequalities. He found that the loss between the HDI and the Inequality-Adjusted Human Development Index (IHDI) ranged from 30 per cent to 57 per cent across 20 developing countries. Mishra (2011) suggested the addition of the percentage of persons surviving for at least 40 years to adjust the health dimension of the HDI. The inclusion of the new variable led to a decrease in the HDI values. The rankings shifted both up and down because the rate of improvement in index values changed, influenced by the added factor of survivorship.

Panigrahi and Sivramkrishna (2002) adjusted the HDI using the Borda Count method[1] and also by scaling down each indicator's value proportionally to equalise the spread of all indicator values to that of the least spread in the indicator index. After adjusting the HDI, they found that the country ranks remained broadly the same, with the change in the lower and upper limits of the indicators. Biggeri and Mauro (2018) suggested to include the sustainable and freedom (political rights and civil freedom) indicators in the HDI and developed the Sustainable Human Development Index (SHDI) based on the multi-dimensional synthesis of the indicator. The introduction of these two dimensions, *viz.*, environment and freedom, increased the potential of the HDI to capture sustainable human development and its future. Neumayer (2001) argued that the linkages between the Human Development Index and sustainability would allow for monitoring whether a country is mortgaging the choices of future generations.

Ryumina (2016) proposed adjusting the HDI using the percentage of negative water and air samples as the fourth component of the HDI. His results of the environmentally adjusted HDI Index for all regions considered in the Russian Federation differed significantly from the traditional HDI. The inclusion of the environment variables in the HDI drastically changed the HDI ranks of all the regions. While the rankings of some regions improved by several places, those of some other regions declined. Anjara (2019) advocated for political freedom as an extension of choices in human well-being and adjusted the HDI for the political and democratic choices of the individual. They used the Corruption Perceptions Index (CPI) and the democracy index to adjust the composite HDI. A significant decrease was noticed in the values of the HDI after the adjustments.

In India, the Ministry of Women and Child Development (MoWCD) revised the Human Development Index in 2009 (GoI, 2009). The health index was revised using infant mortality and life expectancy at age one, the education index using mean years of schooling (15+ years) and literacy rate (7+ years), and the living standards index using per capita income. Thereafter, the Ministry of Statistics and Programme Implementation (MoSPI) estimated the HDI along with the GDI and Gender Inequality Index (GII) for the Indian states for the years 2011–12 and 2017–18. The GII incorporates the three major components of human development, *viz.*, health, empowerment, and the labour market. However, these measures have not been released after 2017–18. Suryanarayana *et al. (2011)* adjusted each of the sub-indices of HDI for the asymmetries in their distribution and developed Inequality-adjusted HDI across Indian states. Of all the three elements of the HDI, inequality was the highest in education, which they described as worrisome because of its inter-generational impact. The national index lost 32 per cent due to inequality. The highest loss was accounted for by Madhya Pradesh (36 per cent), followed by Chhattisgarh (35 per cent), while the minimum was in Kerala (17 per cent). This inequality-adjusted HDI considered only the distributional aspects, not the qualitative aspects of the indices. They suggested targeted interventions for addressing the disparities in health, education, and living standards within the country.

3. Methodology and Data

The HDI computed by the UNDP comprises three elements, *viz.*, a healthy life, knowledge, and a decent standard of living. The health dimension is represented by life expectancy at birth (LEB*), i.e.,* the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. Thus, a higher LEB signifies a better health condition. The knowledge aspect uses both mean and expected years of schooling; a higher level of schooling denotes better educational attainment. A decent standard of living is captured by per capita income. There are limitations of all three above-referred elements of the HDI.

3.1 Health

The LEB represents the average life years for a newborn but disregards the years lost due to diseases and disabilities. The Disability-Adjusted Life Years (DALY) capture the overall burden of diseases. DALY, as defined by the World Health Organization (WHO), is a time-based measure that combines years of life lost due to premature mortality and years of life lost due to time lived in a state of less than full health, or years of healthy life lost due to disability (Neethling, 2019). To achieve healthy life years, the

[1] The Borda Count method ranks countries by assigning points based on their ranks across health, education, and income, with higher total points indicating higher HDI ranks.

number of years lost due to disease and disability were subtracted from LEB to form Healthy Life Years (HLY) at birth. The HLY is finally indexed based on the minimum and maximum ages of 20 and 85 years, respectively, as are used for computing the health index by the UNDP. The Quality-Adjusted Health Index (Q-HI) is computed as:

$$\text{Q-HI} = \frac{\text{Actual HLY - minimum(20)}}{\text{maximum(85) - minimum(20)}}$$

3.2 Education

The traditional education index relies on mean and expected years of schooling but does not assess whether students acquire meaningful knowledge. To address this, our study incorporated the reading and mathematical abilities of students at the primary level using Annual Status of Education Report (ASER) data. The quality of education is incorporated by the reading and mathematical abilities of students studying in standard 8. Under the ASER surveys conducted by *Pratham*, students (from standard 1 to standard 8) were tested for their reading abilities and arithmetic skills, *i.e.,* the proportion of students who were able to read words, sentences, or paragraphs from standards 1 and 2. Likewise, it reports the proportion of students who are able to identify numbers, do subtraction, or division. The quality factor of education was arrived at by taking a geometric mean of the proportion of students from class 8 who could read at least a paragraph from standard 1 (denoted by 'r') and of those who were able to at least divide (denoted by 'a') as explained below:

$$\delta_e = \sqrt{r \cdot a}$$

The Quality-adjusted Education Index (Q-EI) was computed by taking a geometric mean of the traditional Education Index (EI) and the education quality factor (δe):

$$\text{Q-EI} = \sqrt{\delta_e \cdot \text{EI}}$$

A geometric mean is preferred over other measures so that one dimension is not linearly compensated by the other, *i.e.,* it reduces the level of substitutability between the qualitative factors, such as reading and arithmetic abilities. Similarly, the geometric mean between the traditional EI and quality factor of education reduces the substitutability between the qualitative (quality factor of education) and quantitative (traditional EI) aspects of human development. Thus, a geometric mean punishes a lopsided development in any one aspect of the index.

Data on quality aspects of education are available from different surveys, *viz.,* Annual Status of Education Report (ASER) and National Achievement Survey (NAS) - Box 1. However, for the purpose of our study, we use the ASER dataset.

Box 1: ASER and NAS Surveys: A Comparison

The Annual Status of Education Report (ASER) and the National Achievement Survey (NAS) are two of India's most prominent large-scale education surveys that provide a holistic measure of learning outcomes at the state level. ASER, conducted annually by the ASER Centre (*Pratham*), is a household-based, citizen-led survey that assesses foundational literacy and numeracy skills among children aged 3–16 in rural India, including those who are out of school. In contrast, NAS, administered by the National Council of Educational Research and Training (NCERT) under the Ministry of Education, Government of India, is a school-based assessment that evaluates students in grades 3, 5, 8, and 10 across a broad range of subjects, including language, mathematics, science, and social science, aligned with the national curriculum.

ASER's greatest strength lies in its inclusivity and grassroots approach, capturing data on both in-school and out-of-school children through oral, one-on-one assessments conducted at the household level. This makes ASER highly suitable for evaluating foundational learning outcomes, particularly basic reading and arithmetic skills, which are essential for early learning and are often overlooked by curriculum-based assessments. However, ASER is limited by its exclusive rural focus. On the other hand, NAS offers comprehensive system-level insights by covering both urban and rural regions, testing children within the formal education system on curriculum-aligned competencies. The survey is aligned with the national curriculum and uses written tests to evaluate performance in subjects like language, mathematics, science, social science, and environmental studies. The NAS framework includes feedback from students, teachers, and school heads, offering a rich institutional context but excluding children outside the formal schooling system. However, the limitation of NAS is its exclusion of out-of-school children, leading to a selection bias, and its design may overestimate actual learning by focussing on what should be known rather than what is understood.

From a qualitative standpoint, ASER's strength lies in its focus on foundational learning skills that form the basis of lifelong education. Its methodology is designed to be low-cost, scalable, and participatory, enabling real-time monitoring of basic education in rural contexts. Most importantly, by assessing what children can do, rather than what they should know according to the curriculum, ASER helps assess the depth of learning deficits, especially among the most disadvantaged (Banerji & Chavan, 2016). On the other hand, NAS offers standardised, curriculum-aligned data. However, its school-based design introduces a sample bias, as it systematically excludes out-of-school children and may overestimate learning achievements by focussing on grade-level competencies rather than actual capabilities (Kingdon, 2007).

In conclusion, while NAS is instrumental for assessing systemic and institutional performance, ASER directly measures actual foundational learning outcomes and includes marginalised populations often left out of official data. Thus, for research focussed on the quality dimension of education, particularly in terms of reading and arithmetic, ASER offers a more accurate and equitable solution.

Also, the variables (per cent of students in grade 8 who can do simple division and read at least a standard 1 paragraph text) that were required for the study were available for all three years in the ASER dataset only. NAS has the learning outcomes information only for the 2021–22.

3.3 Income

The income index is adjusted for inequality at the household level across states. Economic well-being reflects not just average income but also its equal distribution. Inequality could be gauged based on income or consumption expenditure. However, inequality in this paper is represented through consumption expenditure rather than income for two reasons. First, consumption expenditure better captures the standard of living than reported income. Second, several sources of income other than wages generally remain under-reported. The Gini coefficient, which is a measure of inequality, for each state was worked out based on the reported household monthly consumption expenditure. The income quality factor (δ_i) is obtained by subtracting the Gini coefficient of consumption expenditure from 1.

Thus, a higher value of the quality factor implies a more equal distribution. To obtain the inequality-adjusted income index, the income index was multiplied by the income quality factor as explained below:

$$Q\text{-}II=\delta_i \cdot II$$

3.4 Composite HDI

After having adjusted all three elements of the HDI for quality, the Quality-Adjusted HDI (Q-HDI) was finally measured as a geometric mean of the three quality-adjusted elements as explained below:

$$Q\text{-}HDI=\left((Q\text{-}HI) \cdot (Q\text{-}EI) \cdot (Q\text{-}II)\right)^{\frac{1}{3}}$$

3.5 Sourcing of Data

The selection of 2011–12, 2017–18, and 2021–22 for the study was driven by their significance in capturing key developments in India. The selection of 2021–22 as the endpoint was mainly due to data availability, as it is the most recent year for which state-level data for all sub-indices of the HDI are available. To maintain a balanced decadal analysis, 2011–12 was chosen as the base year, allowing for an assessment of long-term trends during which significant economic, social and policy shifts have taken place with a bearing on human development. The mid-period, 2017–18, provides a critical midpoint to observe changes in human development. Additionally, some datasets, such as LEB, were not available for all the years between 2011–12 and 2021–22, making these discrete three time points the most feasible for a consistent and meaningful comparison. This structured approach enables a clear understanding of qualitative aspects of human development progress while minimising data gaps and inconsistencies.

The state-wise data on the HDI and the indices on the three dimensions are sourced from a report on Gendering Human Development by MoSPI for 2011–12 and 2017–18, and Global Data Lab for the year 2021–22. The report uses the same criteria as adopted by the UNDP to compute the two dimensions: health and knowledge of the HDI. However, for measuring a decent standard of living through per capita GSDP, the UNDP used a common national currency against the recommended use of Purchasing Power Parity (PPP) US$ (MoSPI, 2021).

The quinquennial state-wise data on LEB were extracted from the RBI Database on the Indian Economy and National Family Health Survey – 5 (NFHS-5). The LEB for the periods 2010–2014, 2013–2017, and 2019–2021 were used to represent the LEB in 2011–12, 2017–18, and 2021–22. Data for several North-Eastern (NE) states (Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura) and Goa were unavailable for the required periods. Therefore, following the report on Gendering Human Development in 2021 by MoSPI, the values for NE states were proxied by the value of Assam. The data on DALY for the years 2011–12, 2017–18, and 2021–22 were sourced from the Institute for Health Metrics and Evaluation (IHME) and the World Health Organization (WHO).

The data on education quality are sourced from Basic ASER reports in 2011, 2018, and 2022. Since the survey data were not available for 2017, survey data for 2018 were used to represent the year 2017–18, and data for 2022 were used to represent 2021–22. The data on education quality for Sikkim were missing for 2011–12, and for Andhra Pradesh and Goa for 2017–18. Therefore, these states were dropped for the periods for which the data were not available. The ASER surveys are conducted only in the rural parts of the states. Since the proportion of students from standards 1 to 8 in rural areas is more than two-thirds of the total as per the last Census in 2011–12, the survey results were used to represent the quality of education for the entire state.

Data on household monthly consumption expenditure were sourced from the 68th NSS Round on household consumption expenditure for 2011–12, while data for 2017–18 and 2021–22 were obtained from the Periodic Labour Force Survey (PLFS) for the financial year 2017–18 and 2021–22.

A comprehensive overview of the formulae used and data sources used in the study is provided in Table 1.

Table 1: Formulae used and Data Sources

S. No.	Term	Variable	Formula	Components	Data Source
1	Quality-adjusted Health Index	Q-HI	$\text{Q-HI}=\frac{\text{Actual HLY - minimum(20)}}{\text{maximum(85) - minimum(20)}}$	HLY = LEB – DALY LEB = Life expectancy at birth DALY = disability adjusted life years (these are on a per-person basis)	RBI, NFHS-5, and IHME
2	Health Index	HI	$\text{HI}=\frac{\text{LEB - minimum(20)}}{\text{maximum(85) - minimum(20)}}$	LEB = Life expectancy at birth	MoSPI and Global Data Lab
3	Quality-adjusted Education Index	Q-EI	$\text{Q-EI}=\sqrt{\delta_e \cdot \text{EI}}$	$\delta_e=\sqrt{r \cdot a}$ δ_g= Education Quality Factor; r = Proportion of students who can read standard 1 paragraph a = Proportion of students who can divide	ASER
4	Education Index	EI	$\text{Mean Years of Schooling Index}=\frac{\text{Mean years of schooling – minimum(0)}}{\text{maximum(15) – minimum(0)}}$ $\text{Expected Years of Schooling Index}=\frac{\text{Expected years of schooling - minimum(0)}}{\text{maximum(18) - minimum(0)}}$ $\text{EI}=\frac{\text{Expected Years of schooling + Mean years of schooling}}{2}$	Mean Years of Schooling Index Expected Years of Schooling Index	MoSPI and Global Data Lab
5	Quality-adjusted Income Index	Q-II	$\text{Q-II}=\delta_i \cdot \text{II}$	δ_g = (1- Gini coefficient of PCME) δ_g = Income Quality Factor; PCME = Per Capita Monthly Expenditure of Households	NSSO and MoSPI
6	Income Index	II	$\text{II}=\frac{\ln(\text{GSDP})-\ln(2{,}000)}{\ln(4{,}00{,}000)-\ln(2{,}000)}$	GSDP per capita (in INR) GSDP = Gross State Domestic Product	MoSPI and Global Data Lab
7	Quality-adjusted Human Development Index	Q-HDI	$\text{Q-HDI}=\left((\text{Q-HI}) \cdot (\text{Q-EI}) \cdot (\text{Q-II})\right)^{\frac{1}{3}}$	Quality-adjusted Health Index, Quality-adjusted Education Index, Quality-adjusted Income Index	MoSPI and Global Data Lab
8	Gender Quality-adjusted Human Development Index	G-HDI	$\text{G-HDI}=\left(\delta_g \cdot (\text{Q-HI}) \cdot (\text{Q-EI}) \cdot (\text{Q-II})\right)^{\frac{1}{4}}$	δ_g = 1- GII, Where, GII = Gender Inequality Index	MoSPI[2]

RBI – Reserve Bank of India.
NFHS – National Family Health Survey.
IHME – Institute for Health Metrics and Evaluation.
MoSPI – Ministry of Statistics and Programme Implementation.
ASER – Annual Status of Education Report.
NSSO – National Sample Survey Office.

[2] Gendering Human Development (2021), MoSPI.

4. Results and Analysis

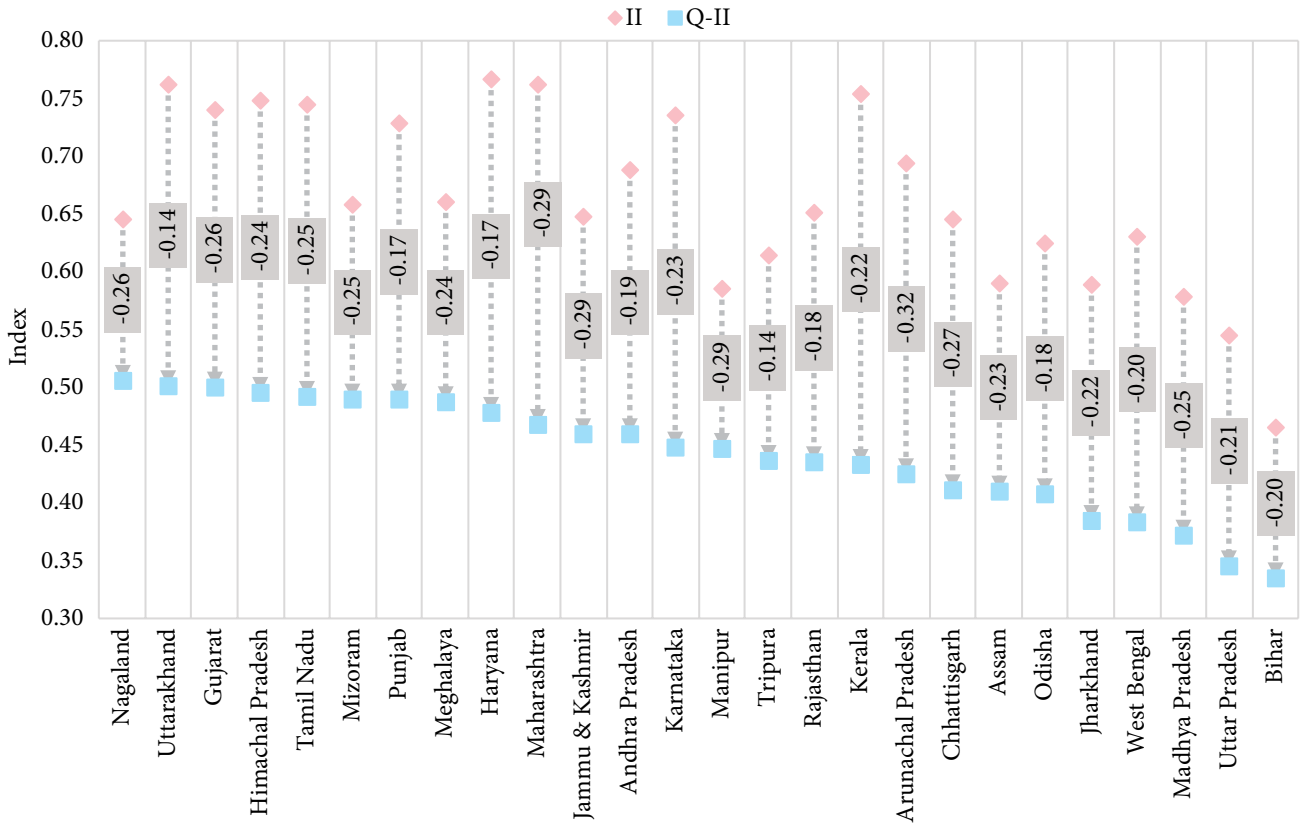
The focus of the analysis is on setting a comparison of the Quality-Adjusted Human Development Index with the traditional human development index. Likewise, the quality-adjusted income, education and health indices are compared with traditional income, education and health indices. For all the elements of the HDI as well as the composite HDI, the analysis covers three years, *viz*., 2011–12, 2017–18, and 2021–22.

4.1 Quality-adjusted Income Index (Q-II)

Significant divergences have been observed in the quality-adjusted income index (Q-II) *vis-à-vis* the income index (II). The Q-II was lower *vis-à-vis* the II in all the states for all three years (2011–12, 2017–18, and 2021–22), though the extent of divergence varied (Figures 1 to 3). In 2011-12, the largest divergence was observed in Arunachal Pradesh, followed by Maharashtra. However, in subsequent years, 2017–18 and 2021–22, the largest divergence was observed in the case of Maharashtra, suggesting that relative to other states, income inequalities were more pronounced in Maharashtra (Figures 1 to 3). A few other states with large divergences in all the three years were Karnataka, Tamil Nadu, Arunachal Pradesh, and Gujarat. In all three years, the divergence was the least in Bihar in 2017–18 and 2021–22, while it was the least for Tripura and Uttarakhand in 2011–12. Income inequalities were generally lower in relatively economically weaker states such as Assam, Bihar, and Meghalaya. However, there were some exceptions, such as Uttarakhand, Odisha, and Jharkhand (Figures 1 to 3).

It is significant that relative to 2011–12, income inequalities widened somewhat in 2017–18, but narrowed in 2021–22.

Figure 1: Quality-adjusted Income Index *vs* Income Index - 2011–12

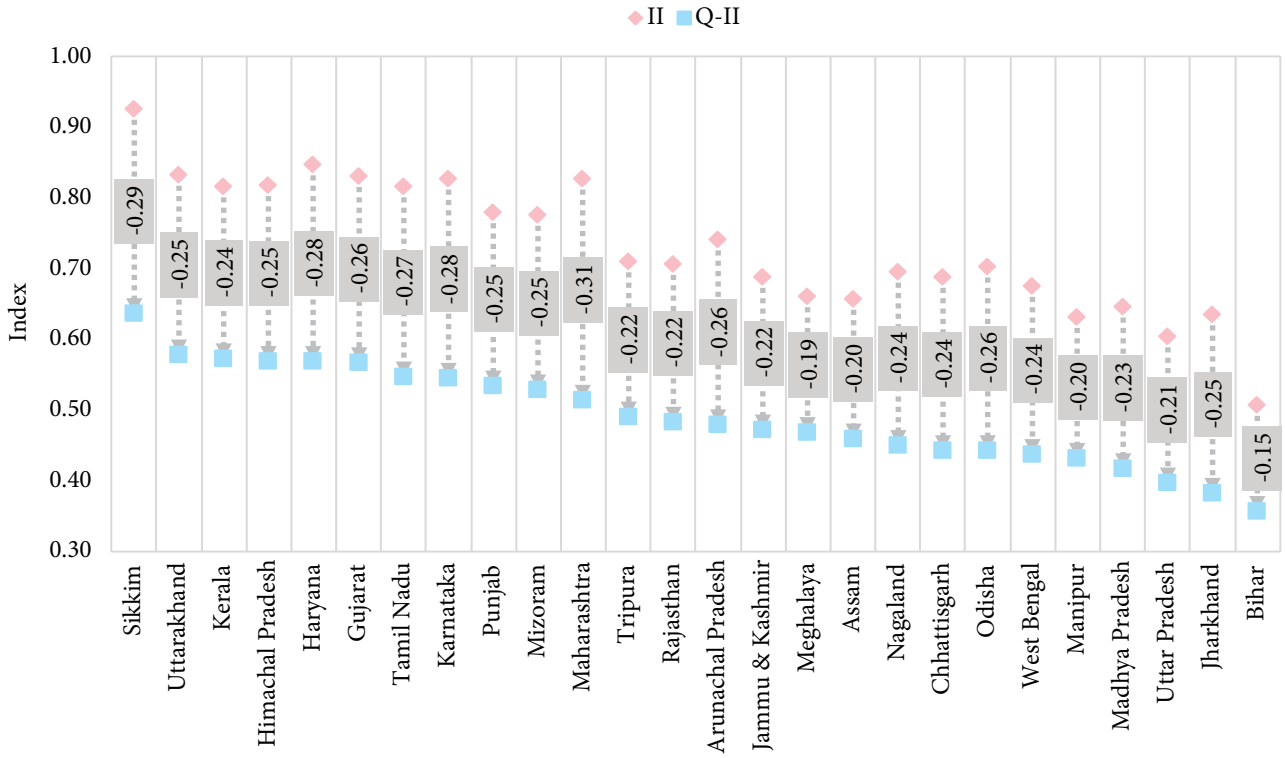


II – Income Index.

Q-II – Quality-adjusted Income Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Figure 2: Quality-adjusted Income Index *vs* Income Index - 2017–18

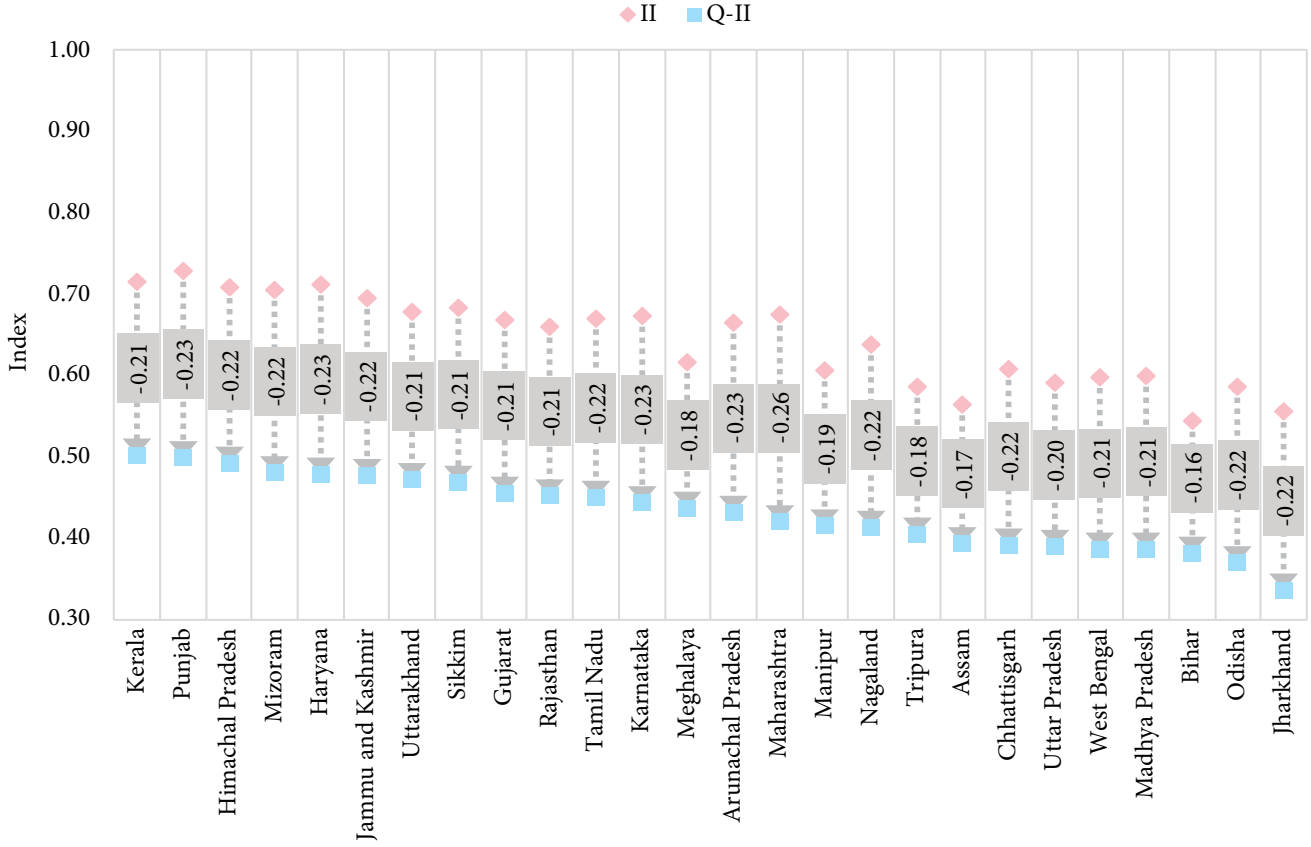


II – Income Index.

Q-II – Quality-adjusted Income Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Figure 3: Quality-adjusted Income Index *vs* Income Index - 2021–22



II – Income Index.

Q-II – Quality-adjusted Income Index.

Source: Global Data Lab and authors' calculations.

4.2 Quality-adjusted Education Index (Q-EI)

The quality-adjusted education index (Q-EI) was lower than the traditional education index (EI) in all states in the three years, suggesting that, adjusted for quality, the education level deteriorates in all states. However, significant divergences were observed across states and over time.

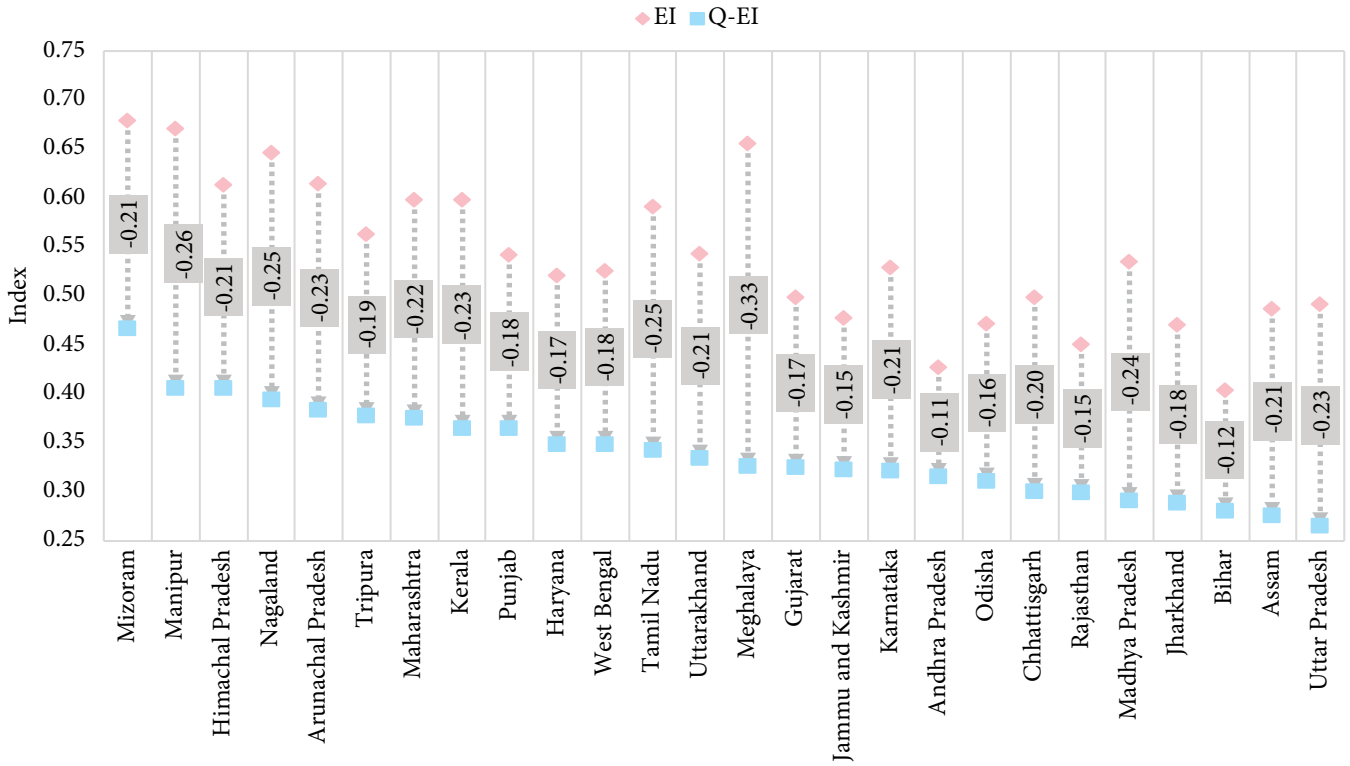
In 2011–12, states such as Mizoram, Manipur, and Himachal Pradesh exhibit relatively higher EI values but also larger disparities between EI and Q–EI, indicating that while educational attainment is comparatively better, the quality of education lags. On the other hand, states such as Bihar and Odisha display smaller gaps between EI and Q–EI, suggesting a more consistent, *albeit* lower, performance in both access to education and in quality of education. The divergence between Q-EI and EI, for Meghalaya was significantly higher than that of the other states (Figure 4), which could be attributed to the maximum drop-out rate (68 per cent) and poor performance on right to education (RTE) norms (pupil–teacher ratio and teacher–classroom ratio) in primary schools, second only to Bihar and Uttar Pradesh (ASER, 2012).

However, in 2017–18, the gap between the Q-EI and EI index widened significantly in some states such as Kerala, Himachal Pradesh, Haryana and West Bengal; the largest gap was observed in Meghalaya. The larger divergence between the Q-EI and the EI in 2017–18 *vis-à-vis* 2011–12 was caused by major challenges in infrastructure, educational access, governance, and management in north-eastern states such as Arunachal Pradesh, Mizoram, Manipur, and Meghalaya (Government of India, 2019). By 2021–22, the divergence between the Q-EI and EI widened further in the case of Kerala but narrowed for Himachal Pradesh.

It is intriguing that in 2021–22, of all the states, the divergence was the largest in the case of Kerala – a state with the highest literacy rate (Figure 6). In 2021–22, the least divergence was observed in Gujarat, followed by Bihar and Tripura (Figure 6). The second least divergence (-0.12) in Bihar needs to be put in perspective. Despite having a low literacy rate, Bihar is performing outstandingly in foundational learning (ASER, 2022). Bihar is among the top three performers in foundational arithmetic abilities, with 59 per cent of students in class 8 being able to perform division, after Haryana (63 per cent) and Manipur (71 per cent). Bihar's improvement in foundational arithmetic skills is driven by targeted community-based interventions like *Pratham's* programmes and increased government focus on early-grade learning (ASER, 2025).

However, the quality of education in many north-eastern states such as Mizoram, Tripura, Arunachal Pradesh, and Sikkim deteriorated in 2021–22 *vis-à-vis* 2017-18. Owing to poor infrastructure, governance problems, and a lack of facilities for teacher education and training, the situation deteriorated in states like Nagaland, Manipur, Tripura, Meghalaya, Arunachal Pradesh, and Mizoram by 2021–22 (Government of India, 2023). As a result, the quality of education was significantly low in these north-eastern states in 2021–22.

Figure 4: Quality-adjusted Education Index *vs* Education Index - 2011–12

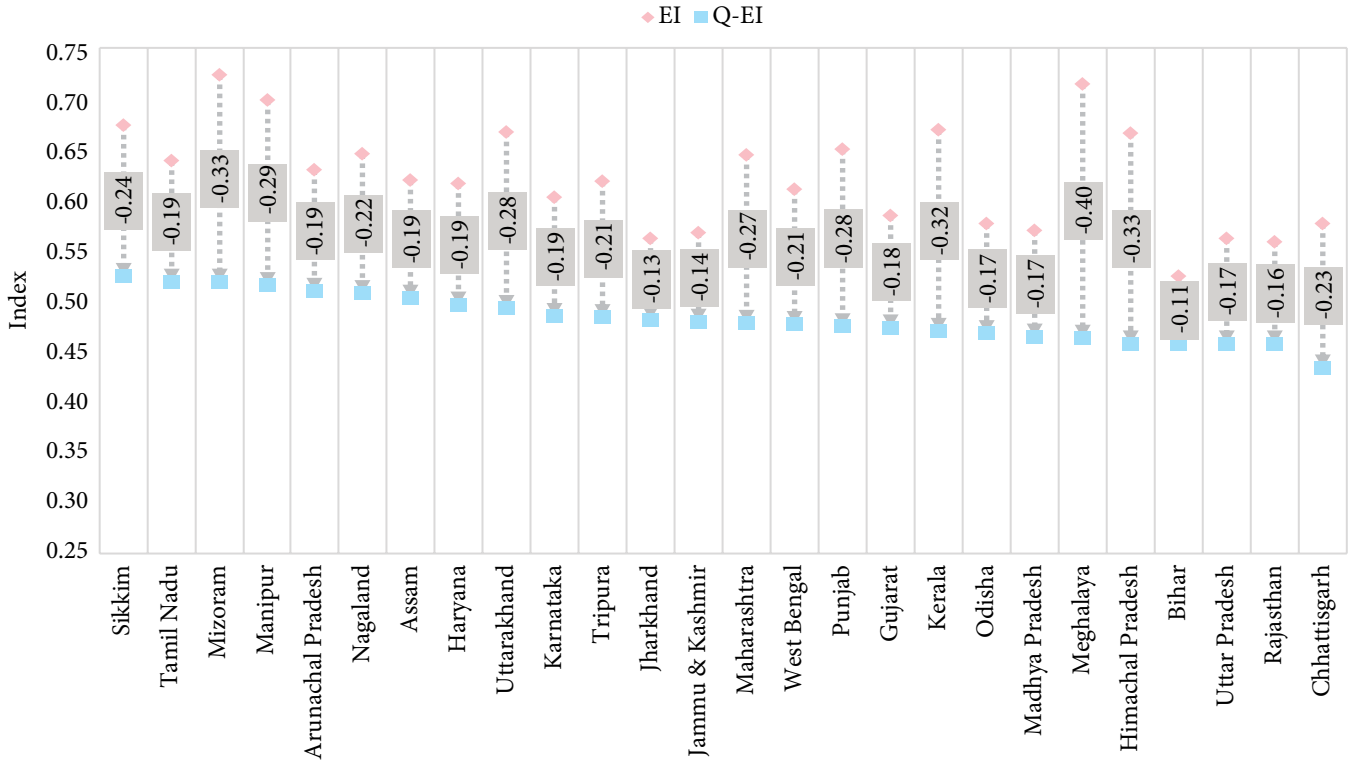


EI – Education Index.

Q-EI – Quality-adjusted Education Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Figure 5: Quality-adjusted Education Index *vs* Education Index - 2017–18

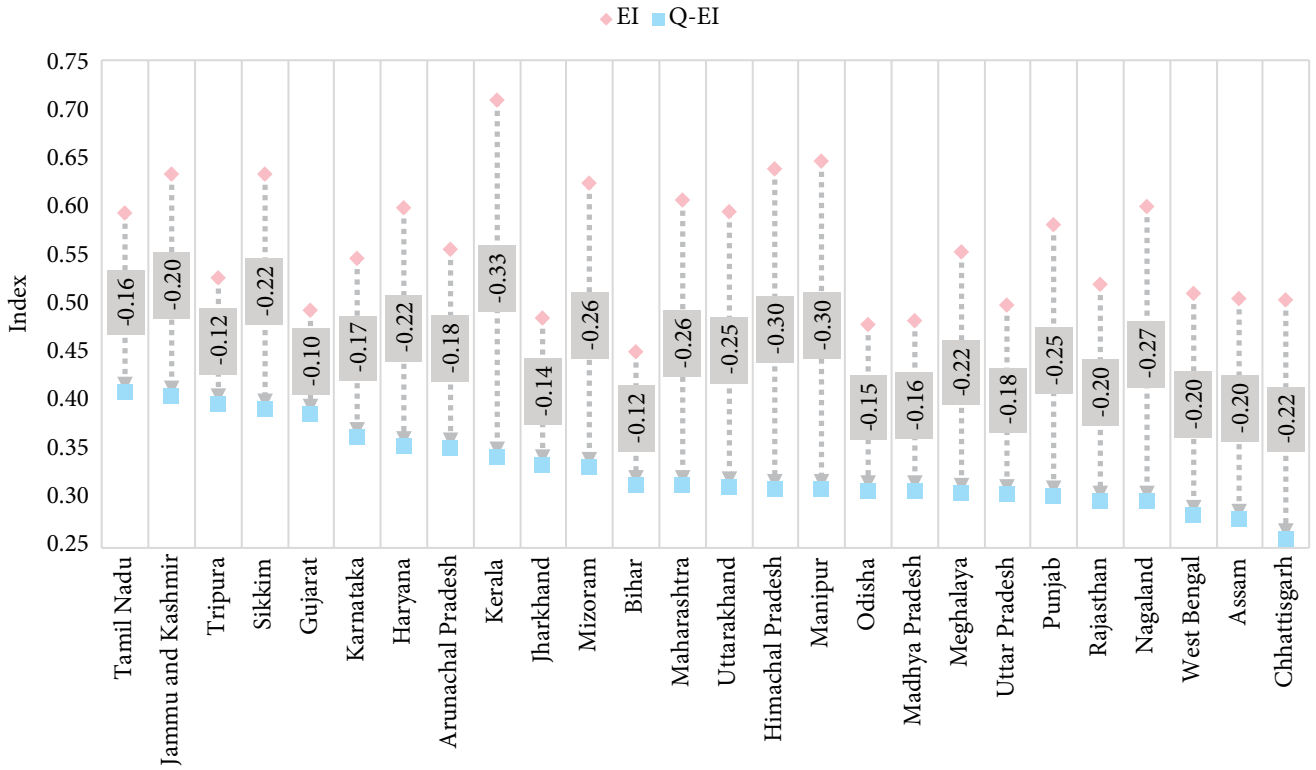


EI – Education Index.

Q-EI – Quality-adjusted Education Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Figure 6: Quality-adjusted Education Index *vs* Education Index - 2021–22



EI – Education Index.

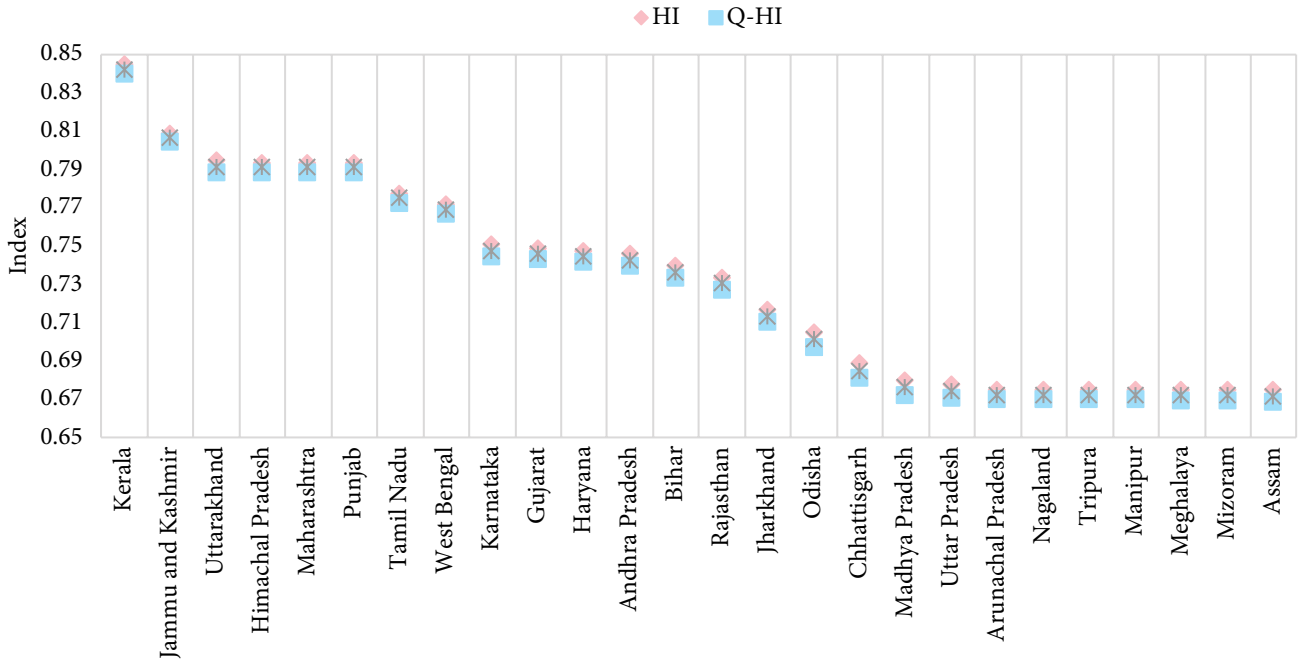
Q-EI – Quality-adjusted Education Index.

Source: Global Data Lab and authors' calculations.

4.3 Quality-adjusted Health Index (Q-HI)

In two of the three years (2011–12 and 2017–18), there was hardly any divergence in the adjusted Health Index (Q-HI) and Health Index (HI), and this was the case across all the states (Figures 7 and 8). However, in 2021–22, there was a sharp deterioration in Q-HI *vis-à-vis* HI, caused mainly by the COVID-19 pandemic. Of all the states, Sikkim and West Bengal showed the largest divergences. On the other hand, some states showed either no divergence (Himachal Pradesh, Jammu and Kashmir, Nagaland, Uttarakhand, and Mizoram) or minimal divergence (Meghalaya, Uttar Pradesh, Chhattisgarh, Gujarat, Rajasthan, Assam, and Madhya Pradesh) - Figure 9. The minimal or no deviation between the adjusted and traditional health index is because of the low Disability-Adjusted Life Years (DALYs). As a result, the adjustment does not significantly alter the overall health index, adjusted for quality.

Figure 7: Quality-adjusted Health Index *vs* Health Index - 2011–12

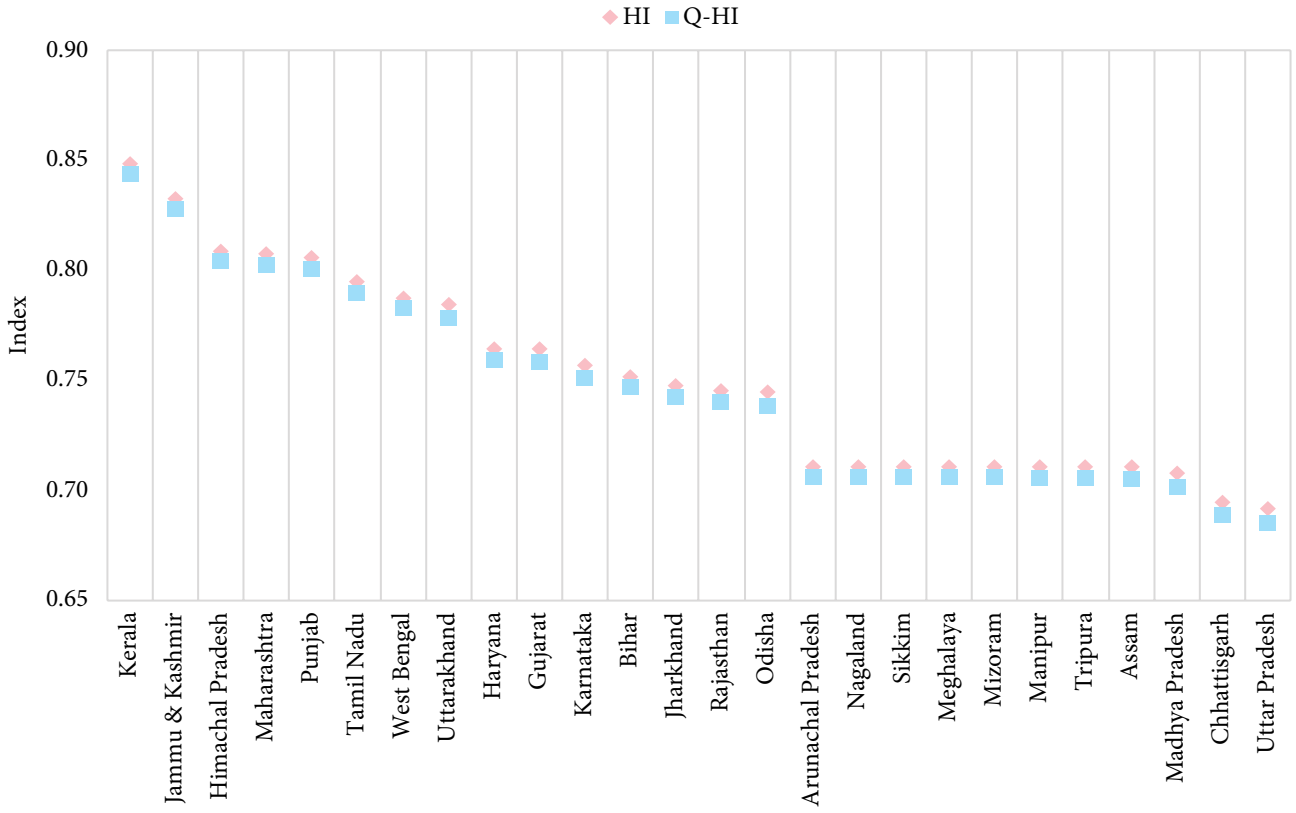


HI – Health Index.

Q-HI – Quality-adjusted Health Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Figure 8: Quality-adjusted Health Index *vs* Health Index - 2017–18

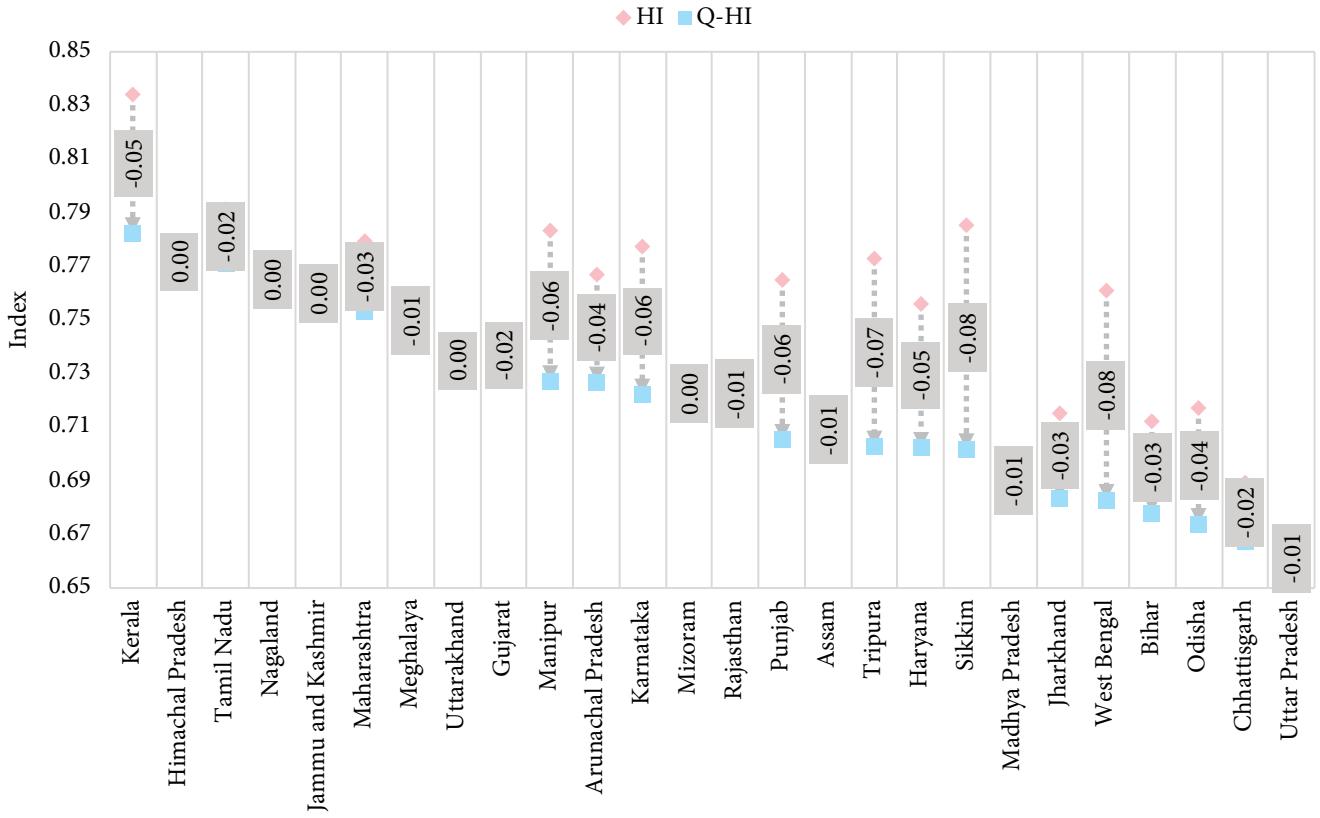


HI – Health Index.

Q-HI – Quality-adjusted Health Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Figure 9: Quality-adjusted Health Index *vs* Health Index - 2021–22



HI – Health Index.

Q-HI – Quality-adjusted Health Index.

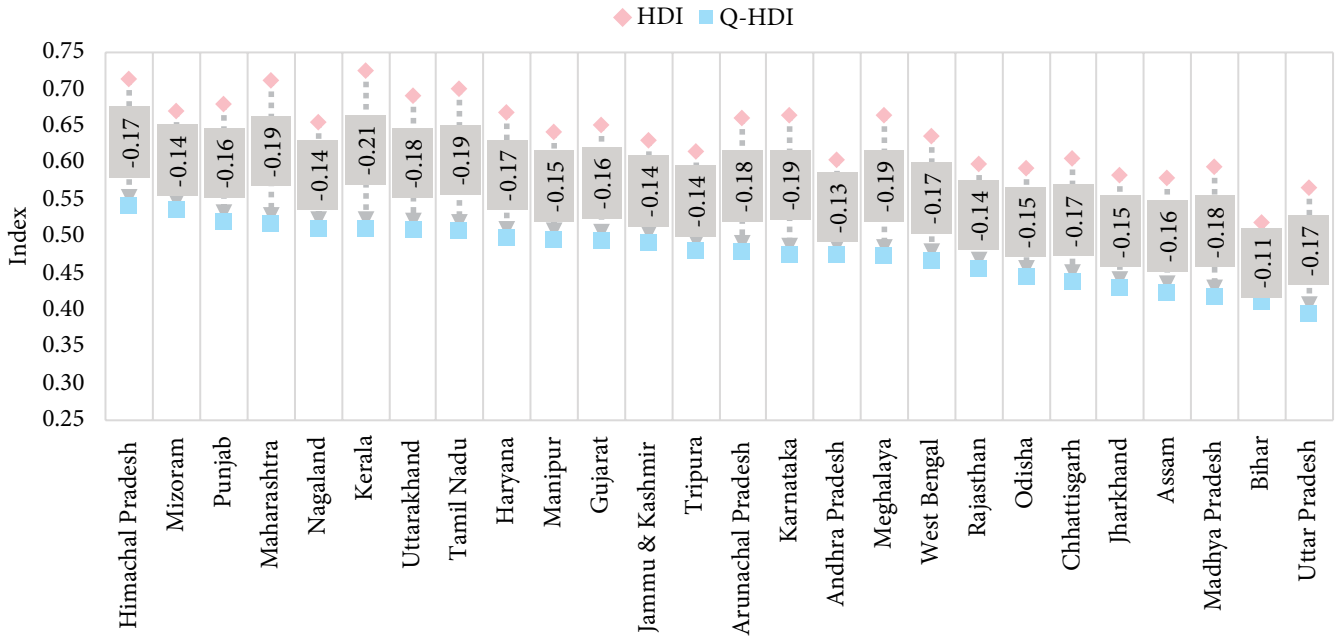
Source: Global Data Lab and authors' calculations.

4.4 Quality-adjusted Human Development Index (Q-HDI)

The Quality-Adjusted HDI (Q-HDI) was computed by combining all three elements, *i.e.*, income, education, and health, after having adjusted them for quality. Different patterns were observed in the three years.

In 2011–12, of all the states, the highest value of Q-HDI was observed in Himachal Pradesh and the lowest in Uttar Pradesh. The least divergence between the Q-HDI and HDI was observed in Bihar (-0.11), followed by Andhra Pradesh (-0.13). On the other hand, the largest divergence between Q-HDI and HDI was observed in Kerala, followed by Maharashtra, Tamil Nadu, Karnataka, and Meghalaya. The divergences between the Q-HDI and HDI ranged from -0.11 to -0.21 (Figure 10).

Figure 10: Quality-adjusted HDI vs HDI - 2011–12



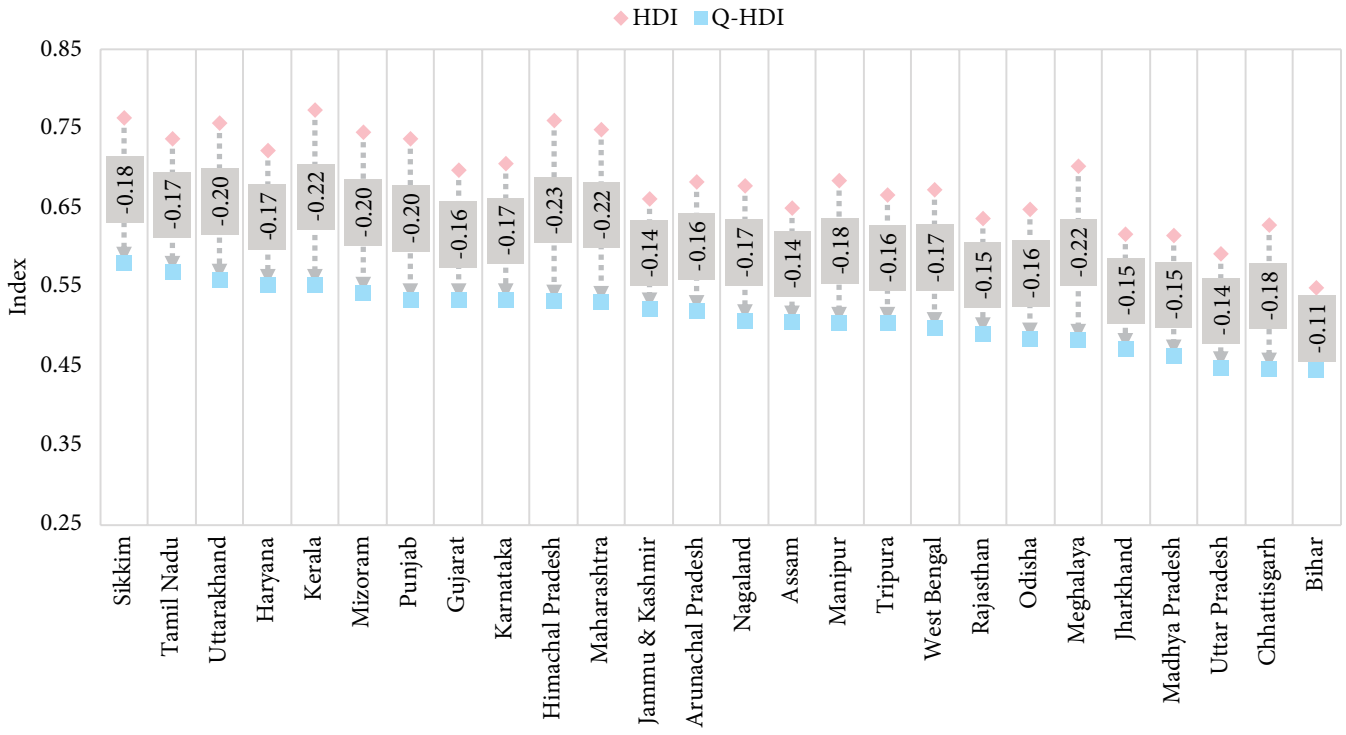
HDI – Human Development Index.

Q-HDI – Quality-adjusted Human Development Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

In 2017–18, the Q-HDI value was the highest for Sikkim and the lowest for Bihar. The least divergence between Q-HDI and HDI was again observed in Bihar, followed by Uttar Pradesh, Assam, and Jammu and Kashmir. The largest divergence was observed in Himachal Pradesh, followed by Kerala, Maharashtra and Meghalaya (Figure 11).

Figure 11: Quality-adjusted HDI *vs* HDI - 2017–18



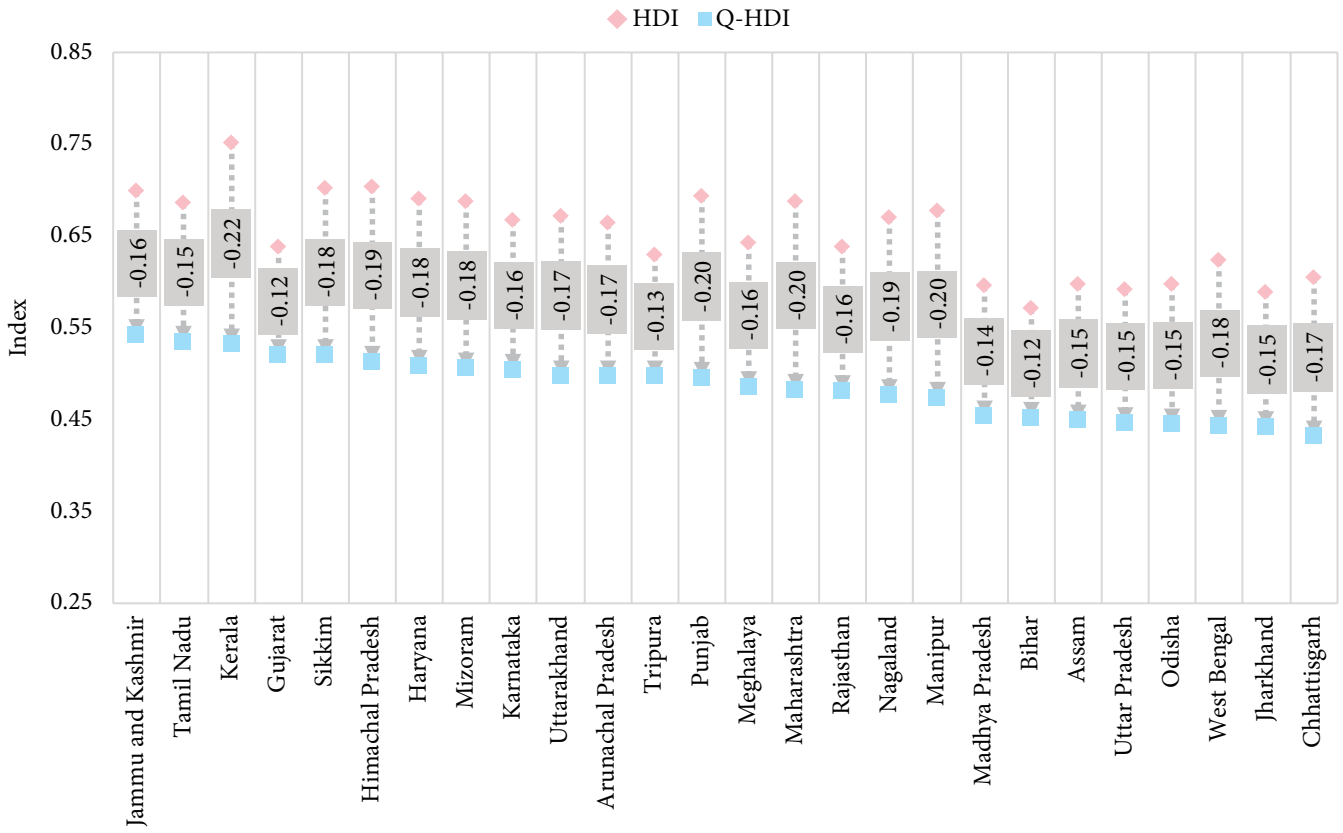
HDI – Human Development Index.

Q-HDI – Quality-adjusted Human Development Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

In 2021–22, the Q-HDI was the highest for Jammu and Kashmir, followed by Tamil Nadu and Kerala, and the lowest for Chhattisgarh, followed by Jharkhand and West Bengal. The least divergence between Q-HDI and HDI was observed in Gujarat and Bihar, followed by Tripura and Madhya Pradesh, while the largest divergence was observed in Kerala, followed by Punjab, Maharashtra and Manipur, though there was some decline in the divergence in these states in 2021–22 *vis-à-vis* 2017–18 (Figure 12). Significant divergences in the income and education indices were the primary factors contributing to the significant differences between Q-HDI and HDI in all three years, as health indices hardly showed any divergence, barring 2021–22. The consistent decline in the divergence of Q-HDI *vis-à-vis* HDI suggests an improvement in the quality of human development over time.

Figure 12: Quality-adjusted HDI *vs* HDI - 2021–22



HDI – Human Development Index.

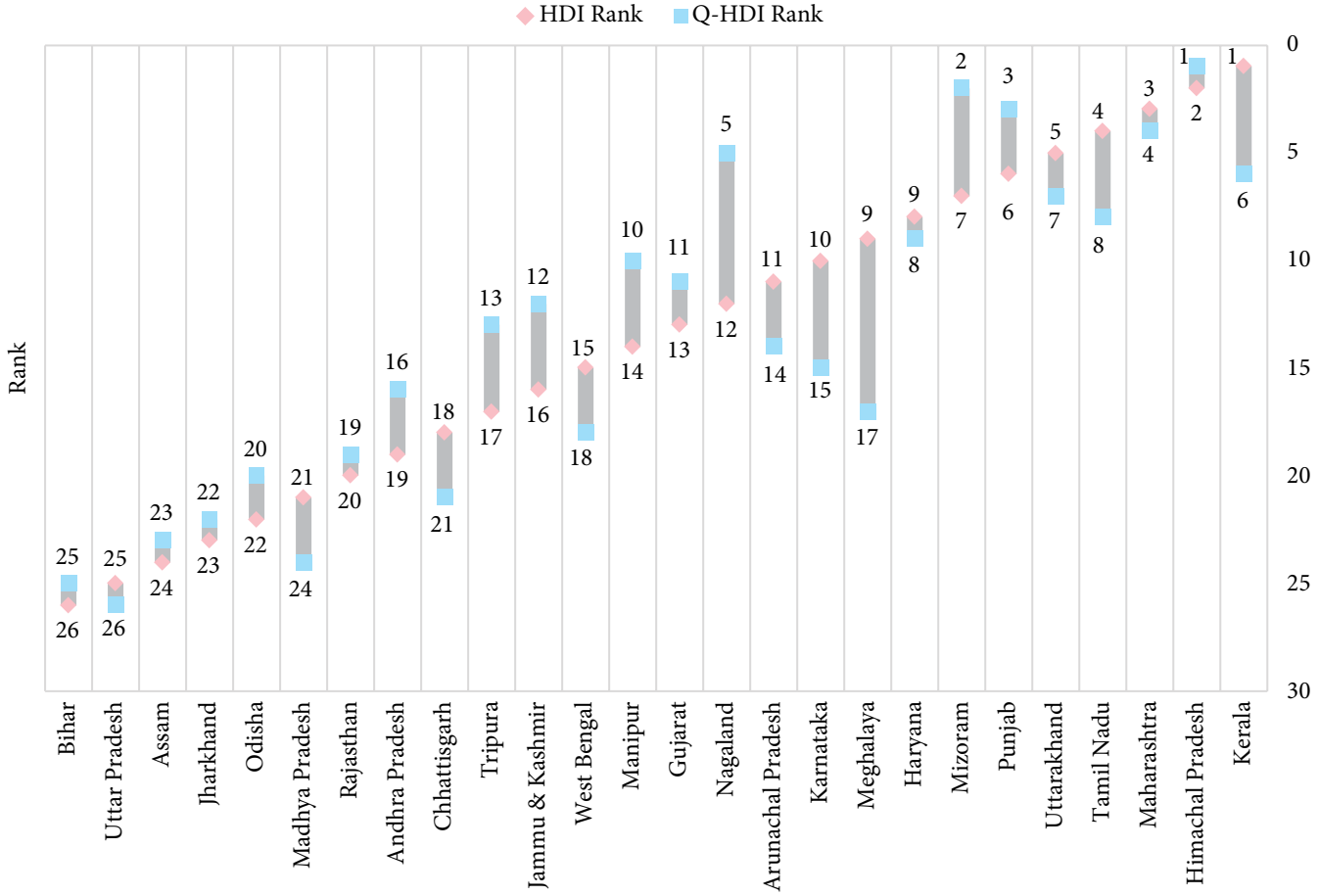
Q-HDI – Quality-adjusted Human Development Index.

Source: Global Data Lab and authors' calculations.

A Comparison of State Rankings – Quality-adjusted HDI versus HDI

Significant changes were observed in the rankings of various states in Quality-Adjusted HDI *vis-à-vis* HDI over the three years for which the study was conducted. The rankings of the three north-eastern states, *viz.*, Nagaland, Mizoram, and Manipur, improved significantly by several places in Q-HDI *vis-à-vis* HDI in 2011–12. On the other hand, the rankings of Meghalaya and Arunachal Pradesh declined significantly. The ranking of Kerala declined by five places. However, the ranking of Himachal Pradesh improved by one place (Figure 13).

Figure 13: A Comparison of State Rankings of Quality-adjusted HDI and HDI - 2011–12



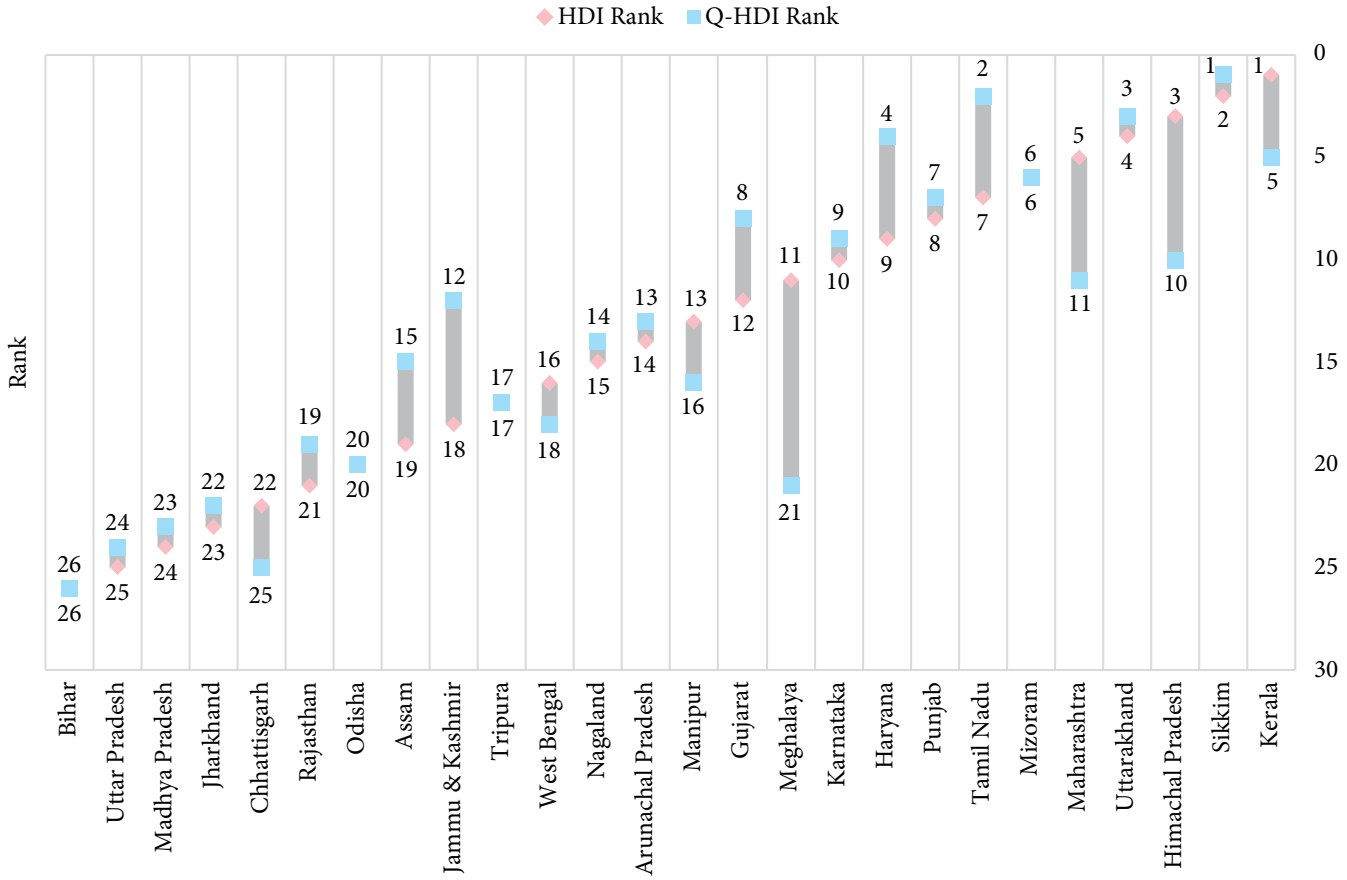
HDI – Human Development Index.

Q-HDI – Quality-adjusted Human Development Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

In 2017–18, Himachal Pradesh, Maharashtra, and Meghalaya lost several places in their Q-HDI rankings *vis-à-vis* HDI. The rankings of Sikkim, Uttarakhand, Punjab, Karnataka, Arunachal Pradesh, Nagaland, Jharkhand, Madhya Pradesh, and Uttar Pradesh changed by only one place each. The rankings of Mizoram, Tripura, Odisha, and Bihar remained the same (Figure 14).

Figure 14: A Comparison of State Rankings of Quality-adjusted HDI and HDI - 2017–18



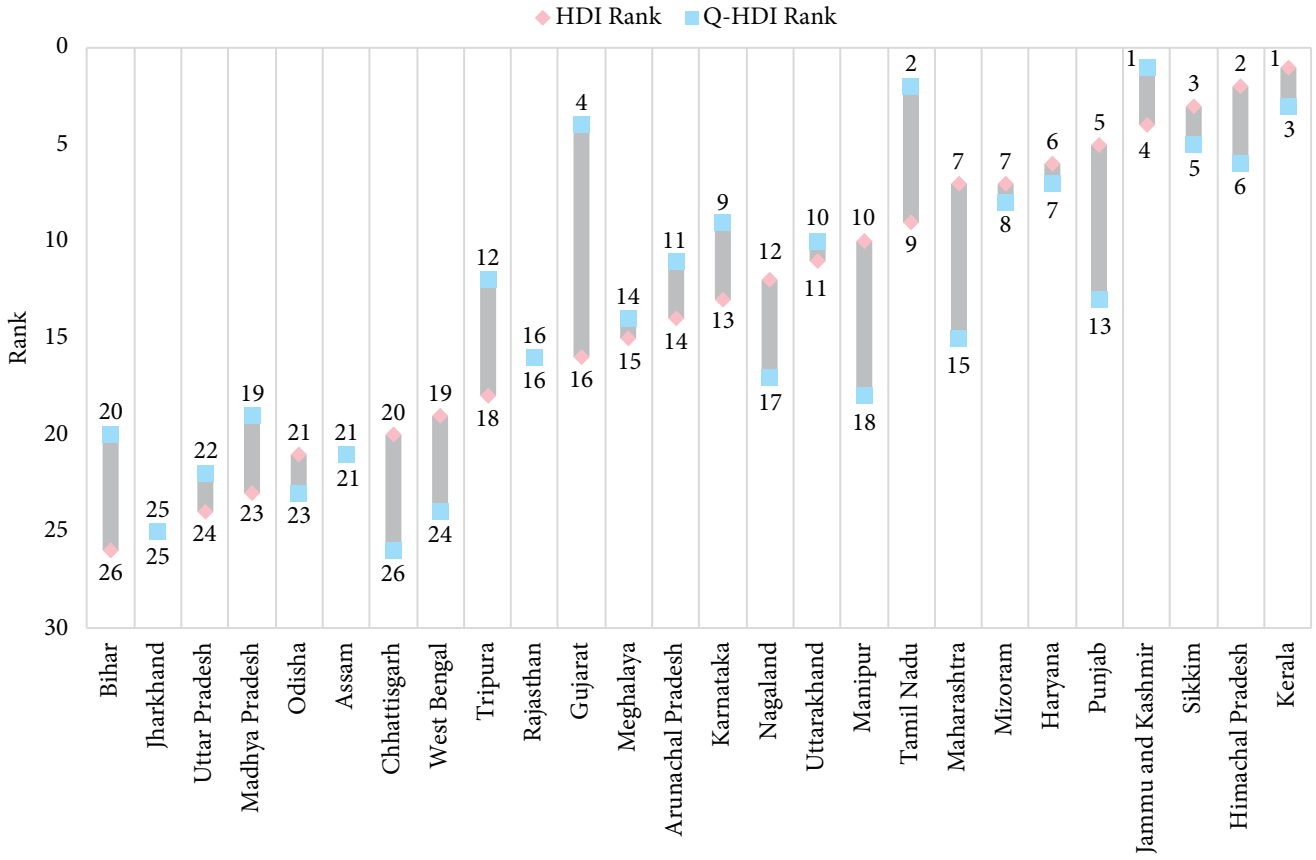
HDI – Human Development Index.

Q-HDI – Quality-adjusted Human Development Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

In 2021–22, Himachal Pradesh, Punjab, Maharashtra, Manipur, Nagaland, West Bengal, and Chhattisgarh lost their rankings by several places in Q-HDI relative to HDI. On the other hand, the rankings of Gujarat, Tamil Nadu, Tripura, and Bihar improved by several places. However, Rajasthan, Assam, and Jharkhand retained their respective rankings in Q-HDI as in HDI (Figure 15).

Figure 15: A Comparison of State Rankings of Quality-adjusted HDI and HDI - 2021–22



HDI – Human Development Index.

Q-HDI – Quality-adjusted Human Development Index.

Source: Global Data Lab and authors' calculations.

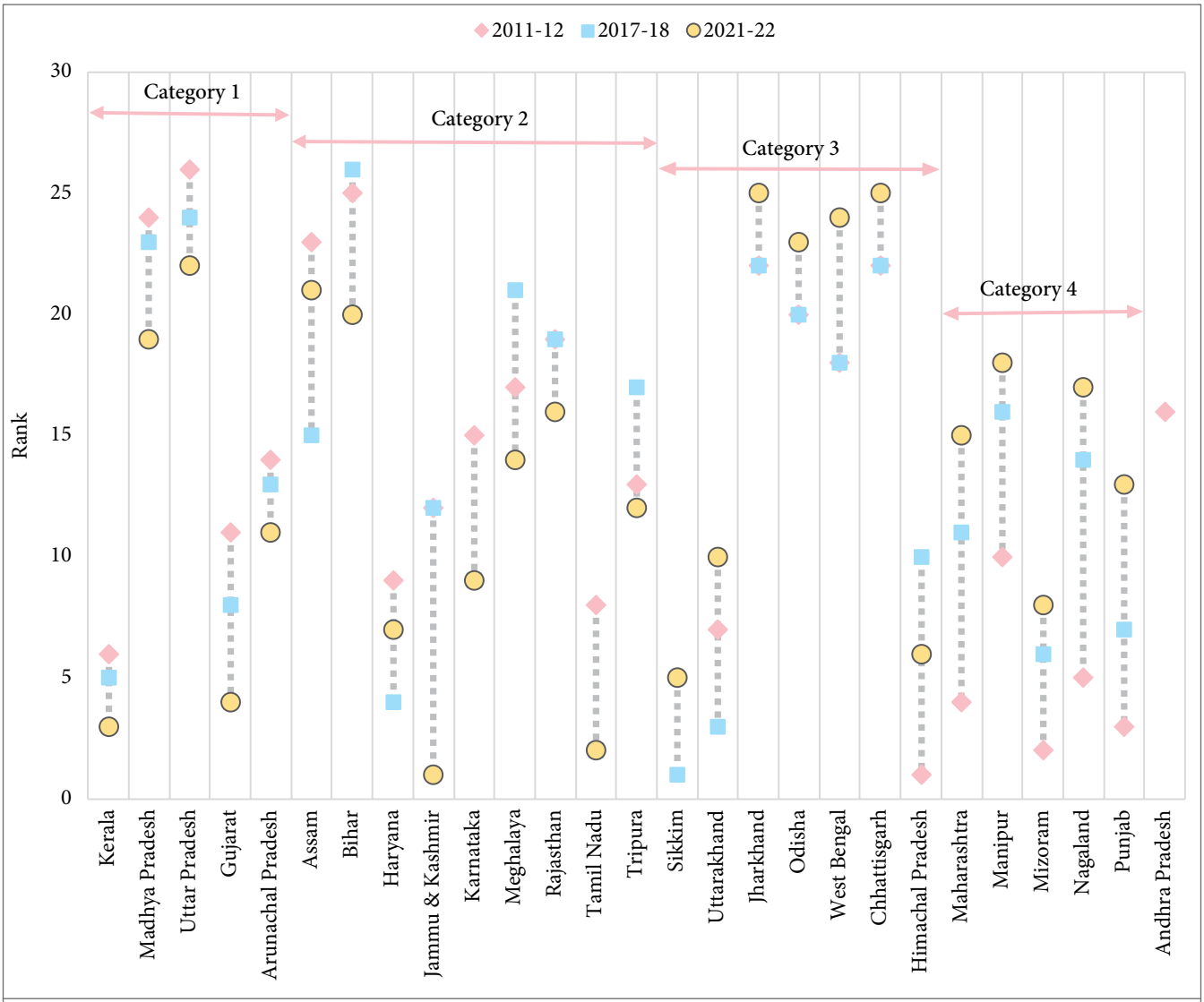
Overall Trends

Significant divergences were observed inter-temporally in the ranking of states based on Quality-Adjusted HDI *vis-à-vis* HDI. Four patterns were observed.

The rankings of some states improved consistently in Quality-Adjusted HDI in 2017–18 and 2021–22 relative to 2011–12. States showing this pattern were Kerala, Madhya Pradesh, Uttar Pradesh, Gujarat, and Arunachal Pradesh (Category 1). There was another category in which the rankings of the states improved overall in 2021–22 relative to 2011–12. States showing this pattern were Assam, Bihar, Haryana, Jammu and Kashmir, Karnataka, Meghalaya, Rajasthan, Tamil Nadu, and Tripura (Category 2). In another pattern, states showed overall deterioration in 2021–22 in comparison with 2011–12. The states in this category were Uttarakhand, Sikkim, Jharkhand, Odisha, West Bengal, Chhattisgarh, and Himachal Pradesh. The rankings of some states, such as Jharkhand, Odisha, West Bengal, and Chhattisgarh, did not change in 2017–18 relative to 2011–12, but deteriorated in 2021–22 (Category 3).

In the last pattern, the ranking of some states declined consistently between 2011–12 and 2021–22. States showing this pattern were Maharashtra, Manipur, Mizoram, Nagaland, and Punjab (Category 4) - Figure 16.

Figure 16: Quality-adjusted HDI: Inter-Temporal Comparison



State	2011–12	2017–18	2021–22
Kerala	6	5	3
Madhya Pradesh	24	23	19
Uttar Pradesh	26	24	22
Gujarat	11	8	4
Arunachal Pradesh	14	13	11
Assam	23	15	21
Bihar	25	26	20
Haryana	9	4	7
Jammu & Kashmir	12	12	1
Karnataka	15	9	9
Meghalaya	17	21	14
Rajasthan	19	19	16
Tamil Nadu	8	2	2
Tripura	13	17	12
Sikkim	–	1	5
Uttarakhand	7	3	10
Jharkhand	22	22	25
Odisha	20	20	23
West Bengal	18	18	24
Chhattisgarh	22	22	25
Himachal Pradesh	1	10	6
Maharashtra	4	11	15
Manipur	10	16	18
Mizoram	2	6	8
Nagaland	5	14	17
Punjab	3	7	13
Andhra Pradesh	16	–	–

Source: Authors' calculations.

Furthermore, the study has also estimated the gender quality-adjusted human development index (G-HDI). The Gender Inequality Index (GII) was used to incorporate the gender quality factor in the G-HDI. The G-HDI was lower for all the states in all three years, *viz.,* 2011–12, 2017–18, and 2021–22, suggesting deterioration in HDI after adjustments for gender quality. In other words, HDI adjusted for gender quality reflects deterioration in human development. While the divergences between G-HDI and HDI in all the states declined between 2011–12 and 2021–22, this suggests an overall improvement in quality over time. The larger divergences were observed in the north-eastern states such as Arunachal Pradesh, Manipur, Mizoram, and Nagaland across the years 2011–12, 2017–18, 2021–22 (Appendix 1).

5. Conclusion

In this study, all three elements of the HDI and the composite HDI were adjusted for quality in India at the state level for three years, *viz.*, 2011–12, 2017–18, and 2021–22. Income is adjusted for income inequality, education is adjusted for the mathematical and reading abilities of students in grade 8, and health is adjusted for disabilities. Several key findings emerge from the study.

First, the values of quality-adjusted income, education, and health indices, as well as the composite HDI were lower than the income, education, health, and HDI for all three years and for all states. However, relative to health and income, divergences in the quality-adjusted education index *vis-à-vis* the traditional education index were larger in the case of most states. In general, states with high values of education and income indices showed larger divergences between quality-adjusted and traditional elements. This included states such as Kerala, Uttarakhand, Himachal Pradesh, Meghalaya, Manipur, and Mizoram.

Second, even some of the highest-ranking states, such as Kerala and Himachal Pradesh, showed large divergences in quality-adjusted HDI *vis-à-vis* HDI.

Third, the overall divergence between Q-HDI and traditional HDI widened from 2011–12 to 2017–18 but narrowed between 2017–18 and 2021–22. Although divergence in 2021–22 was lower than in 2011–12, but the extent of divergence was not significant.

The study has important policy implications. Lower values of quality-adjusted elements of the HDI *vis-à-vis* the traditional elements in all states and for all the years suggest that the traditional HDI and its elements alone do not capture an accurate picture of human development in the country. Hence, there is a need to focus on the quality of human development as much as, if not more than, its quantitative aspects. This will necessitate action in all three elements of the HDI. In health, the need is to focus on addressing several structural deficiencies, such as governance and introducing systemic reforms to deliver cost-effective public health services. The focus should also shift from curative to preventive healthcare services. Primary healthcare services also need to be strengthened.

The challenges of improving education quality in India are varied, requiring reforms at all levels of governance. Institutional strengthening, data-based governance, targeted resource allocation, and stakeholder participation are critical to address disparities in learning outcomes.

One of the primary areas of focus in higher education should be to expand the scope and rigour of quality assessments and accreditation mechanisms. Literature suggests that increasing the number of institutions subject to regular quality audits can significantly raise educational standards (World Bank, 2021). Performance-based resource allocation has been increasingly recognised as an effective strategy for improving education quality (GoI, 2013; World Bank, 2013).

To reduce income inequalities, it is important to provide educational opportunities to all and promote employment, which, in turn, will require imparting appropriate skills. It is also imperative to encourage female labour force participation. Gender-responsive policies play an important role in improving the income of women as they face structural barriers in labour force participation and equitable incomes (Chaudhary & Verick, 2014).

The study has some limitations. The scope of the study was only on the qualitative aspects of human development in all three elements of the HDI, *viz.,* income, health, and education, and the composite HDI. However, the qualitative aspects of health, education, and income are subjective. Quality, being multifaceted, could also encompass several other elements such as creativity, critical thinking, or cultural diversity in the classroom in education. Similarly, health quality could cover other important aspects such as mental and physical well-being or access to healthcare infrastructure. Furthermore, the study has not considered other social and economic differences that are particularly significant in India such as regional inequalities.

References

Anand, S., & Sen, A. (1994). Human Development Index: Methodology and measurement. Human Development Report Office Occasional Paper No. 12). United Nations Development Programme.

Anjara, R. (2019). An essay on an adjustment of the Human Development Index (HDI) to corruption and democracy.

ASER Centre. (2012). Annual Status of Education Report (Rural) 2011. Pratham Education Foundation.

ASER Centre. (2022). Annual Status of Education Report (Rural) 2022. ASER Centre. https://www.asercentre.org

ASER Centre. (2025). Annual Status of Education Report (Rural) 2024. Pratham Education Foundation. https://asercentre.org/wp-content/uploads/2022/12/ASER_2024_Final-Report_25_1_24.pdf

Banerji, R., & Chavan, M. (2016). The ASER experience: Seeing is believing. Journal of Indian School of Political Economy, 28(1), 15–35.

Biggeri, M., & Mauro, V. (2018). Towards a more 'sustainable' human development index: Integrating the environment and freedom. *Ecological Indicators*, 91, 220–231.

Chaudhary, R., & Verick, S. (2014). Female labour force participation in India and beyond (ILO Asia-Pacific Working Paper Series). International Labour Organization.

Cobb, C. W., & Rixford, C. (1998). Lessons from the Index of Sustainable Economic Welfare: A discussion. Ecological Economics, 25(1), 61–69.

GoI (2009). Ministry of Women and Child Development. Gendering human development indices: Recasting the Gender Development Index and Gender Empowerment Measure for India.

GoI (2013). Rashtriya Uchchatar Shiksha Abhiyan: National higher education mission - Strategic overview.

GoI (2019). Ministry of Human Resource Development. (2019). Performance Grading Index (PGI) for States and Union Territories 2017-18. Department of School Education and Literacy. https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/pgi_eng_17-18_0.pdf

GoI (2021). Ministry of Statistics and Programme Implementation. (2021). Gendering Human Development Report: Working paper for computing HDI, GDI and GII for states of India. Social Statistics Division.

GoI (2023). Ministry of Education, Department of School Education & Literacy. Performance Grading Index 2.0 for States and Union Territories (PGI State 2021–22) [Brochure]. https://www.education.gov.in/sites/upload_files/mhrd/files/statistics-new/pgi-s.pdf

Haq, M. (1995). Reflections on human development. Oxford University Press.

Hicks, D. A. (1997). The inequality-adjusted human development index: A constructive proposal. World Development, 25(8), 1283–1298.

Kingdon, G. G. (2007). The progress of school education in India. *Oxford Review of Economic Policy*, 23(2), 168–195. https://doi.org/10.1093/oxrep/grm015

MoSPI. (2021). Gendering human development. https://mospi.gov.in/documents/213904/301563//Report%20on%20Gendering%20Human%20Development1669890183111.pdf/1332113c-111c-d147-9121-111111111111

Mishra, U. S. (2011). On adjusting the survivorship dimension in the Human Development Index. Indian Journal of Human Development, 5(1), 246–256.

NCERT. (2021). National Achievement Survey 2021: State Reports and national report. Ministry of Education, Government of India. https://nas.education.gov.in

Neumayer, E. (2001). The human development index and sustainability—A constructive proposal. *Ecological Economics,* 39(1), 101–114.

Neethling, I. (2019). Enhancing the use of burden of disease information for health sector decision making [Doctoral dissertation, University of the Western Cape]. University of the Western Cape.

OECD. (2018). Education policy outlook 2018: Putting student learning at the centre. OECD Publishing. https://doi.org/10.1787/9789264301528-en

Panigrahi, R., & Sivramkrishna, S. (2002). An adjusted human development index: Robust country rankings with respect to the choice of fixed maximum and minimum indicator values. *Journal of Human Development,* 3(2), 301–311.

Raghuvanshi, G., & Verma, P. (2024). Human Development Index: A critical review. *International Journal for Multidisciplinary Research*, *6*(2), IJFMR240218146. https://www.ijfmr.com

Ranis, G., Stewart, F., & Samman, E. (2006). Human development: Beyond the human development index. *Journal of Human Development*, *7*(3), 323–358.

Resce, G. (2021). Wealth-adjusted human development index. *Journal of Cleaner Production,* 318, 128587.

Ryumina, Y. V. (2016). Ecological aspects of the assessment of quality of life. *Ekonomika Regiona/ Economy of Regions,* (4), 1113–1122.

Sen, A. (1999). Development as freedom. Anchor Books.

Suryanarayana, M. H., Agrawal, A., & Prabhu, K. S. (2011). Inequality-adjusted human development index: States in India. *Indian Journal of Human Development,* 10(2), 157–175.

UNDP. (2002). Human Development Report 2002: Deepening democracy in a fragmented world. Oxford University Press.

UNDP. (2010). Human development report 2010: The real wealth of nations—Pathways to human development. United Nations Development Programme.

UNESCWA. (2021). What drives quality-adjusted human development achievements? https://www.unescwa.org/publications/what-drives-quality-adjusted-human-development-achievements

World Bank. (2013). What matters most for school accountability: A framework paper (Systems Approach for Better Education Results). https://openknowledge.worldbank.org/handle/10986/16557

World Bank. (2021). From good to great in Indian tertiary education: Realizing the promise of the National Education Policy. https://documents1.worldbank.org/curated/en/099080503142332315/pdf/P1747790711faf048085a70993d530a04de.pdf

Appendices

Appendix 1: Gender Quality-adjusted HDI

Gender equality is an important aspect of human development in terms of health, education, and income. To adjust the HDI for gender inequality, the Gender Inequality Index (GII) was used. It was constructed by the Ministry of Statistics and Programme Implementation (MoSPI) in the Gendering Human Development (2021–22) report for 2011–12 and 2017–18. The GII for 2021–22 was not available. Hence, it was estimated using the methodology provided by MoSPI. The GII captures gender disparity in the three dimensions, namely, health, empowerment, and employment. The disparity in health is captured by the maternal mortality ratio (maternal deaths per 100,000 live births) and adolescent birth rate (births per 1,000 women aged 15–19 years). The empowerment dimension consists of two indicators, *viz*., women's share of seats in parliament and women's population share with at least some secondary education aged 25+ years (GoI, 2021). The employment dimension simply reflects the female labour force participation rate. Based on five indicators across the three dimensions, the GII is a holistic measure of gender disparity across the three aspects of the HDI. Hence, the HDI was adjusted for gender inequality also by using the GII. The gender quality factor (δg) is obtained after subtracting the GII score from 1. Thus, a higher GII implies higher gender disparity, and a high-quality factor implies greater gender equality. The HDI was adjusted for gender inequality to compute the Quality and Gender Inequality-Adjusted Human Development Index (G-HDI) as follows:

$$\text{G-HDI} = \left(\delta_g \cdot (\text{Q-HI}) \cdot (\text{Q-EI}) \cdot (\text{Q-II})\right)^{\frac{1}{4}}$$

Gender Quality-adjusted Human Development Index (G-HDI)

Different patterns were observed in the HDI adjusted for gender equality in the three different years.

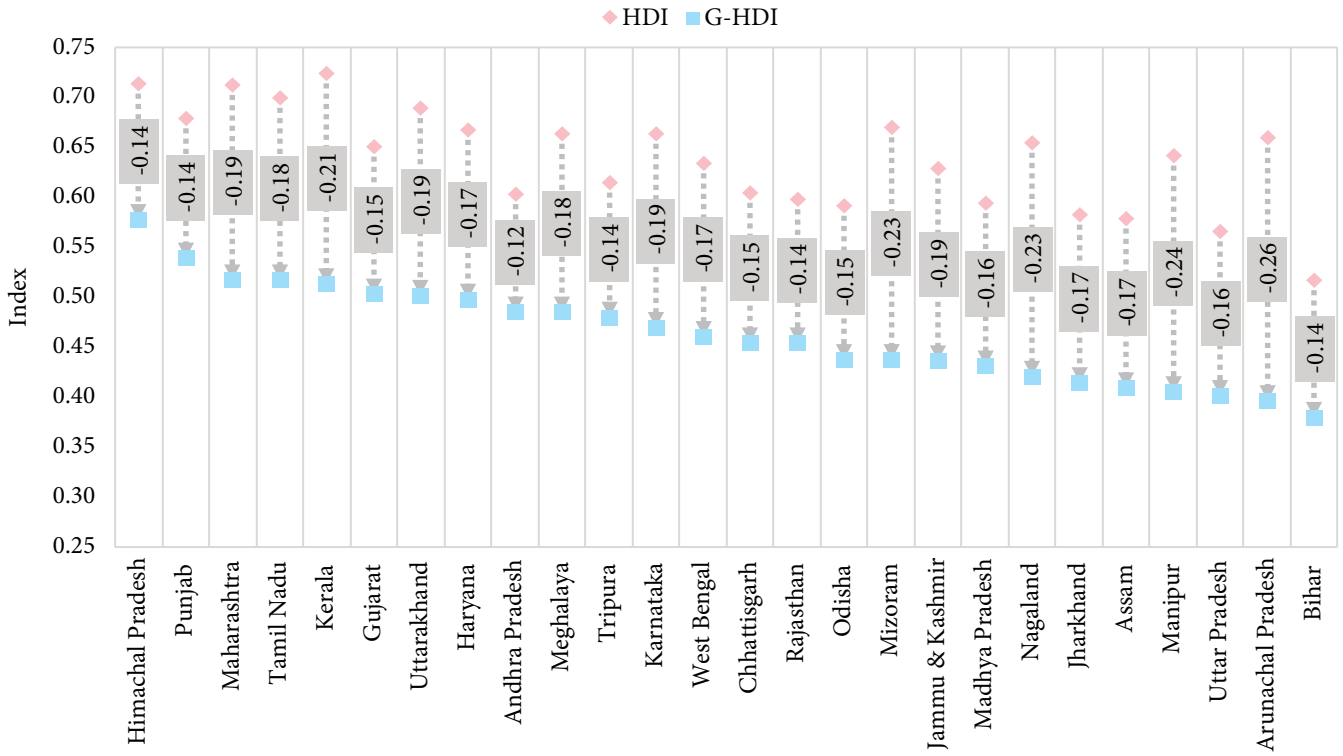
In 2011–12, Andhra Pradesh had the least divergence (0.12) of all states, followed by Himachal Pradesh, Punjab, Tripura, Rajasthan, and Bihar (0.14), suggesting that they performed better than all other states. On the other hand, the largest divergence between G-HDI and HDI was observed in Arunachal Pradesh, followed by the three other NE states: Nagaland, Mizoram, and Manipur (Figure 17), implying the deterioration in HDI values adjusted for gender quality, pulled down mainly by higher gender inequality, higher dropout rates in primary schools, and a low percentage of trained teachers in these states.

In 2017–18, the least divergence between G-HDI and HDI was observed in Jammu and Kashmir, followed by Madhya Pradesh, Uttar Pradesh, and Bihar, suggesting relatively better performance in HDI adjusted for gender quality. The largest divergence was observed in Mizoram and Sikkim, followed by Arunachal Pradesh, Manipur, and Nagaland, implying relatively poor performance of HDI adjusted for gender equality (Figure 18).

In 2021–22, the least divergence between G-HDI and HDI was observed in Gujarat, followed by Jharkhand, Uttar Pradesh, Chhattisgarh and Madhya Pradesh, suggesting relatively better performance in HDI adjusted for gender quality. The largest divergence was observed in four NE states, Mizoram, Nagaland, Manipur and Arunachal Pradesh, followed by Punjab and Haryana, implying relatively poor performance of HDI adjusted for gender equality. The G-HDI was the highest for Kerala, followed by Tamil Nadu and Jammu and Kashmir, indicating that these states performed better in HDI adjusted for gender equality relative to other states (Figure 19). On the other hand, the G-HDI was lowest for Bihar, followed by Assam, implying relatively poor performance of HDI adjusted for gender quality.

Gender inequality and the EI were the primary factors contributing to the significant divergences between G-HDI and HDI in all three years.

Figure 17: Gender Quality-adjusted HDI *vs* HDI - 2011–12

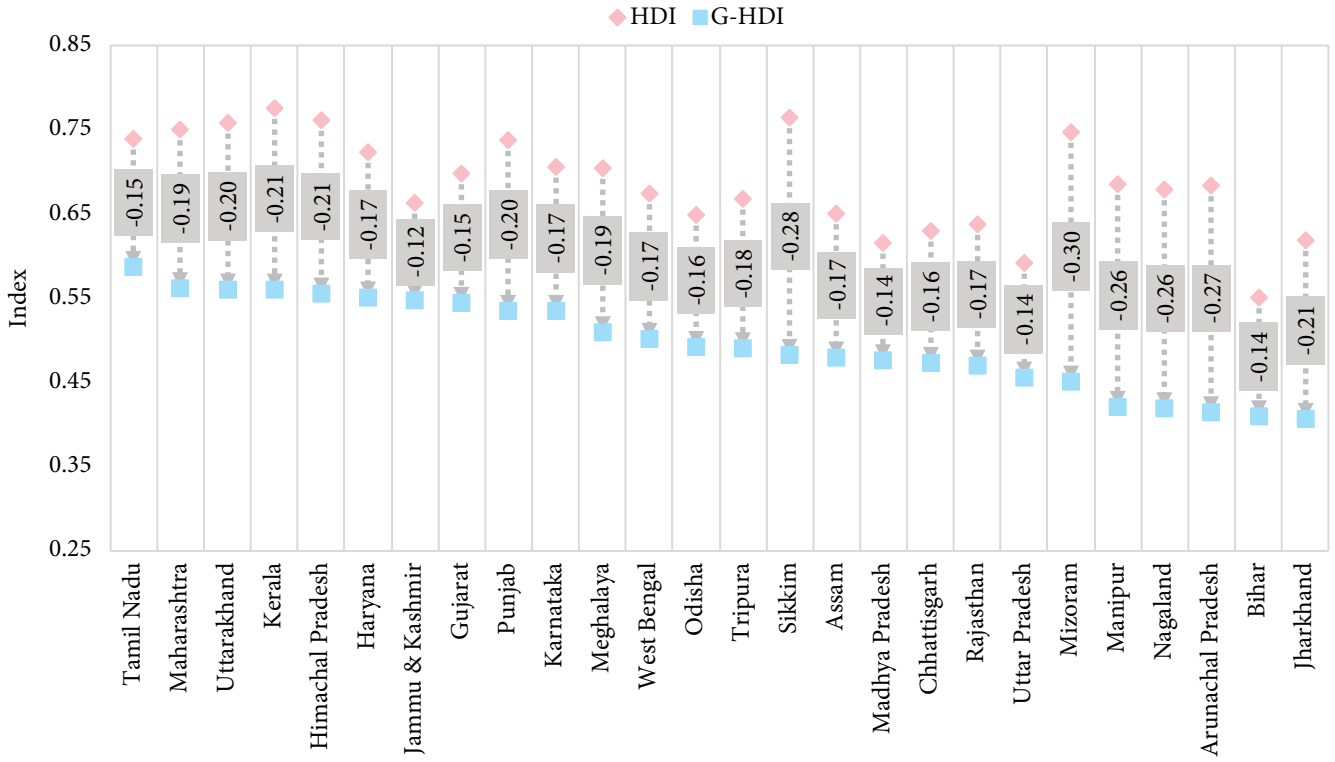


HDI – Human Development Index.

G-HDI – Gender Quality-adjusted Human Development Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Figure 18: Gender Quality-adjusted HDI *vs* HDI - 2017–18

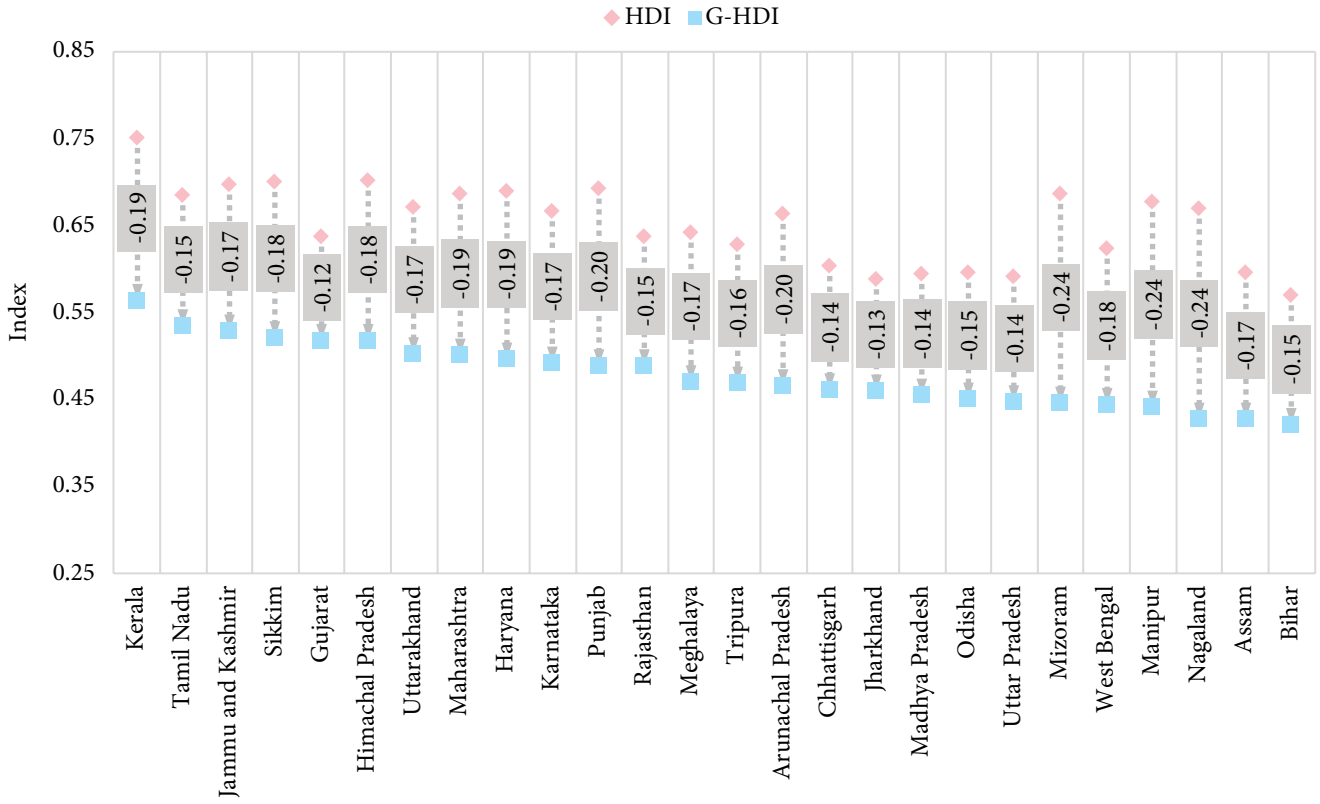


HDI – Human Development Index.

G-HDI – Gender Quality-adjusted Human Development Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculation.

Figure 19: Gender Quality-adjusted HDI *vs* HDI - 2021–22



HDI – Human Development Index.

G-HDI – Gender Quality-adjusted Human Development Index.

Source: Global Data Lab and authors' calculations.

Appendix 2: Data Tables

Traditional Human Development Index and its Sub-indices

Table 2: HDI and its Sub-indices at State Level - 2011–12

State	HI	EI	II	HDI
Andhra Pradesh	0.75	0.43	0.69	0.60
Arunachal Pradesh	0.68	0.61	0.69	0.66
Assam	0.68	0.49	0.59	0.58
Bihar	0.74	0.40	0.47	0.52
Chhattisgarh	0.69	0.50	0.65	0.61
Gujarat	0.75	0.50	0.74	0.65
Haryana	0.75	0.52	0.77	0.67
Himachal Pradesh	0.79	0.61	0.75	0.71
Jammu & Kashmir	0.81	0.48	0.65	0.63
Jharkhand	0.72	0.47	0.59	0.58
Karnataka	0.75	0.53	0.74	0.66
Kerala	0.85	0.60	0.75	0.72
Madhya Pradesh	0.68	0.54	0.58	0.59
Maharashtra	0.79	0.60	0.76	0.71
Manipur	0.68	0.67	0.59	0.64
Meghalaya	0.68	0.66	0.66	0.66
Mizoram	0.68	0.68	0.66	0.67
Nagaland	0.68	0.65	0.65	0.66
Odisha	0.71	0.47	0.63	0.59
Punjab	0.79	0.54	0.73	0.68
Rajasthan	0.73	0.45	0.65	0.60
Tamil Nadu	0.78	0.59	0.75	0.70
Tripura	0.68	0.56	0.62	0.62
Uttar Pradesh	0.68	0.49	0.55	0.57
Uttarakhand	0.80	0.54	0.76	0.69
West Bengal	0.77	0.53	0.63	0.64

HI – Health Index.

EI – Education Index.

II – Income Index.

HDI – Human Development Index.

Source: Gendering Human Development Report (MoSPI, 2021).

Table 3: HDI and its Sub-indices at State Level - 2017–18

State	HI	EI	II	HDI
Arunachal Pradesh	0.71	0.61	0.74	0.68
Assam	0.71	0.59	0.66	0.65
Bihar	0.75	0.44	0.51	0.55
Chhattisgarh	0.70	0.52	0.69	0.63
Gujarat	0.77	0.54	0.83	0.70
Haryana	0.77	0.59	0.85	0.72
Himachal Pradesh	0.81	0.67	0.82	0.76
Jammu & Kashmir	0.83	0.51	0.69	0.66
Jharkhand	0.75	0.50	0.63	0.62
Karnataka	0.76	0.56	0.83	0.71
Kerala	0.85	0.67	0.82	0.77
Madhya Pradesh	0.71	0.51	0.65	0.62
Maharashtra	0.81	0.63	0.83	0.75
Manipur	0.71	0.72	0.63	0.69
Meghalaya	0.71	0.74	0.66	0.70
Mizoram	0.71	0.76	0.78	0.75
Nagaland	0.71	0.63	0.70	0.68
Odisha	0.75	0.52	0.70	0.65
Punjab	0.81	0.64	0.78	0.74
Rajasthan	0.75	0.49	0.71	0.64
Sikkim	0.71	0.68	0.93	0.76
Tamil Nadu	0.80	0.62	0.82	0.74
Tripura	0.71	0.59	0.71	0.67
Uttar Pradesh	0.69	0.50	0.60	0.59
Uttarakhand	0.79	0.67	0.83	0.76
West Bengal	0.79	0.58	0.68	0.67

Table 4: HDI and its Sub-indices at State Level - 2021–22

State	HI	EI	II	HDI
Arunachal Pradesh	0.77	0.58	0.67	0.67
Assam	0.71	0.53	0.56	0.60
Bihar	0.71	0.48	0.54	0.57
Chhattisgarh	0.69	0.53	0.61	0.61
Gujarat	0.75	0.52	0.67	0.64
Haryana	0.76	0.61	0.71	0.69
Himachal Pradesh	0.78	0.65	0.71	0.70
Jammu and Kashmir	0.76	0.64	0.70	0.70
Jharkhand	0.72	0.51	0.56	0.59
Karnataka	0.78	0.57	0.67	0.67
Kerala	0.83	0.71	0.72	0.75
Madhya Pradesh	0.69	0.51	0.60	0.60
Maharashtra	0.78	0.62	0.68	0.69
Manipur	0.78	0.66	0.61	0.68
Meghalaya	0.75	0.57	0.62	0.64
Mizoram	0.73	0.64	0.71	0.69
Nagaland	0.77	0.61	0.64	0.67
Odisha	0.72	0.51	0.59	0.60
Punjab	0.77	0.60	0.73	0.69
Rajasthan	0.73	0.54	0.66	0.64
Sikkim	0.79	0.64	0.68	0.70
Tamil Nadu	0.79	0.61	0.67	0.69
Tripura	0.77	0.55	0.59	0.63
Uttar Pradesh	0.67	0.52	0.59	0.59
Uttarakhand	0.73	0.61	0.68	0.67
West Bengal	0.76	0.53	0.60	0.62

HI – Health Index.

EI – Education Index.

II – Income Index.

HDI – Human Development Index.

Source: Global Data Lab; Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Quality-adjusted Income Indices at State Level

Table 5: Quality-adjusted Income Index at State Level - 2011–12

State	II	GINI	Income Quality Factor	Q-II
Andhra Pradesh	0.69	0.33	0.67	0.46
Arunachal Pradesh	0.69	0.39	0.61	0.42
Assam	0.59	0.31	0.69	0.41
Bihar	0.47	0.28	0.72	0.33
Chhattisgarh	0.65	0.36	0.64	0.41
Gujarat	0.74	0.32	0.68	0.50
Haryana	0.77	0.38	0.62	0.48
Himachal Pradesh	0.75	0.34	0.66	0.50
Jammu & Kashmir	0.65	0.29	0.71	0.46
Jharkhand	0.59	0.35	0.65	0.38
Karnataka	0.74	0.39	0.61	0.45
Kerala	0.75	0.43	0.57	0.43
Madhya Pradesh	0.58	0.36	0.64	0.37
Maharashtra	0.76	0.39	0.61	0.47
Manipur	0.59	0.24	0.76	0.45
Meghalaya	0.66	0.26	0.74	0.49
Mizoram	0.66	0.26	0.74	0.49
Nagaland	0.65	0.22	0.78	0.51
Odisha	0.63	0.35	0.65	0.41
Punjab	0.73	0.33	0.67	0.49
Rajasthan	0.65	0.33	0.67	0.44
Tamil Nadu	0.75	0.34	0.66	0.49
Tripura	0.62	0.29	0.71	0.44
Uttar Pradesh	0.55	0.37	0.63	0.35
Uttarakhand	0.76	0.34	0.66	0.50
West Bengal	0.63	0.39	0.61	0.38

Table 6: Quality-adjusted Income Index at State Level - 2017–18

State	II	GINI	Income Quality Factor	Q-II
Arunachal Pradesh	0.74	0.35	0.65	0.48
Assam	0.66	0.30	0.70	0.46
Bihar	0.51	0.30	0.70	0.36
Chhattisgarh	0.69	0.36	0.64	0.44
Gujarat	0.83	0.32	0.68	0.57
Haryana	0.85	0.33	0.67	0.57
Himachal Pradesh	0.82	0.30	0.70	0.57
Jammu & Kashmir	0.69	0.31	0.69	0.47
Jharkhand	0.63	0.40	0.60	0.38
Karnataka	0.83	0.34	0.66	0.54
Kerala	0.82	0.30	0.70	0.57
Madhya Pradesh	0.65	0.35	0.65	0.42
Maharashtra	0.83	0.38	0.62	0.51
Manipur	0.63	0.32	0.68	0.43
Meghalaya	0.66	0.29	0.71	0.47
Mizoram	0.78	0.32	0.68	0.53
Nagaland	0.70	0.35	0.65	0.45
Odisha	0.70	0.37	0.63	0.44
Punjab	0.78	0.31	0.69	0.53
Rajasthan	0.71	0.32	0.68	0.48
Sikkim	0.93	0.31	0.69	0.64
Tamil Nadu	0.82	0.33	0.67	0.55
Tripura	0.71	0.31	0.69	0.49
Uttar Pradesh	0.60	0.34	0.66	0.40
Uttarakhand	0.83	0.30	0.70	0.58
West Bengal	0.68	0.35	0.65	0.44

II – Income Index.

Q-II – Quality-adjusted Income Index.

Source: Global Data Lab; Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Table 7: Quality-adjusted Income Index at State Level - 2021–22

State	II	GINI	Income Quality Factor	Q-II
Arunachal Pradesh	0.67	0.35	0.65	0.43
Assam	0.56	0.30	0.70	0.39
Bihar	0.54	0.30	0.70	0.38
Chhattisgarh	0.61	0.36	0.64	0.39
Gujarat	0.67	0.32	0.68	0.46
Haryana	0.71	0.33	0.67	0.48
Himachal Pradesh	0.71	0.30	0.70	0.49
Jammu and Kashmir	0.70	0.31	0.69	0.48
Jharkhand	0.56	0.40	0.60	0.34
Karnataka	0.67	0.34	0.66	0.44
Kerala	0.72	0.30	0.70	0.50
Madhya Pradesh	0.60	0.35	0.65	0.39
Maharashtra	0.68	0.38	0.62	0.42
Manipur	0.61	0.32	0.68	0.41
Meghalaya	0.62	0.29	0.71	0.44
Mizoram	0.71	0.32	0.68	0.48
Nagaland	0.64	0.35	0.65	0.41
Odisha	0.59	0.37	0.63	0.37
Punjab	0.73	0.31	0.69	0.50
Rajasthan	0.66	0.32	0.68	0.45
Sikkim	0.68	0.31	0.69	0.47
Tamil Nadu	0.67	0.33	0.67	0.45
Tripura	0.59	0.31	0.69	0.40
Uttar Pradesh	0.59	0.34	0.66	0.39
Uttarakhand	0.68	0.30	0.70	0.47
West Bengal	0.60	0.35	0.65	0.39

Quality-adjusted Education Indices at State Level

Table 8: Quality-adjusted Education Index at State Level - 2011–12

State	EI	Arithmetic Ability	Reading Ability	Education Quality Factor	Q-EI
Andhra Pradesh	0.43	0.29	0.19	0.23	0.32
Arunachal Pradesh	0.61	0.29	0.20	0.24	0.38
Assam	0.49	0.13	0.19	0.16	0.28
Bihar	0.40	0.27	0.14	0.20	0.28
Chhattisgarh	0.50	0.19	0.18	0.18	0.30
Gujarat	0.50	0.22	0.20	0.21	0.32
Haryana	0.52	0.39	0.14	0.23	0.35
Himachal Pradesh	0.61	0.44	0.17	0.27	0.41
Jammu & Kashmir	0.48	0.19	0.25	0.22	0.32
Jharkhand	0.47	0.21	0.15	0.18	0.29
Karnataka	0.53	0.19	0.20	0.20	0.32
Kerala	0.60	0.34	0.15	0.22	0.36
Madhya Pradesh	0.54	0.17	0.15	0.16	0.29
Maharashtra	0.60	0.26	0.21	0.24	0.38
Manipur	0.67	0.35	0.17	0.25	0.41
Meghalaya	0.66	0.14	0.19	0.16	0.33
Mizoram	0.68	0.45	0.23	0.32	0.47
Nagaland	0.65	0.26	0.22	0.24	0.39
Odisha	0.47	0.21	0.20	0.20	0.31
Punjab	0.54	0.40	0.15	0.25	0.36
Rajasthan	0.45	0.24	0.17	0.20	0.3
Tamil Nadu	0.59	0.17	0.23	0.20	0.34
Tripura	0.56	0.31	0.21	0.25	0.38
Uttar Pradesh	0.49	0.16	0.13	0.14	0.27
Uttarakhand	0.54	0.28	0.15	0.21	0.33
West Bengal	0.53	0.28	0.20	0.23	0.35

EI – Education Index.

Q-EI – Quality-adjusted Education Index.

Source: Gendering Human Development Report (MoSPI, 2021); ASER Reports; and authors' calculations.

Table 9: Quality-adjusted Education Index at State Level - 2017–18

State	EI	Arithmetic ability	Reading Ability	Education Quality Factor	Q-EI
Arunachal Pradesh	0.61	0.50	0.16	0.65	0.41
Assam	0.59	0.31	0.25	0.70	0.40
Bihar	0.44	0.57	0.11	0.70	0.33
Chhattisgarh	0.52	0.31	0.09	0.64	0.29
Gujarat	0.54	0.36	0.16	0.68	0.36
Haryana	0.59	0.63	0.11	0.67	0.39
Himachal Pradesh	0.67	0.61	0.05	0.70	0.33
Jammu & Kashmir	0.51	0.33	0.21	0.69	0.37
Jharkhand	0.50	0.44	0.17	0.60	0.37
Karnataka	0.56	0.39	0.16	0.66	0.37
Kerala	0.67	0.52	0.07	0.70	0.35
Madhya Pradesh	0.51	0.37	0.15	0.65	0.34
Maharashtra	0.63	0.41	0.11	0.62	0.36
Manipur	0.72	0.73	0.09	0.68	0.42
Meghalaya	0.74	0.28	0.09	0.71	0.34
Mizoram	0.76	0.71	0.08	0.68	0.43
Nagaland	0.63	0.51	0.14	0.65	0.41
Odisha	0.52	0.43	0.13	0.63	0.35
Punjab	0.64	0.62	0.07	0.69	0.36
Rajasthan	0.49	0.42	0.12	0.68	0.33
Sikkim	0.68	0.45	0.18	0.69	0.44
Tamil Nadu	0.62	0.50	0.18	0.67	0.43
Tripura	0.59	0.31	0.18	0.69	0.37
Uttar Pradesh	0.50	0.44	0.11	0.66	0.33
Uttarakhand	0.67	0.49	0.11	0.70	0.39
West Bengal	0.58	0.29	0.18	0.65	0.36

EI – Education Index.

Q-EI – Quality-adjusted Education Index.

Source: Gendering Human Development Report (MoSPI, 2021); ASER Reports; and authors' calculations.

Table 10: Quality-adjusted Education Index at State Level - 2021–22

State	EI	Arithmetic Ability	Reading Ability	Education Quality Factor	Q-EI
Arunachal Pradesh	0.58	0.47	0.15	0.27	0.39
Assam	0.53	0.28	0.15	0.20	0.33
Bihar	0.48	0.59	0.12	0.27	0.36
Chhattisgarh	0.53	0.41	0.08	0.18	0.31
Gujarat	0.52	0.32	0.38	0.35	0.42
Haryana	0.61	0.63	0.10	0.25	0.39
Himachal Pradesh	0.65	0.52	0.07	0.19	0.35
Jammu and Kashmir	0.64	0.36	0.25	0.30	0.44
Jharkhand	0.51	0.45	0.17	0.28	0.38
Karnataka	0.57	0.36	0.23	0.28	0.40
Kerala	0.71	0.44	0.10	0.21	0.38
Madhya Pradesh	0.51	0.42	0.14	0.24	0.35
Maharashtra	0.62	0.35	0.12	0.21	0.36
Manipur	0.66	0.71	0.05	0.19	0.35
Meghalaya	0.57	0.28	0.16	0.21	0.35
Mizoram	0.64	0.45	0.11	0.22	0.37
Nagaland	0.61	0.50	0.07	0.19	0.34
Odisha	0.51	0.43	0.14	0.25	0.35
Punjab	0.60	0.54	0.08	0.20	0.35
Rajasthan	0.54	0.36	0.13	0.22	0.34
Sikkim	0.64	0.44	0.18	0.28	0.43
Tamil Nadu	0.61	0.44	0.24	0.32	0.44
Tripura	0.55	0.44	0.26	0.34	0.43
Uttar Pradesh	0.52	0.49	0.11	0.23	0.35
Uttarakhand	0.61	0.44	0.10	0.21	0.36
West Bengal	0.53	0.32	0.13	0.20	0.33

EI – Education Index.

Q-EI – Quality-adjusted Education Index.

Source: Global Data Lab; ASER Reports; and authors' calculations.

Quality-adjusted Health Indices at State Level

Table 11: Quality-adjusted Health Index at State Level - 2011–12

State	HI	LEB	DALYs per person	HLYs per person	Q-HI
Andhra Pradesh	0.75	68.5	0.38	68.12	0.74
Arunachal Pradesh	0.68	63.9	0.29	63.59	0.67
Assam	0.68	63.9	0.43	63.47	0.67
Bihar	0.74	68.1	0.41	67.69	0.73
Chhattisgarh	0.69	64.8	0.50	64.30	0.68
Gujarat	0.75	68.7	0.38	68.32	0.74
Haryana	0.75	68.6	0.37	68.23	0.74
Himachal Pradesh	0.79	71.6	0.33	71.27	0.79
Jammu & Kashmir	0.81	72.6	0.28	72.32	0.80
Jharkhand	0.72	66.6	0.40	66.20	0.71
Karnataka	0.75	68.8	0.38	68.42	0.74
Kerala	0.85	74.9	0.30	74.60	0.84
Madhya Pradesh	0.68	64.2	0.47	63.73	0.67
Maharashtra	0.79	71.6	0.33	71.27	0.79
Manipur	0.68	63.9	0.31	63.56	0.67
Meghalaya	0.68	63.9	0.32	63.55	0.67
Mizoram	0.68	63.9	0.32	63.55	0.67
Nagaland	0.68	63.9	0.29	63.58	0.67
Odisha	0.71	65.8	0.44	65.36	0.70
Punjab	0.79	71.6	0.34	71.26	0.79
Rajasthan	0.73	67.7	0.40	67.30	0.73
Tamil Nadu	0.78	70.6	0.38	70.22	0.77
Tripura	0.68	63.9	0.34	63.56	0.67
Uttar Pradesh	0.68	64.1	0.46	63.64	0.67
Uttarakhand	0.80	71.7	0.43	71.27	0.79
West Bengal	0.77	70.2	0.34	69.86	0.77

HI – Health Index.

Q-HI – Quality-adjusted Health Index.

LEB – Life Expectancy at Birth.

DALY – Disability-adjusted Life Year.

HLY – Healthy Life Year.

Source: Gendering Human Development Report (MoSPI, 2021); IHME; and authors' calculations.

Table 12: Quality-adjusted Health Index at State Level - 2017–18

State	HI	LEB	DALYs	HLYs	Q-HI
Arunachal Pradesh	0.71	66.20	0.26	65.94	0.71
Assam	0.71	66.20	0.36	65.84	0.71
Bihar	0.75	68.90	0.33	68.57	0.75
Chhattisgarh	0.70	65.20	0.42	64.78	0.69
Gujarat	0.77	69.70	0.35	69.35	0.76
Haryana	0.77	69.70	0.33	69.37	0.76
Himachal Pradesh	0.81	72.60	0.31	72.29	0.80
Jammu & Kashmir	0.83	74.10	0.27	73.83	0.83
Jharkhand	0.75	68.60	0.31	68.29	0.74
Karnataka	0.76	69.20	0.35	68.85	0.75
Kerala	0.85	75.20	0.31	74.89	0.84
Madhya Pradesh	0.71	66.00	0.39	65.61	0.70
Maharashtra	0.81	72.50	0.31	72.19	0.80
Manipur	0.71	66.20	0.30	65.90	0.71
Meghalaya	0.71	66.20	0.29	65.91	0.71
Mizoram	0.71	66.20	0.29	65.91	0.71
Nagaland	0.71	66.20	0.27	65.93	0.71
Odisha	0.75	68.40	0.39	68.01	0.74
Punjab	0.81	72.40	0.31	72.09	0.80
Rajasthan	0.75	68.50	0.35	68.15	0.74
Sikkim	0.71	66.20	0.27	65.93	0.71
Tamil Nadu	0.80	71.70	0.35	71.35	0.79
Tripura	0.71	66.20	0.31	65.89	0.71
Uttar Pradesh	0.69	65.00	0.41	64.59	0.69
Uttarakhand	0.79	71.00	0.40	70.60	0.78
West Bengal	0.79	71.20	0.31	70.89	0.78

HI – Health Index.

Q-HI – Quality-adjusted Health Index.

LEB – Life Expectancy at Birth.

DALY – Disability-adjusted Life Year.

HLY – Healthy Life Year.

Source: Gendering Human Development Report (MoSPI, 2021); IHME; and authors' calculations.

Table 13: Quality-adjusted Health Index at State Level - 2021–22

States	HI	LEB	DALYs	HLYs	Q-HI
Arunachal Pradesh	0.77	67.5	0.27	67.23	0.73
Assam	0.71	66.1	0.37	65.73	0.70
Bihar	0.71	64.4	0.34	64.06	0.68
Chhattisgarh	0.69	63.8	0.44	63.36	0.67
Gujarat	0.75	67.7	0.38	67.32	0.73
Haryana	0.76	66.0	0.36	65.64	0.70
Himachal Pradesh	0.77	70.6	0.35	70.25	0.77
Jammu and Kashmir	0.76	69.5	0.30	69.23	0.76
Jharkhand	0.72	64.7	0.30	64.40	0.68
Karnataka	0.78	67.3	0.38	66.92	0.72
Kerala	0.83	71.2	0.36	70.84	0.78
Madhya Pradesh	0.69	65.0	0.40	64.65	0.69
Maharashtra	0.78	69.3	0.36	68.94	0.75
Manipur	0.78	67.6	0.35	67.25	0.73
Meghalaya	0.75	68.8	0.30	68.50	0.75
Mizoram	0.73	67.1	0.31	66.82	0.72
Nagaland	0.77	69.9	0.29	69.56	0.76
Odisha	0.72	64.2	0.41	63.79	0.67
Punjab	0.77	66.2	0.36	65.84	0.71
Rajasthan	0.73	67.1	0.35	66.77	0.72
Sikkim	0.79	65.9	0.31	65.59	0.70
Tamil Nadu	0.79	70.5	0.40	70.10	0.77
Tripura	0.77	66.0	0.34	65.66	0.70
Uttar Pradesh	0.67	63.0	0.43	62.57	0.65
Uttarakhand	0.73	68.3	0.44	67.86	0.74
West Bengal	0.76	64.7	0.33	64.37	0.68

HI – Health Index.
Q-HI – Quality-adjusted Health Index.
LEB – Life Expectancy at Birth.
DALY – Disability-adjusted Life Year.
HLY – Healthy Life Year.
Source: Global Data Lab; IHME; and authors' calculations.

Quality-adjusted Human Development Indices at State Level

Table 14: Quality-adjusted Human Development Index at State Level - 2011–12

State	Q-HI	Q-EI	Q-II	Q-HDI
Andhra Pradesh	0.74	0.32	0.46	0.48
Arunachal Pradesh	0.67	0.38	0.42	0.48
Assam	0.67	0.28	0.41	0.42
Bihar	0.73	0.28	0.33	0.41
Chhattisgarh	0.68	0.30	0.41	0.44
Gujarat	0.74	0.32	0.50	0.49
Haryana	0.74	0.35	0.48	0.50
Himachal Pradesh	0.79	0.41	0.50	0.54
Jammu & Kashmir	0.80	0.32	0.46	0.49
Jharkhand	0.71	0.29	0.38	0.43
Karnataka	0.74	0.32	0.45	0.48
Kerala	0.84	0.36	0.43	0.51
Madhya Pradesh	0.67	0.29	0.37	0.42
Maharashtra	0.79	0.38	0.47	0.52
Manipur	0.67	0.41	0.45	0.50
Meghalaya	0.67	0.33	0.49	0.47
Mizoram	0.67	0.47	0.49	0.54
Nagaland	0.67	0.39	0.51	0.51
Odisha	0.70	0.31	0.41	0.45
Punjab	0.79	0.36	0.49	0.52
Rajasthan	0.73	0.30	0.44	0.46
Tamil Nadu	0.77	0.34	0.49	0.51
Tripura	0.67	0.38	0.44	0.48
Uttar Pradesh	0.67	0.27	0.35	0.39
Uttarakhand	0.79	0.33	0.50	0.51
West Bengal	0.77	0.35	0.38	0.47

Q-HI – Quality-adjusted Health Index.
Q-EI – Quality-adjusted Education Index.
Q-II – Quality-adjusted Income Index.
Q-HDI – Quality-adjusted Human Development Index.
Source: Authors' calculations.

Table 15: Quality-adjusted Human Development Index at State Level - 2017–18

State	Q-HI	Q-EI	Q-II	Q-HDI
Arunachal Pradesh	0.71	0.41	0.48	0.52
Assam	0.71	0.40	0.46	0.51
Bihar	0.75	0.33	0.36	0.45
Chhattisgarh	0.69	0.29	0.44	0.45
Gujarat	0.76	0.36	0.57	0.54
Haryana	0.76	0.39	0.57	0.55
Himachal Pradesh	0.80	0.33	0.57	0.53
Jammu & Kashmir	0.83	0.37	0.47	0.52
Jharkhand	0.74	0.37	0.38	0.47
Karnataka	0.75	0.37	0.54	0.54
Kerala	0.84	0.35	0.57	0.55
Madhya Pradesh	0.70	0.34	0.42	0.46
Maharashtra	0.80	0.36	0.51	0.53
Manipur	0.71	0.42	0.43	0.51
Meghalaya	0.71	0.34	0.47	0.48
Mizoram	0.71	0.43	0.53	0.54
Nagaland	0.71	0.41	0.45	0.51
Odisha	0.74	0.35	0.44	0.49
Punjab	0.80	0.36	0.53	0.54
Rajasthan	0.74	0.33	0.48	0.49
Sikkim	0.71	0.44	0.64	0.58
Tamil Nadu	0.79	0.43	0.55	0.57
Tripura	0.71	0.37	0.49	0.51
Uttar Pradesh	0.69	0.33	0.40	0.45
Uttarakhand	0.78	0.39	0.58	0.56
West Bengal	0.78	0.36	0.44	0.50

Table 16: Quality-adjusted Human Development Index at State Level - 2021–22

State	Q-HI	Q-EI	Q-II	Q-HDI
Arunachal Pradesh	0.73	0.39	0.43	0.50
Assam	0.70	0.33	0.39	0.45
Bihar	0.68	0.36	0.38	0.45
Chhattisgarh	0.67	0.31	0.39	0.43
Gujarat	0.73	0.42	0.46	0.52
Haryana	0.70	0.39	0.48	0.51
Himachal Pradesh	0.77	0.35	0.49	0.51
Jammu and Kashmir	0.76	0.44	0.48	0.54
Jharkhand	0.68	0.38	0.34	0.44
Karnataka	0.72	0.40	0.44	0.50
Kerala	0.78	0.38	0.50	0.53
Madhya Pradesh	0.69	0.35	0.39	0.45
Maharashtra	0.75	0.36	0.42	0.48
Manipur	0.73	0.35	0.41	0.47
Meghalaya	0.75	0.35	0.44	0.49
Mizoram	0.72	0.37	0.48	0.51
Nagaland	0.76	0.34	0.41	0.48
Odisha	0.67	0.35	0.37	0.44
Punjab	0.71	0.35	0.50	0.50
Rajasthan	0.72	0.34	0.45	0.48
Sikkim	0.70	0.43	0.47	0.52
Tamil Nadu	0.77	0.44	0.45	0.54
Tripura	0.70	0.43	0.40	0.50
Uttar Pradesh	0.65	0.35	0.39	0.45
Uttarakhand	0.74	0.36	0.47	0.50
West Bengal	0.68	0.33	0.39	0.44

Q-HI – Quality-adjusted Health Index.

Q-EI – Quality-adjusted Education Index.

Q-II – Quality-adjusted Income Index.

Q-HDI – Quality-adjusted Human Development Index.

Source: Authors' Calculations.

Gender Quality-adjusted Human Development Index at State Level

Table 17: Gender Quality-adjusted Human Development Index at State Level - 2011–12

State	Q-HI	Q-EI	Q-II	Gender Quality Factor	G-HDI
Andhra Pradesh	0.74	0.32	0.46	0.52	0.49
Arunachal Pradesh	0.67	0.38	0.42	0.23	0.40
Assam	0.67	0.28	0.41	0.37	0.41
Bihar	0.73	0.28	0.33	0.30	0.38
Chhattisgarh	0.68	0.30	0.41	0.51	0.46
Gujarat	0.74	0.32	0.50	0.53	0.50
Haryana	0.74	0.35	0.48	0.50	0.50
Himachal Pradesh	0.79	0.41	0.50	0.70	0.58
Jammu & Kashmir	0.80	0.32	0.46	0.30	0.44
Jharkhand	0.71	0.29	0.38	0.38	0.42
Karnataka	0.74	0.32	0.45	0.45	0.47
Kerala	0.84	0.36	0.43	0.53	0.51
Madhya Pradesh	0.67	0.29	0.37	0.48	0.43
Maharashtra	0.79	0.38	0.47	0.52	0.52
Manipur	0.67	0.41	0.45	0.22	0.41
Meghalaya	0.67	0.33	0.49	0.52	0.49
Mizoram	0.67	0.47	0.49	0.24	0.44
Nagaland	0.67	0.39	0.51	0.24	0.42
Odisha	0.70	0.31	0.41	0.42	0.44
Punjab	0.79	0.36	0.49	0.60	0.54
Rajasthan	0.73	0.30	0.44	0.45	0.45
Tamil Nadu	0.77	0.34	0.49	0.55	0.52
Tripura	0.67	0.38	0.44	0.48	0.48
Uttar Pradesh	0.67	0.27	0.35	0.42	0.40
Uttarakhand	0.79	0.33	0.50	0.48	0.50
West Bengal	0.77	0.35	0.38	0.44	0.46

Q-HI – Quality-adjusted Health Index.

Q-EI – Quality-adjusted Education Index.

Q-II – Quality-adjusted Income Index.

G-HDI – Gender Quality-adjusted Human Development Index.

Source: Authors' calculations.

Table 18: Gender Quality-adjusted Human Development Index at State Level - 2017–18

State	Q-HI	Q-EI	Q- II	Gender Quality Factor	G-HDI
Arunachal Pradesh	0.71	0.41	0.48	0.21	0.42
Assam	0.71	0.40	0.46	0.40	0.48
Bihar	0.75	0.33	0.36	0.32	0.41
Chhattisgarh	0.69	0.29	0.44	0.56	0.47
Gujarat	0.76	0.36	0.57	0.58	0.55
Haryana	0.76	0.39	0.57	0.54	0.55
Himachal Pradesh	0.80	0.33	0.57	0.63	0.56
Jammu & Kashmir	0.83	0.37	0.47	0.63	0.55
Jharkhand	0.74	0.37	0.38	0.26	0.41
Karnataka	0.75	0.37	0.54	0.54	0.54
Kerala	0.84	0.35	0.57	0.58	0.56
Madhya Pradesh	0.70	0.34	0.42	0.51	0.48
Maharashtra	0.80	0.36	0.51	0.66	0.56
Manipur	0.71	0.42	0.43	0.24	0.42
Meghalaya	0.71	0.34	0.47	0.60	0.51
Mizoram	0.71	0.43	0.53	0.26	0.45
Nagaland	0.71	0.41	0.45	0.24	0.42
Odisha	0.74	0.35	0.44	0.52	0.49
Punjab	0.80	0.36	0.53	0.54	0.54
Rajasthan	0.74	0.33	0.48	0.41	0.47
Sikkim	0.71	0.44	0.64	0.28	0.48
Tamil Nadu	0.79	0.43	0.55	0.64	0.59
Tripura	0.71	0.37	0.49	0.45	0.49
Uttar Pradesh	0.69	0.33	0.40	0.48	0.46
Uttarakhand	0.78	0.39	0.58	0.57	0.56
West Bengal	0.78	0.36	0.44	0.51	0.50

Q-HI – Quality-adjusted Health Index.

Q-EI – Quality-adjusted Education Index.

Q-II – Quality-adjusted Income Index.

G-HDI – Gender Quality-adjusted Human Development Index.

Source: Authors' calculations.

Table 19: Gender Quality-adjusted Human Development Index at State Level - 2021–22

State	Q-HI	Q-EI	Q-II	Gender Quality Factor	G-HDI
Arunachal Pradesh	0.73	0.39	0.43	0.39	0.47
Assam	0.70	0.33	0.39	0.37	0.43
Bihar	0.68	0.36	0.38	0.34	0.42
Chhattisgarh	0.67	0.31	0.39	0.57	0.46
Gujarat	0.73	0.42	0.46	0.52	0.52
Haryana	0.70	0.39	0.48	0.47	0.50
Himachal Pradesh	0.77	0.35	0.49	0.54	0.52
Jammu and Kashmir	0.76	0.44	0.48	0.50	0.53
Jharkhand	0.68	0.38	0.34	0.52	0.46
Karnataka	0.72	0.40	0.44	0.46	0.49
Kerala	0.78	0.38	0.50	0.68	0.56
Madhya Pradesh	0.69	0.35	0.39	0.46	0.46
Maharashtra	0.75	0.36	0.42	0.56	0.50
Manipur	0.73	0.35	0.41	0.36	0.44
Meghalaya	0.75	0.35	0.44	0.43	0.47
Mizoram	0.72	0.37	0.48	0.31	0.45
Nagaland	0.76	0.34	0.41	0.31	0.43
Odisha	0.67	0.35	0.37	0.47	0.45
Punjab	0.71	0.35	0.50	0.47	0.49
Rajasthan	0.72	0.34	0.45	0.51	0.49
Sikkim	0.70	0.43	0.47	0.53	0.52
Tamil Nadu	0.77	0.44	0.45	0.53	0.54
Tripura	0.70	0.43	0.40	0.40	0.47
Uttar Pradesh	0.65	0.35	0.39	0.46	0.45
Uttarakhand	0.74	0.36	0.47	0.52	0.50
West Bengal	0.68	0.33	0.39	0.45	0.45

Q-HI – Quality-adjusted Health Index.

Q-EI – Quality-adjusted Education Index.

Q-II – Quality-adjusted Income Index.

G-HDI – Gender Quality-adjusted Human Development Index.

Source: Authors' calculations.

Gender Quality Factor

Table 20: Gender Quality Factor - 2011–12 and 2017–18

State	GII	Gender Quality Factor	GII	Gender Quality Factor
Arunachal Pradesh	0.77	0.23	0.79	0.21
Assam	0.63	0.37	0.60	0.40
Bihar	0.70	0.30	0.68	0.32
Chhattisgarh	0.49	0.51	0.44	0.56
Gujarat	0.47	0.53	0.43	0.58
Haryana	0.50	0.50	0.46	0.54
Himachal Pradesh	0.30	0.70	0.37	0.63
Jammu and Kashmir	0.70	0.30	0.37	0.63
Jharkhand	0.62	0.38	0.74	0.26
Karnataka	0.55	0.45	0.46	0.54
Kerala	0.47	0.53	0.42	0.58
Madhya Pradesh	0.52	0.48	0.49	0.51
Maharashtra	0.48	0.52	0.34	0.66
Manipur	0.78	0.22	0.76	0.24
Meghalaya	0.48	0.52	0.40	0.60
Mizoram	0.76	0.24	0.74	0.26
Nagaland	0.77	0.24	0.77	0.24
Odisha	0.58	0.42	0.48	0.52
Punjab	0.40	0.60	0.46	0.54
Rajasthan	0.55	0.45	0.59	0.41
Sikkim	0.76	0.24	0.73	0.28
Tamil Nadu	0.45	0.55	0.36	0.64
Tripura	0.52	0.48	0.55	0.45
Uttar Pradesh	0.58	0.42	0.52	0.48
Uttarakhand	0.52	0.48	0.43	0.57
West Bengal	0.56	0.44	0.49	0.51

GII – Gender Inequality Index.

Source: Gendering Human Development Report (MoSPI, 2021) and authors' calculations.

Table 21: Gender Quality Factor - 2021–22

State	Maternal mortality ratio (deaths per 100,000 live births)	Adolescent fertility ratio (births per 1000 women ages 15-19)	Seats in State Assembly held by – Female (per cent of total)	Seats in State Assembly held by – Male (per cent of total)	Population with at least secondary education – Female (per cent ages 25 and older)
Arunachal Pradesh	284	38	5.0	95.0	41.0
Assam	195	61	4.8	95.2	51.9
Bihar	118	77	10.7	89.3	27.8
Chhattisgarh	137	24	14.4	85.6	34.2
Goa	91	14	5.0	95.0	59.6
Gujarat	57	34	7.1	92.9	39.3
Haryana	110	27	10.0	90.0	45.8
Himachal Pradesh	127	22	5.9	94.1	53.9
Jammu and Kashmir	151	9	2.3	97.7	44.7
Jharkhand	56	64	12.4	87.7	29.2
Karnataka	69	40	3.1	96.9	46.7
Kerala	19	18	7.9	92.1	71.3
Madhya Pradesh	173	37	9.1	90.9	30.8
Maharashtra	33	47	8.3	91.7	51.3
Manipur	282	43	3.3	96.7	66.8
Meghalaya	266	49	5.1	94.9	52.8
Mizoram	131	22	0.1	99.9	73.9
Nagaland	143	19	0.1	99.9	72.6
Odisha	119	40	8.9	91.1	36.9
Punjab	105	21	5.1	94.9	52.9
Rajasthan	113	31	12.0	88.0	27.6
Tamil Nadu	54	34	5.1	94.9	47.9
Tripura	119	91	5.0	95.0	45.9
Uttar Pradesh	167	22	10.6	89.5	34.2
Uttarakhand	103	19	7.1	92.9	47.2
West Bengal	103	81	13.7	86.3	40.5
Sikkim	228	22	9.4	90.6	49.1

GII – Gender Inequality Index.

Source: SRS MMR bulletin 2018–20; NFHS-5; Ministry of Law and Justice, India; Men and Women in India-2022 (MoSPI).

Note: States with no female member in the state assembly are assigned a standardised value of 0.1, following MoSPI guidelines.

Table 21A: Gender Quality Factor - 2021–22

State	Population with at least secondary education – Female (per cent ages 25 and older)	Population with at least secondary education - Male (per cent ages 25 and older)	Labour force participation rate – Female (per cent)	Labour force participation rate – Male (per cent)	Gender Inequality Index	Gender Quality Factor
Arunachal Pradesh	41.0	60.2	27.6	73.0	0.61	0.39
Assam	51.9	63.6	24.6	79.2	0.63	0.37
Bihar	27.8	52.1	10.7	71.0	0.66	0.34
Chhattisgarh	34.2	55.2	53.9	76.2	0.43	0.57
Goa	59.6	78.6	27.3	68.7	0.47	0.53
Gujarat	39.3	62.6	33.1	78.4	0.48	0.52
Haryana	45.8	66.6	19.1	72.4	0.53	0.47
Himachal Pradesh	53.9	73.3	62.6	81.7	0.46	0.54
Jammu and Kashmir	44.7	70.8	43.4	74.0	0.50	0.50
Jharkhand	29.2	53.9	43.9	78.9	0.48	0.52
Karnataka	46.7	63.8	35.9	78.4	0.54	0.46
Kerala	71.3	75.7	33.2	72.2	0.32	0.68
Madhya Pradesh	30.8	53.9	40.5	81.4	0.54	0.46
Maharashtra	51.3	69.7	36.0	75.4	0.44	0.56
Manipur	66.8	81.5	21.4	65.4	0.64	0.36
Meghalaya	52.8	56.4	51.6	75.4	0.57	0.43
Mizoram	73.9	76.5	41.7	70.3	0.69	0.31
Nagaland	72.6	85.2	47.6	74.1	0.69	0.31
Odisha	36.9	52.0	33.2	80.1	0.53	0.47
Punjab	52.9	63.0	23.1	77.2	0.53	0.47
Rajasthan	27.6	56.3	39.9	75.7	0.49	0.51
Tamil Nadu	47.9	62.6	43.0	78.5	0.47	0.53
Tripura	45.9	54.1	30.8	80.6	0.60	0.40
Uttar Pradesh	34.2	61.1	22.6	77.3	0.54	0.46
Uttarakhand	47.2	71.3	31.5	72.5	0.48	0.52
West Bengal	40.5	51.4	28.7	81.7	0.55	0.45
Sikkim	49.1	56.9	61.1	82.5	0.47	0.53

Source: Ministry of Law and Justice, India; Men and Women in India-2022 (MoSPI); and authors' calculations.

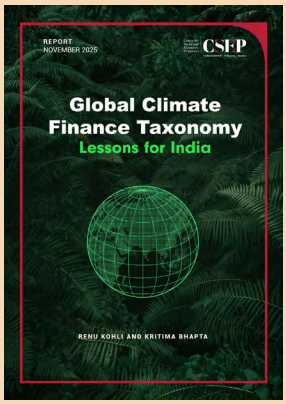
About the authors

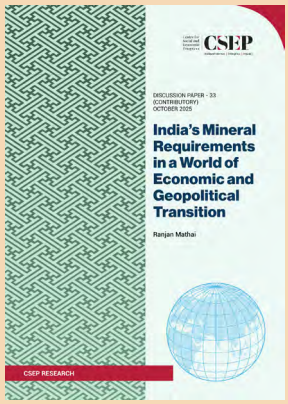
Janak Raj leads the macroeconomic segment in the Growth, Finance, and Development vertical. His areas of interest are health, climate finance and MDB reforms. He has worked with the Reserve Bank of India, the International Monetary Fund, and Ministry of Finance. Dr. Janak Raj served as an Executive Director in the Reserve Bank of India and as a member of its Monetary Policy Committee. In the IMF, he was Senior Advisor to the Executive Director for Bangladesh, Bhutan, India and Sri Lanka. He also served as a nominee director on the governing Board of BSE (formerly Bombay Stock Exchange). He holds a Ph.D in Economics from IIT Bombay.

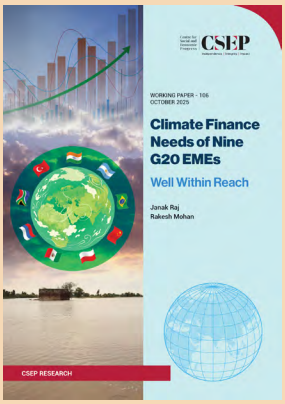
Indramani Tiwari is a Research Analyst in the Growth, Finance, and Development vertical at the Centre for Social and Economic Progress (CSEP), New Delhi. His work centres on quantitative policy research spanning human development, climate finance, public policy, and applied econometrics. At CSEP, he has contributed to state-level human development assessments, climate finance estimation, and multi-sector data-driven policy analysis.

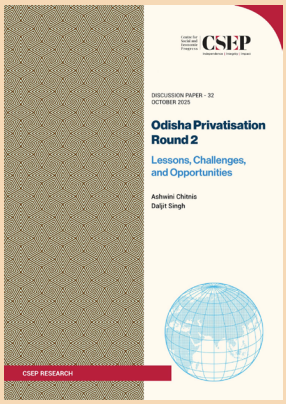
Previously, he worked as an Economist (Researcher) at the University of New South Wales (UNSW), Australia, where he developed Computable General Equilibrium (CGE) models and safety performance frameworks for India's road transport network. Indramani holds a Master's degree in Economics from the Indian Institute of Technology (IIT) Roorkee. His research interests include microeconomics, development economics, climate finance, and empirical modelling.

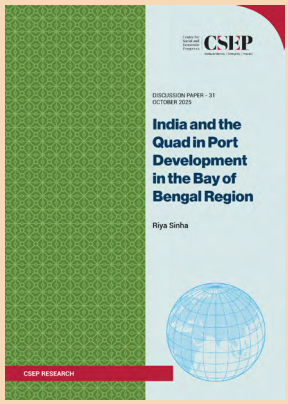
Other publications

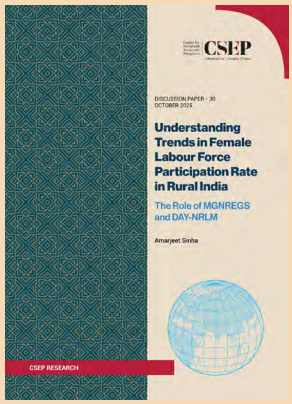


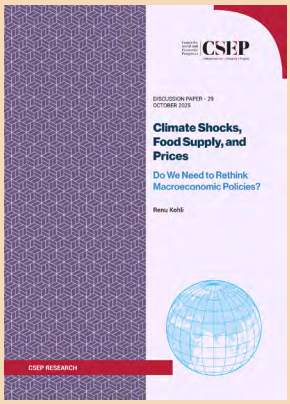


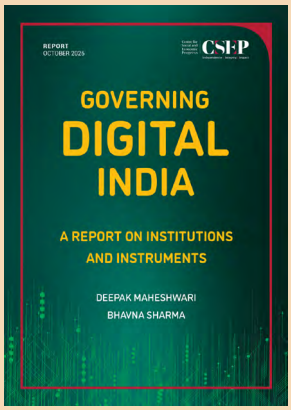


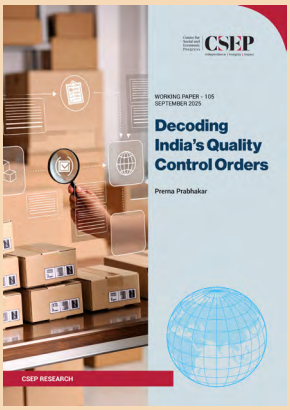


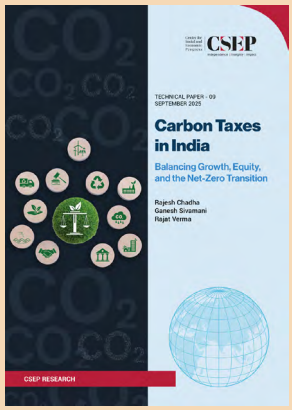


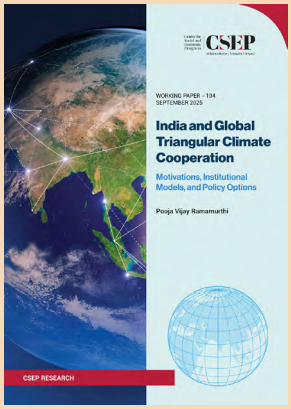


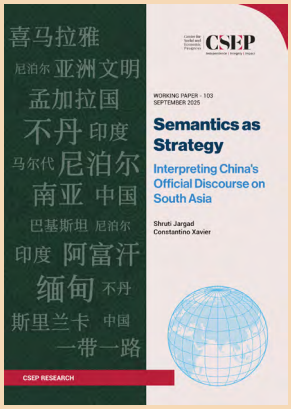


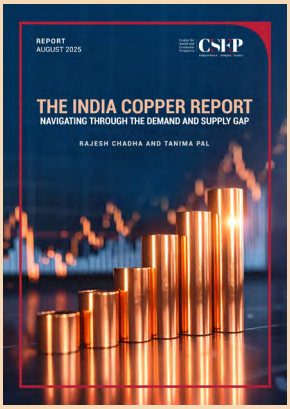












All CSEP publications are available at www.csep.org

Independence | Integrity | Impact

Centre for Social and Economic Progress

6, Dr Jose P. Rizal Marg, Chanakyapuri, New Delhi- 110021, India

Centre for Social and Economic Progress

@CSEP_Org

www.csep.org