

Growth of Income Inequality and its Trend in North Eastern States of India

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Abstract: *One of the greatest challenges in the development of Indian economy is widening regional income inequality. Since its independence, Indian states have experienced different degree and pace of economic growth, where some states are forerunner in terms of economic growth and some others languishing behind. North East India as a backward region of the country has also experienced a varied growth during the planning era. Although the average growth of GSDP of the region is below the national average, it has shown sign of improvement in the post-reform period. Based on the secondary information collated from reports of 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, income inequality, convergence, kernel density function, generalized entropy

1. Introduction

Attaining higher economic growth becomes a plan economic goal of both developed and developing nations. According to Todaro and Smith [1], economic growth is a steady process by which the productive capacity of the economy increases over time to bring about rising levels of national output and income. However, achieving higher level of economic growth is not an indication of high level of economic development due to the impediments of poverty and inequality. World Income Inequality Database (WIID) confirms that although World Gross Domestic Product (WGDP) has increased in recent times, the level of income inequality has also widened [2]. The World Economic Forum's Global Risk Report rated inequality as one of the top global risks of 2013 [3].

India also has made tremendous economic progress in the last couple of decades and is rapidly emerging as major economic force in the world economy [4], [5]. However, the rate of economic growth across the national territory reflects disparity, which has become a major policy concern [6]. It is imperative to comprehend the causes and nature of differences in the levels and growth of income across the regions, since even small differences in growth rate over a long period may have substantial impact on the standard of living of people [7].

Although the extant sources of literature on regional growth and productivity in Indian economy shows different perspective of regional income inequality ([4], [6] among others), the study on regional inequality of northeast region of India counts less in number. It is apparent from the literature on regional inequality that north eastern region of India is an economically constrained region. Since most of the studies in Indian setting consider major state economies of India, therefore, the present study tries to explore the magnitude of intra-regional income inequality of the region. With this backdrop, the present study tries to examine the economic growth of the region along with the growth and trend in inter regional income inequality.

The paper is organized in five sections. Apart from the introduction in section 1, section 2 describes the data and methodology relates to the study. Section 3 sheds light on the growth of the regional economy of the region, which is followed by the magnitude and trend of regional income inequality in section 4. Finally, section 5 concludes the paper.

2. Data and Methodology

The study is based on secondary data. Data published by various organizations such as Planning Commission of India, Reserve Bank of India (RBI), Central Statistical Organization (CSO), World Bank, etc. are used for analysis.

The present study devices simple descriptive statistics such as percentage compounded annualized growth rate (CAGR) for the analysis of some of the aspects such as growth of state economies, trend of poverty.

To analyse the distribution of income across the north eastern states Kernel Density Function is used for the period 1999-00 and 2012-13. Since data on state domestic product for Mizoram is unavailable for the constant price series 1980-81 to 1993-99, therefore it is excluded from the analysis. Kernel Density Function is a non-parametric method, which is used in the measurement of distribution of a variable. In this study, Gaussian kernel is used, which is adopted from Cameron and Trivedi [8]. A non-parametric kernel density estimate is given by

$$\theta_K(x) = \frac{1}{nh} \sum_{i=1}^n \left(K\left(\frac{x-x_i}{h}\right) \right) \dots\dots\dots(1)$$

with $K(x)$ usually chosen as a symmetric probability density function satisfying the condition:

$$\int_{-\infty}^{\infty} K(x) dx = 1 \quad K(x) = K(-x) \dots\dots\dots(2)$$

Here h is also known as bandwidth, or smoothing parameter. To measure the extent of inequality across the states of NER, Generalised Entropy (GE) index of inequality measure is calculated. For further reference on the measurement of this method please see Litchfield [9].

3. Growth of NSDP in North East India

Before analysing the extent and magnitude of income inequality in the region, this section portrays the growth of NSDP and population for better understanding the growth-inequality nexus.

Table 1: Growth of Population and Per Capita NSDP in North Eastern States* vis-à-vis India (1980-2012)

State	Population (in Lakhs)			Per Capita NSDP (Rs. At 2004-05 Prices)		
	1980	2012	CAGR (%)	1980	2012	CAGR (%)
Arunachal Pradesh	6.2	14.4	2.57	8857	35845	4.33
Assam	178.9	311.7	1.70	6461	23448	3.98
Meghalaya	13.2	30.8	2.61	12186	34004	3.16
Manipur	14.1	29.6	2.28	10716	22395	2.26
Nagaland	7.7	20.6	3.00	16316	48111	3.33
Sikkim	3.1	6.2	2.12	7247	78427	7.48
Tripura	20.2	36.8	1.83	8716	42315	4.90
India	6790.1	12170.0	1.78	10712	38856	3.98

* Mizoram has been excluded from this analysis due to lack of data at constant price series 1980-81 and 193-94.

Source: Author's calculation based on RBI database

The growth rate of population of all north eastern states except Assam is higher as compared to the national growth rate (see table 1). Among the north eastern states, while Nagaland has recorded highest population growth, the growth rate of Assam remains at the lowest. It is worth mentioning that Assam shares most of the total population of the region (73.5 per cent and 69.3 per cent respectively for the period 1980 and 2012).

While the per capita Net National Product at factor cost (NNP_{FC}) of India has increased from INR 10712 in 1980 to INR 38856 in 2012, three north eastern states, namely, Arunachal Pradesh (4.33 %), Sikkim (7.48 %) and Tripura (4.9 %) has recorded higher level of growth compared to the national growth rate (3.98 %). In absolute value, 43 per cent of the north eastern states have recorded higher per capita NSDP during the period 1980 and 2012, which implies better standard of living for the respective states than the national average.

4. Regional Disparities and Trends in Income Inequality

4.1 Extent of Poverty in North East Region of India

Before analysing the trend of income distribution and inequality, it is imperative to glimpse on regional disparities of the NER of India in terms of poverty headcount ratios and its growth.

It is apparent from the table 2 that the poverty headcount ratio of India has declined from 54.9 per cent in 1973-74 to 21.9 per cent in 2011-12. Among the north eastern states,

Sikkim has commendably lowered the headcount ratio from 50.8 per cent in 1973-74 to 8.2 per cent in 2011-12, which is followed by Meghalaya and Tripura. While, the growth of Below Poverty Line (BPL) population is the highest in Arunachal Pradesh among the states of NER, Sikkim registers a highest negative growth rate as compared to all India average growth rate (see table 3).

Table 2: Poverty Head Count Ratio in North Eastern States vis-à-vis India

States	1973-74	1977-78	1983	1987-88	1993-94	1999-00	2004-05	2009-10	2011-12
Arunachal Pradesh	51.9	58.3	40.9	36.2	39.4	33.5	31.1	25.9	34.7
Assam	51.2	57.2	40.5	36.2	40.9	36.1	34.4	37.9	32.0
Manipur	50.0	53.7	37.0	31.4	33.8	28.5	38.0	47.1	36.9
Meghalaya	50.2	55.2	38.8	33.9	37.9	33.9	16.1	17.1	11.9
Mizoram	50.3	54.4	36.0	27.5	25.7	19.5	15.3	21.1	20.4
Nagaland	50.8	56.0	39.3	34.4	37.9	32.7	09.0	20.9	18.9
Sikkim	50.9	55.9	39.7	36.1	41.4	36.6	31.1	13.1	08.2
Tripura	51.0	56.9	40.0	35.2	39.0	34.4	40.6	17.4	14.0
ALL INDIA	54.9	51.3	38.9	38.9	36.0	26.1	37.2	29.8	21.9

Source: Planning Commission, 2014

Table 3: CAGR of Poverty and Population in North Eastern States of India (1973-74 to 2011-12)

States	BPL Population	Total Population
Arunachal Pradesh	4.64	5.75
Assam	0.56	1.82
Manipur	1.47	2.28
Meghalaya	-1.12	2.70
Mizoram	0.62	3.04
Nagaland	0.71	3.37
Sikkim	-2.26	2.55
Tripura	-1.30	2.12
ALL INDIA	-0.46	1.98

Source: Author's calculation based on Planning Commission, 2014

4.2 Inequality in North East Region of India

It is apparent in the earlier discussion that north eastern states have made substantive economic growth. The literature suggest that higher the economic growth, wider the inequality. It is therefore, the present subsection delves to understand the debate.

Table 4: Quartile Distribution of NSDP of Indian States in 2012-13

States in 1 st Quartile	States in 2 nd Quartile	States in 3 rd Quartile	States in 4 th Quartile
A& N	Chandigarh	Jharkhand	Delhi
Mizoram	Tripura	Orissa	Karnataka
Sikkim	Goa	Punjab	WB
Arunachal	J&K	Bihar	Gujrat
Manipur	Himachal	Haryana	Andhra Pradesh
Naga	Uttarakhand	MP	UP
Meghalaya	Chattisgarh	Kerala	Tamil Nadu
Puducherry	Assam	Rajasthan	Maharashtra

Source: Author's calculation based on CSO Online Database

It is clear from table 4 that that all the north eastern states have placed in the lowest two quartiles of income distribution, where, six states occupy the 1st quartile and remaining two states occupy the 2nd quartile. It thus, reflects that the NER region as a whole is still lagging in the growth process. Let us now examine the nature of income distribution within the states of the region. In this endeavour, Kernel density function is estimated, where density estimation is based on the log value of the Per Capita NSDP of the sample states. The non-parametric estimates of the distribution of per capita NSDP across the states of the region for two years, 1999-00 and 2012-13 are plotted in figure 1.

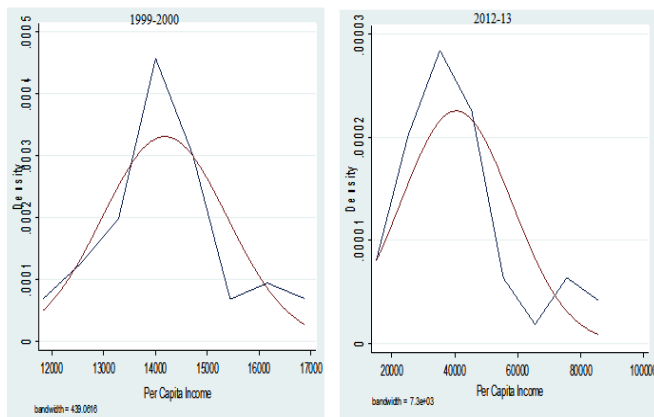


Figure 1: Per Capita Income Inequality in North East India (1999-00, 2012-13)

It is evident from the figure that there has been an increase in mean income in 2012-13 as compared to the period 1999-00. Although the kernel density curve for both periods seems to be same, the density curve has comparatively more peak in 2012-13 and a mixture of normal curve as compared to the normal curve for the period 199-00. Thus, it reflects that increase in mean incomes of the region increases inequality. In view of the unequal shift in income distribution, it is imperative to examine the extent of inequality for which, GE inequality measures for different values of α (0,1 and 2) are estimated as in table 5 and plotted in figure 2 the five different years.

Table 5: Measures of Generalised Entropy in North East India

Period	GE($\alpha=0$)		GE($\alpha=1$)		GE($\alpha=2$)	
	Estimated Value	Standard Error	Estimated Value	Standard Error	Estimated Value	Standard Error
1980-81	0.0499	0.0205	0.0501	0.0204	0.0519	0.0215
1993-94	0.0287	0.0145	0.0299	0.0144	0.0317	0.0146
1999-00	0.0195	0.0118	0.0186	0.0113	0.0181	0.0111
2004-05	0.0215	0.0087	0.0206	0.0089	0.0200	0.0093
2012-13	0.0973	0.0438	0.1011	0.0414	0.1114	0.0434

Source: Author's Calculation

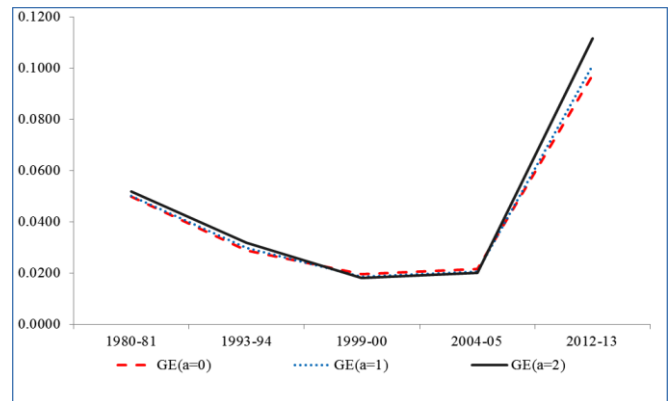


Figure 2: Generalised Entropy Indices for different period in North East India

It is apparent from table 5 and figure 2 that the extent of inequality has continuously declined from the year 1980-81 to 1999-00 and then shows increasing trend in 2004-05, which further aggravated largely in 2012-13. It thus indicates that increasing per capita incomes increases the magnitude of inequality. Moreover, the extent of inequality in the post-liberalized period is observed at lower level as compare to pre-liberalized period.

5. Concluding Remarks

The paper seeks to study the extent and magnitude of income distribution across the north eastern states of India. The estimated results and discussion indicates that, increase in per capita income in the states of regions has widened income inequality in general and in the recent period in particular. It is interesting to note that GE inequality measure indicates higher magnitude of income inequality during pre-liberalised period. However, overall the extent of inequality during the pre-liberalised period is less as compared to post-liberalised period. The present analysis is limited only to the analysis of growth and trend of income inequality in the region. In its sphere, the present study does not include convergence test to comment on the growth-inequality nexus, which is due to lack of uniformity in data.

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