

Income Inequality and its Trend in the North East States of India

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Abstract: *One of the most significant challenges in developing the Indian economy is the widening of regional income inequality. Since its independence, Indian states have experienced different degrees and paces of economic growth, where some states are forerunners in terms of economic growth and some others languishing behind. Despite its economic constraints, Northeast India has survived and played an essential role in shaping the country's economic landscape. This region's unique cultural and geographical features present a distinct economic landscape. Although the average growth of GSDP in the area is below the national average, there have been signs of improvement in the post-reform period. Based on the secondary information collated from reports of the National Sample Survey Organization, Central Statistical Organization, and Reserve Bank of India, the paper examines the trend and growth of inter-state income inequality of eight state economies of the North Eastern region of India.*

Keywords: Northeast India, convergence, kernel density function, generalized entropy, income inequality

JEL Classification: C01, F63, O10

1. Introduction

The North Eastern region of India showcases a distinct economic landscape with its unique cultural and geographical features. This region, with its diverse tribal population and varied topography, faces unique economic challenges and opportunities. The achievements and pitfalls of the policy reforms in 1991 have been the subject of endless debates. However, all critics agree that these cross-sectoral reforms have accelerated growth and lifted many people from poverty. The region's annual growth rates peaked between 2003-04 and 2008-09 at about 9%, and poverty dropped from about 36 percent in 1993-94 to about 21.9 percent in 2011-12. This growth story touched and transformed the lives of millions of people. Nevertheless, more than that, this process unleashed the energy of the entrepreneurs and youth by freeing the economy from the endless controls that were stifling the economy to death. After the subsequent slowdown from the global economic meltdown post-2008, India now finds itself on the cusp of growth, becoming the fastest-growing economy in the world, and these debates are reviving again. There is also enough evidence in literature reflecting the other side of India's economic reforms, which brings out the unpleasant fact that liberalization has widened inequality and disparity across all regions and states of the country and between rural and urban people, that generation of wealth has not been accompanied by an equitable process of distribution. Expenditure inequality measured by the Gini Coefficient shows that the differences between rich and poor have been widened. As per the Census of India, in 2011, the population of the northeastern region of India stood at 45.48 million, accounting for 7.9 percent of the country's total land space. It comprises eight states: Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura. Among these eight States, four - specifically Mizoram, Nagaland, Meghalaya, and Arunachal Pradesh - have a tribal population in the majority. However, many scholars find it challenging to consider the region a compact unit and be termed North-East (Misra, 2000; Hussain, 2004). India has also made tremendous economic progress in the last couple

of decades and is rapidly emerging as a significant economic force in the world economy (Dholakia,1985; Sachs et al.,2002). However, the economic growth rate across the national territory reflects disparity, which has become a significant policy concern (Bakshi,2015). It is imperative to comprehend the causes and nature of differences in the levels and growth of income across the regions since even minor differences in growth rate over a long period may substantially impact people's standard of living (Martin,1995). Although the extant sources of literature on regional growth and productivity in the Indian economy show different perspectives on regional income inequality (Dholakia,1985; Bakshi et al.,2015), the study on regional inequality in the northeast region of India counts less in the number. It is apparent from the literature on regional inequality that the northeastern region of India is economically constrained. Since most studies in the Indian setting consider major state economies of India, the present study explores the region's intra-regional income inequality. Against this backdrop, the present study examines the region's economic growth, growth, and trend in inter-regional income inequality.

2. Data and Methodology

The study is based on secondary data. Data published by various organizations, such as the Planning Commission of India, Reserve Bank of India (RBI), Central Statistical Organization (CSO), World Bank, etc., are analyzed. The present study utilizes simple descriptive statistics such as the percentage compounded annualized growth rate (CAGR) to analyze some aspects, such as the growth of state economies and the trend of poverty. To analyze the distribution of per capita net state domestic product of northeastern states of India, the kernel density function has been used from 2011-12 to 2023-24. Since some data are missing, we have applied the Kalman extrapolation approach to make the dataset uniform. In this study, a Gaussian kernel, which was adopted from Cameron and Trivedi, is used. A non-parametric kernel density estimate is given by

$$\hat{f}_h(x) = \frac{1}{n} \sum_{i=1}^n K_h(x - x_i) = \frac{1}{nh} \sum_{i=1}^n K\left(\frac{x - x_i}{h}\right),$$

Where K is the kernel, a non-negative function, and $h > 0$ is a smoothing parameter called the *bandwidth* or simply width. A kernel with subscript h is called the *scaled kernel* and is defined as $K_h(x) = \frac{1}{h} K\left(\frac{x}{h}\right)$. Intuitively, one wants to choose h as small as the data will allow. However, there is always a trade-off between the estimator's bias and variance. The choice of bandwidth is discussed in more detail below.

The Generalised Entropy (GE) index of inequality measures the extent of inequality across the states of NER. For further reference on the measurement of this method, please see Litchfield.

3. Growth of NSDP in North East India

Before analyzing the extent and magnitude of income inequality in the region, this section portrays the growth of NSDP and population to better understand the growth inequality nexus.

Table 1: Growth of population (Primary Population Census 2001 and Primary Population Census 2011) and growth of Per Capita NSDP at Constant Prices (In Rupees 2011-12 to 2023-24)

States	CAGR of Population	CAGR of per capita NSDP
Arunachal Pradesh	2.125%	3.905%
Assam	0.967%	5.293%
Manipur	1.639%	1.793%
Meghalaya	2.266%	0.989%
Mizoram	1.936%	6.630%
Nagaland	-0.053%	1.558%
Sikkim	1.356%	4.134%
Tripura	1.266%	5.487%

*Missing data Arunachal Pradesh, Manipur, Mizoram, Nagaland, Sikkim, and Tripura have been extrapolated using the Kalman approach source: Author's calculation based on RBI database

The population growth rate is highest for Meghalaya (2.266%). The lowest and negative population growth rate has been observed for Nagaland (-0.053%). Let us compare the population of the northeastern states with the total population of India (2011 census). Assam shares the highest percentage of the region's total population (2.577%), and Sikkim's share is the lowest (0.050%).

State	State's Share of Population
Arunachal Pradesh	0.114%
Assam	2.577%
Manipur	0.236%
Meghalaya	0.245%
Mizoram	0.091%
Nagaland	0.163%
Sikkim	0.050%
Tripura	0.303%

Table 2: State Share of Population compared to whole India Population Summation as per Primary Population Census 2011

While Per Capita Net National Income at current prices is estimated at ₹1,50,906 and ₹1,69,496, respectively, for the years 2021-22 and 2022-23 (Growth is 12.319%). Per Capita PFCE (Private Final Consumption Expenditure) at current prices is estimated at ₹1,05,092 and ₹1,18,755, respectively (Growth is 13.001%), three northeastern states, namely, Assam (5.29%), Mizoram (6.63%) and Tripura (5.49%) have recorded a significant level of the growth rate of per capita NSDP (Table 1), despite their small share of population and land area compared to the whole country. Meghalaya has recorded the lowest (0.989%) CAGR of per capita NSDP.

4. Regional Disparities and Trends in Income Inequality

4.1 Extent of Poverty in North East Region of India

Before analyzing the income distribution and inequality trend, it is imperative to glimpse regional disparities of the NER of India regarding the State-wise Percentage of the Population Below the Poverty Line.

As per Table 3, in 2004-05, only Tripura and Manipur crossed the national poverty line. All NER states other than Meghalaya, Mizoram, and Nagaland have reached near the national threshold of poverty. In the rural context, Tripura, Sikkim, and Manipur crossed the national poverty line.

In 2009-10, Assam and Manipur were at the top in poverty among other NER states and rural areas. The list of states widens for urban regions of North East states. Other than Mizoram, Sikkim, and Tripura, all NER states crossed the national poverty line.

2011-12, Arunachal Pradesh, Assam, and Manipur were the top poverty-stricken states. Only Mizoram can be added to this list for rural areas. For urban areas, Arunachal Pradesh, Assam, Manipur, and Nagaland have crossed the national poverty line.

Table 3: State-wise Percentage of Population Below Poverty Line

States/UTs	2004-05			2009-10			2011-12		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Arunachal Pradesh	33.6	23.5	31.4	26.2	24.9	25.9	38.9	20.3	34.7
Assam	36.4	21.8	34.4	39.9	26.1	37.9	33.9	20.5	32.0
Manipur	39.3	34.5	37.9	47.4	46.4	47.1	38.8	32.6	36.9
Meghalaya	14.0	24.7	16.1	15.3	24.1	17.1	12.5	9.3	11.9
Mizoram	23.0	7.9	15.4	31.1	11.5	21.1	35.4	6.4	20.4
Nagaland	10.0	4.3	8.8	19.3	25.0	20.9	19.9	16.5	18.9
Sikkim	31.8	25.9	30.9	15.5	5.0	13.1	9.9	3.7	8.2

Tripura	44.5	22.5	40.0	19.8	10.0	17.4	16.5	7.4	14.1
All-India	42.0	25.5	37.2	33.8	20.9	29.8	25.7	13.7	21.9

Source: Agricultural Statistics at a Glance 2022

Table 4: CAGR of State-wise Percentage of Population Below the Poverty Line based on Table 3

States/UTs	CAGR								
	2004-05 to 2009-10			2009-10 to 2011-12			2004-05 to 2011-12		
	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total
Arunachal Pradesh	-4.061%	0.969%	-3.158%	14.082%	-6.582%	10.241%	1.848%	-1.813%	1.257%
Assam	1.542%	3.046%	1.628%	-5.287%	-7.735%	-5.484%	-0.885%	-0.766%	-0.900%
Manipur	3.173%	5.063%	3.688%	-6.456%	-11.100%	-7.813%	-0.160%	-0.706%	-0.334%
Meghalaya	1.491%	-0.409%	1.009%	-6.516%	-27.196%	-11.383%	-1.407%	-11.494%	-3.708%
Mizoram	5.157%	6.458%	5.389%	4.411%	-17.745%	-1.118%	5.538%	-2.598%	3.577%
Nagaland	11.582%	34.095%	15.508%	1.026%	-12.934%	-3.297%	8.982%	18.305%	10.027%
Sikkim	-11.288%	-23.977%	-13.327%	-13.881%	-9.550%	-14.458%	-13.573%	-21.592%	-15.281%
Tripura	-12.626%	-12.642%	-12.954%	-5.896%	-9.550%	-6.770%	-11.663%	-12.978%	-12.220%
All-India	-3.555%	-3.261%	-3.629%	-8.728%	-13.132%	-9.758%	-5.955%	-7.472%	-6.408%

Table 4 computes CAGR based on the years of Table 3 to make a comparative analysis of the growth rate of poverty level across all frequencies of years. The points to note here are: -

- 1) Depletion of all India-level Population Below the Poverty Line.
- 2) Across all time frames, Meghalaya has recorded the lowest and most negative growth rate of the population below the poverty line in urban areas from 2009-10 to 2011-12.
- 3) Across all time frames, Nagaland has recorded the highest growth rate of the population below the poverty line in urban areas from 2004-05 to 2009-10.
- 4) In rural areas, the lowest rate of Population Below the Poverty Line was -13.881%, which was recorded in Sikkim from 2009-10 to 2011-12, and the highest rate was 14.082% for Arunachal Pradesh between the same year interval.
- 5) In urban areas, the lowest rate of Population Below the Poverty Line was -27.196%, which was recorded in Meghalaya from 2009-10 to 2011-12, and the highest rate was 34.095% for Nagaland between 2004-05 to 2009-10.

CAGR of State-wise Percentage of Population Below the Poverty Line

States/UTs	2009-10 to 2011-12			2004-05 to 2011-12			CAGR of Population
	Rural	Urban	Total	Rural	Urban	Total	
Arunachal Pradesh	14.082%	-6.582%	10.241%	1.848%	-1.813%	1.257%	2.125%
Assam	-5.287%	-7.735%	-5.484%	-0.885%	-0.766%	-0.900%	0.967%
Manipur	-6.456%	-11.100%	-7.813%	-0.160%	-0.706%	-0.334%	1.639%
Meghalaya	-6.516%	-27.196%	-11.383%	-1.407%	-11.494%	-3.708%	2.266%
Mizoram	4.411%	-17.745%	-1.118%	5.538%	-2.598%	3.577%	1.936%
Nagaland	1.026%	-12.934%	-3.297%	8.982%	18.305%	10.027%	-0.053%
Sikkim	-13.881%	-9.550%	-14.458%	-13.573%	-21.592%	-15.281%	1.356%
Tripura	-5.896%	-9.550%	-6.770%	-11.663%	-12.978%	-12.220%	1.266%

Table 5: CAGR of State-wise Percentage of Population Below the Poverty Line based on Table 3 and Growth of population (Primary Population Census 2001 and Primary Population Census 2011)

Calculating the correlation coefficient between the poverty level's CAGR and the population's CAGR, a positive correlation (0.184 and 0.136, respectively) has been found in rural areas and the total of rural and urban areas for the years 2009-10 to 2011-12, which implies simultaneous growth of population and poverty level for the short term. Let us consider the Urban CAGR of the State-wise Percentage of the Population Below the Poverty Line from 2009-10 to 2011-12 and all CAGR from 2004-05 to 2011-12. The correlation coefficient becomes negative (-0.360, -0.173, -0.569, and -

0.270 sequentially), which implies that population growth helped to alleviate poverty. The reason may be that a large population can provide a large business consumer base and create employment opportunities. Urbanization can also reduce poverty because it can lead to economic growth and improve income distribution and employment.

4.2 Inequality in North-East Region of India

The earlier discussion shows that North Eastern states have experienced substantive economic growth. The literature suggests that the higher the economic growth, the wider the inequality. Therefore, the present subsection delves into the debate.

1st quartile	2nd quartile	3rd quartile	4th quartile
Assam	Chhattisgarh	Andhra Pradesh	Goa
Bihar	Mizoram	Arunachal Pradesh	Gujarat
Jharkhand	Nagaland	Himachal Pradesh	Haryana
Madhya Pradesh	Odisha	Kerala	Karnataka
Manipur	Punjab	Maharashtra	Sikkim
Meghalaya	Rajasthan	Uttarakhand	Tamil Nadu
Uttar Pradesh	Tripura	Andaman & Nicobar Islands	Telangana
Jammu & Kashmir-UT	West Bengal	Puducherry	Chandigarh
			Delhi

*Source: Author’s calculation based on Economic Survey 2023-24 Statistical Appendix

Table 6 shows six northeastern states placed in the first and second quartiles. Only Arunachal Pradesh and Sikkim have reached the upper quartiles. Thus, the NER region is still lagging in the growth process. The Kalman approach has extrapolated the missing Per Capita Net State Domestic Product data at Current Prices (2011-12 Series).

Let us now examine the nature of income distribution within the region's states. In this endeavor, a Kernel density function is estimated, where density estimation is based on the log value of the Per Capita NSDP of the sample states.

Figures 1 and 2 plot the non-parametric estimates of the distribution of per capita NSDP across the region's states and years.

The picks of the kernel density plots are the modes of per capita NSDP across the states and years, which means the point where the values are mainly concentrated. In some of the KDE plots, there is more than one pick. To better understand Figures 1 and 2, kernel density functions and their respective per capita NSDP details are provided below in Tables 7 and 8.

Table 7

North East Indian States	Per capita NSDP	Log of Per capita NSDP	Kernel Density
Arunachal Pradesh	95598	11.468	1.874
Assam	46180	10.740	1.201
Assam	59850	11.000	1.446
Manipur	48804	10.796	4.528
Meghalaya	60236	11.006	6.927
Mizoram	65466	11.089	0.570
Mizoram	120773	11.702	1.371
Nagaland	63274	11.055	3.746
Sikkim	174124	12.068	1.232
Sikkim	243182	12.402	2.011
Tripura	81564	11.309	1.612

Table 8

Years	Per capita NSDP	Log of Per capita NSDP	Kernel Density
2011-2012	53151	10.881	1.281
2011-2012	158592	11.974	0.348
2012-2013	57311	10.956	1.447
2012-2013	160734	11.988	0.407
2013-2014	59624	10.996	1.333
2013-2014	168723	12.036	0.361
2014-2015	57770	10.964	0.967
2014-2015	179913	12.100	0.240
2015-2016	57145	10.953	1.091
2015-2016	194153	12.176	0.243
2016-2017	61596	11.028	1.038
2016-2017	206771	12.239	0.245
2017-2018	64241	11.070	1.028
2017-2018	230836	12.349	0.233
2018-2019	68660	11.137	0.920
2018-2019	239171	12.385	0.229
2019-2020	70292	11.160	0.826
2019-2020	234476	12.365	0.208
2020-2021	67771	11.124	0.851
2020-2021	233561	12.361	0.208
2021-2022	67110	11.114	0.790
2022-2023	72283	11.188	0.765
2022-2023	237907	12.380	0.196
2023-2024	77417	11.257	0.759
2023-2024	253041	12.441	0.195

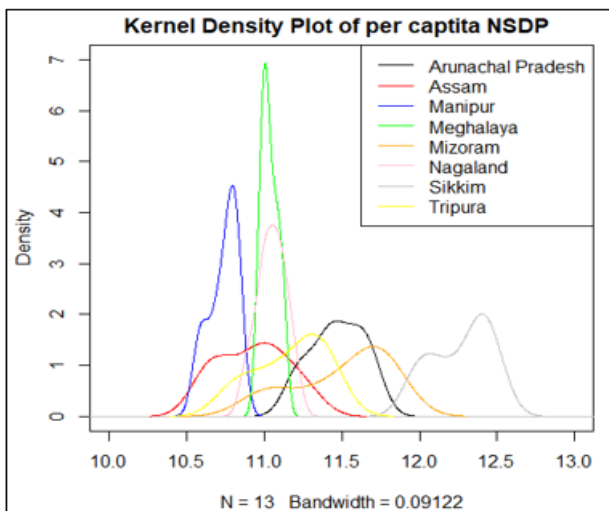


Figure 1

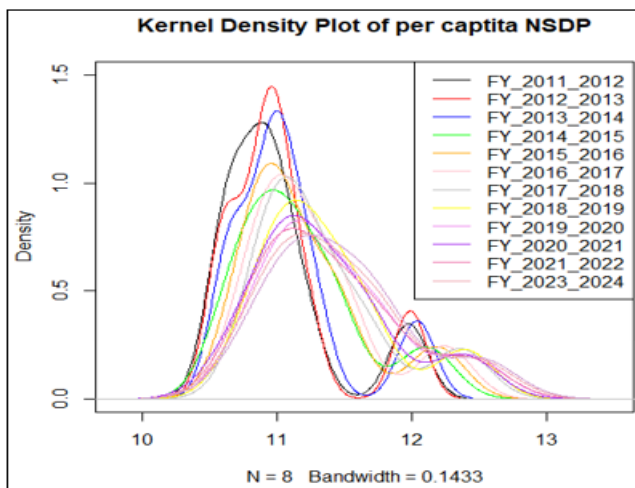


Figure 2

From Tables 7 and 8, the inference can be drawn as: -

- 1) Per capita NSDP of the states across the years are widely distributed (from 46180 to 243182).
- 2) Per capita NSDP of the years across the states are widely distributed (53151 to 253041).
- 3) Income inequality across the states and over the years exists and expands.

Given the unequal shift in income distribution, examining the extent of inequality is imperative. Table 9 estimates Generalized Entropy inequality measures for different values of α (0,1,2 and 3) and plots them in Figure 3 for thirteen years.

Table 9

	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2023-2024
$\alpha = 0$	0.1031	0.1016	0.1014	0.1060	0.1109	0.1127	0.1247	0.1279	0.1309	0.1328	0.1343	0.1360	0.1360
$\alpha = 1$	0.1199	0.1174	0.1166	0.1179	0.1264	0.1277	0.1414	0.1429	0.1429	0.1462	0.1466	0.1483	0.1480
$\alpha = 2$	0.1503	0.1464	0.1445	0.1416	0.1557	0.1569	0.1743	0.1747	0.1706	0.1767	0.1749	0.1776	0.1772
$\alpha = 3$	0.2032	0.1969	0.1934	0.1836	0.2076	0.2090	0.2343	0.2336	0.2226	0.2344	0.2286	0.2336	0.2334

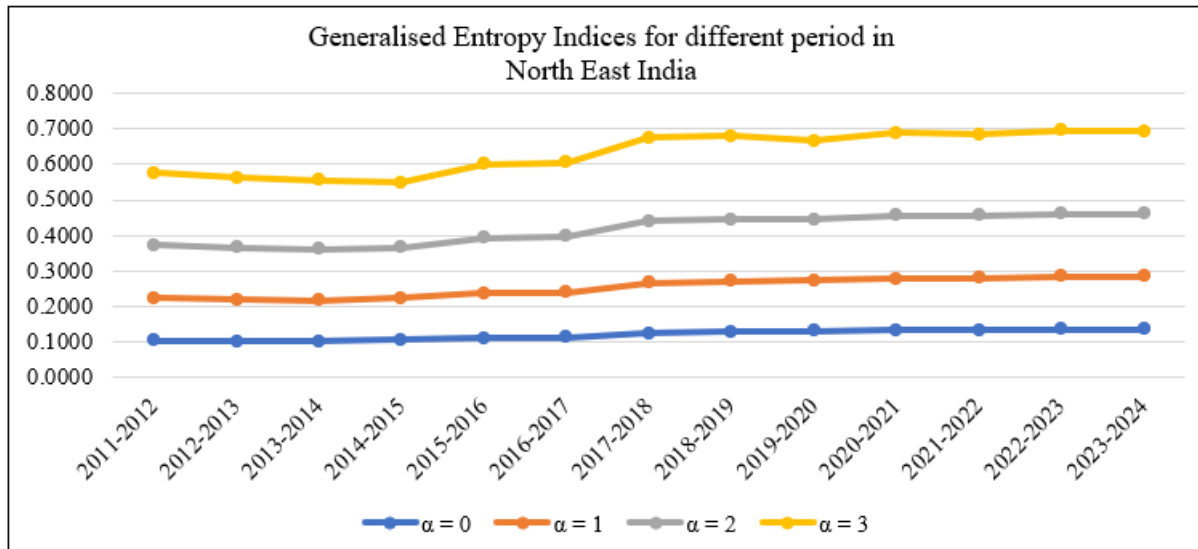


Figure 3

It is apparent from Table 9 and Figure 3 that the extent of inequality has continuously declined from 2011-12 to 2014-15, then showed an increasing trend from 2014-15 to 2017-18. With a slight decline in 2019-20, the movement remains almost invariable up to 2023-24. Regarding Table 1, per capita NSDP grows from 2011-12 to 2023-24, and, as per Figure 3, GE indices also go up over the same year interval. It thus indicates that increasing per capita incomes increases the magnitude of inequality from 2011-12 to 2023-24. A notable point is that after the commencement of the BJP era in 2014, the inequality index of northeastern states has never come down but has kept an upward pace, as shown in Figure 3.

5. Concluding Remarks

The paper seeks to study the extent and magnitude of income distribution across the northeastern states of India. The estimated results and discussion indicate that the increased per capita income in the states and regions has generally widened income inequality in recent periods. Figure 3 shows an upward movement of GE indices from 2014-15. As per general election data, the Bhartiya Janata Party consolidated its political hold from 2014 onward (4 seats in 2009, 8 seats in 2014, 17 seats in 2019, and 15 seats in 2024). Therefore, we can infer that the political uprising of the BJP in northeastern states has downgraded its income prosperity. However, the increment of income inequality in the northeastern region

cannot be solely attributed to political changes because, in the recent past, many incidents of insurgencies and ethnic clashes have been observed in this region. The present analysis is limited only to the region's growth and trend of income inequality. In its sphere, the present study does not include a convergence test to comment on the growth-inequality nexus due to a lack of uniformity in data.

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