Chapter 6
Intra- and Interstate Inequality in the Northeast Region with Special Reference to Assam

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6.1   Whither Northeast

The northeastern (NE) region (NER) of India has a distinct topography, historical background and also a sensitive geopolitical environment. Underdevelopment, deprivation and regional disparity are matters of serious concern, especially for such a sensitive region as they have led not only to economic backwardness but also to social conflicts. With regard to regional equality, while convergence theory tells us that marginal productivity differentials and factor mobility can lead to convergence across regions, high productivity of a factor of production like capital does not depend entirely on its availability. Productivity differentials can occur due to geographical and ethnic characteristics of regions, status of infrastructure, political responsiveness and many other economic and non-economic factors. Eventual levelling of regional imbalances is the prediction of other theories as well; for example, the inverted U hypothesis of Kuznets also puts forth the view that regional inequality will eventually come down with growth and development. Several authors have attempted to empirically test the convergence theory in the context of Indian states, but the literature pertaining to regional convergence in India is sketchy. In this context, one should not ignore the opposing theories, in particular the dependency and structural change theories that put forward the hypothesis that regional inequality is an inevitable outcome of capital accumulation and profit. The growth pole theory also talks about growth being concentrated at the core and then spreading and creating linked secondary sectors outside of it.

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Empirically, a number of authors have tried to examine the theoretically established convergence hypothesis for the Indian states. In the Indian context, when regional disparity is analysed, scholars often confine themselves to selected major states, and some of the smaller states with lower level of income often get neglected. Most of the NE states fall in this category.

It is the general view that the NER of the country is comparatively backward; this, however, is a sweeping statement on two counts. First, the region is not a homogeneous entity with regard to topography, income and other development indicators. For example, the state of Assam is primarily plain while Manipur and Tripura have both plain areas and hilly tracts, and the other NE states are almost entirely hilly. Some common perceptions about Northeast involves the belief that all states in the region are backward, but that Assam, being on less hilly terrain, is more developed than the rest of the region. However, the current study shows that with respect to several development indicators including income, Sikkim's position is comparable to any developed state in India, while Assam lies not only much below the all-India average but also lower than most NE states. Second, in the early post-independence period, the position of the region, especially that of then undivided Assam, was better compared to the all-India average. Assam started lagging behind only by the 1960s (Dutta and Das forthcoming). Thus, regional disparity between the NER and the rest of the country has not only to be studied over time but also across different states within the region. Consequently, policy making has to consider region-specific concerns as well as problems of subunits like states within the regions.

While regional disparities across Indian states have been a matter of concern and have attracted attention of the academicians and policy makers in India, this disparity is not only interstate but also intra-state, in that, it is visible across subregional units such as districts within a state, and talukas or mandals within a district, and so on. Analysing this disparity at the substate level assumes considerable importance, given the current emphasis of the policy makers on local-level planning and governance (see also NE Vision 2020). This chapter makes an important contribution in this regard by going down to the substate level and making an analysis of regional disparity and convergence of districts of one of the prominent and most populated state of the region, viz., the state of Assam. This exercise can be utilized for policy formulation at the substate level.

While we acknowledge the fact that in addition to income or consumption expenditure, disparities can be social in nature or in terms of opportunities, facilities, infrastructure, and other endowment-related indicators, most of these disparities (if not all) manifest themselves through income or income differentials. Keeping this in mind, we discuss briefly some of the crucial differences in social or infrastructure-related indicators across the region in Sect. 6.3, but our primary focus remains on income. In this regard, one of the important contributions of the chapter is to compute income inequality measures across the NE states using the unit record household-level data on consumption expenditure provided by the National Sample Survey Organisation (NSSO). This exercise assumes considerable importance due to the fact that internal unrest that bogs down the development of the region can

not only be due to its disparity vis- à-vis rest of India but also on account of disparity within the states concerned. Some authors argue that the sample sizes for the NE states are small in the NSSO sample and therefore estimates of inequality may have high standard errors. However, our discussion with the NSSO officials reveals that the sample sizes are adequate to have state-level estimates. Further, having computed the sample sizes based on NSSO data across states as percentage of total households in the state concerned (see Table A.10 in the Appendix) we can observe that NE states have a much better representation in the sense that they have a much larger percent of households in the sample compared to the rest of India. Needless to say, this household-level analysis brings out certain interesting findings which have important policy implications. First it highlights the states that have high level of inequality and second also compares differences in rural and urban inequality. Further, changes in inequality levels across time (over the NSSO rounds) also indicate necessary actions required for combating widening differences.

Thus, the chapter makes an attempt to examine regional inequality that exists within the NE states and between the Northeast and other regions of India confining itself primarily on income and also on other selected social and infrastructure indicators. The chapter focuses further on one of the important states in this region, viz., Assam, and evaluates income disparity within the state by considering substate units such as districts and tests the convergence hypothesis. In this backdrop, the chapter unfolds as follows: The next section (Sect. 6.2) provides a brief review of literature, followed by a section on regional disparity between the NER and the rest of India, concentrating on selected infrastructure and social indicators. Income inequality across the NE states is taken up in Sect. 6.4. Section 6.5 continues with the same theme and provides an analysis of NSSO data. Section 6.6 goes deeper into the issue by considering substate-level units, in particular the districts of Assam, and examines disparity in terms of income and level of consumption. The concluding section sums up findings and provides a policy frame for the region.

6.2   A Brief Review of Literature

In general, the literature on the NER comprising all the eight states under consideration, is scanty in nature; in particular, studies on an important and relevant aspect such as regional disparity for a backward region like this are currently limited and therefore calls for early updation[1]. In fact, studies on even general growth performance of the region are not many (see Bhattacharya 2011) and are focussed primarily on overall growth and not on sectoral growth drivers for the region (Debnath and Roy 2011). Most studies usually consider Assam and ignore several other NE states (Shand and Bhide 2000; Bhattacharya and Shakthivel 2004; Ahluwalia 2002), though Dholakia (2009) incorporates a few selected NE states apart from Assam. In this context, one exception is the work of Mishra (2011) on concerns regarding

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[1] For a lucid discussion on the topic see Bhattacharya (2011).

human resource development (HRD) in the region covering all the eight states for an assessment of the level of HRD (also see Raul and Saikia 2011; Bhattacharya 2011). There are, however, a number of studies that examine specific issues or industries concentrating on certain selected parts of the region. For example, Kakoti (2011), Hazarika (2011) and Gupta and Dey (2011) talk about the tea industry in certain parts of Assam; Debnath (2011) examines energy-generation potentials in Tripura; Mishra and Lyngskor (2011) concentrate on the cost of living of casual workers in Shillong, Meghalaya and so on. But there is a real dearth of literature on regional inequality or disparity for this part of the country. This is, however, not true of other parts of India (see, for example, Kar and Sakthivel 2007; Singh et al. 2003; Ahluwalia 2000, and several other writings on the topic). Increased inequality across Indian states in the post-reform era has been a subject of study for a number of scholars. In this context, there is also a large volume of literature surrounding the debate on convergence and divergence of growth in selected Indian states (see Ghosh et al. 1998; Rao et al. 1999). But as mentioned above, a careful review of this literature on regional disparity in general and convergence in particular reveals that the NER has not received much attention by the scholars, possibly due to its backwardness, smaller size and remote geographical location. We argue that this is precisely the reason why one should pay adequate attention to such areas of ethnic and cultural diversity and unacceptable level of development. As history has repeatedly shown, continued neglect of such regions has led to a feeling of isolation and alienation from the mainstream and eventually led to conflicts and unrest which impacted the entire nation. Of course, there are documents and reports that talk about the general backward status of the region. In this regard, one can mention about the Vision 2020 document for the Northeast. This is a rich document that comprehensively discusses a large number of issues pertaining to the NER and suggests a road map for its improvement.

6.3 NER Versus All India: A Comparison of Selected Socioeconomic and Other Indicators

In this section, we consider a set of important indicators that depict the *state of human development* in terms of social indicators concerning health and education, *drivers of development* that cover some of the essential infrastructure facilities and state *finances for development* of the region in terms of central transfers. Needless to say, the set of pointers presented here are no way exhaustive; first, that is beyond the scope of the chapter, and second, the purpose here is not to discuss each sector's specific shortcoming but to arrive at certain general observations based on disparities for policy purposes. This exercise brings home the message that while in terms of some of the indicators, such as infrastructure, there can be region-specific policies, for others such as education one needs diverse strategies to address the problems of backwardness and disparity.

The NER, due to its unique topography, is generally sparsely populated. Assam with mostly plain regions, has a population of 3.12 crores (as per 2011 census),

which is the highest amongst the states in the region. The second most populated state, Tripura, has a population of 36 lakhs, followed by Meghalaya with 29 lakhs, and the smallest of the NE states, Sikkim, has the lowest population of 6 lakhs. Population densities in the plain states are expectedly higher, with Assam registering a density of 397 persons per sq. km, which is higher than the all-India average of 382. Similarly, the state of Tripura has a higher density of population, but the remaining states of the NE have much lower population density (Arunachal Pradesh: 17, Sikkim: 86, and so on), apparently due to preponderance of hilly tracts in these states. The NE states are also special-category states, those which according to the thirteenth Finance Commission have 'hilly terrain, sparsely populated habitation and high transport costs leading to high delivery cost of public services'. For such states, in the past, 90% of central assistance was treated as a grant, the remaining 10% as a loan. Strictly speaking, one may not compare such states with other states of India; however, one needs a benchmark for comparison, and the all-India average is a natural benchmark. We also note that the status of the NE states is not uniform vis-à-vis the all-India average. While some states are far above the all-India level with respect to certain indicators, a few others like Assam lag behind consistently. Such findings no doubt throw light on the issue of regional disparity.

Historically speaking, at the time of independence, most of the NER except the princely states of Manipur and Tripura was known by the name 'Assam'. No doubt partition adversely affected the region, as the traditional approach route of the region to the rest of the country ceased to exist with East Bengal becoming a part of Pakistan. Transport bottlenecks that followed hindered economic integration and dampened its investment attractiveness (Bezbaruah and Dutta 2001). The problem of illegal immigration that developed later in Assam created social and political unrest and discouraged investment flows which further worsened economic backwardness.

One of the noteworthy features of the region is its diversity in terms of culture, language, religious practices and so on. When one talks of diversity, certain striking features with regard to gender issues which emanate from specific social practices are to be noted. For example, some parts of the Northeast such as Meghalaya have a matriarchal society where women's role and position are quite different from other parts such as Assam or Tripura that are markedly patriarchal. While such ethnic and cultural diversity adds to the richness of the region, problems of development also at times emanate from such diversities. As the diverse groups are not equally developed, relatively disadvantaged ones due to their own frustration can create social unrest. Thus, the strategies for addressing disparity also need to be developed at the local level rather than having a blanket policy measures for the region at large.

For example, with regard to certain development indicators such as literacy rates, it is seen that early in the post-independence period, Assam had fared better than the all-India average; but 1971 onwards, it has been either close to the national average or below it. This may be partly due to the large-scale infiltration problem the state has faced which needs to be urgently addressed. Indeed, the lower level of educational achievement amongst some of the migrants may have pulled down the average. But the lower level of achievements in terms of infrastructure reveals lack

Table 6.1 Literacy rate of northeastern states. (Source: Selected socioeconomic indicators of northeastern states in India, Directorate of Economics and Statistics, Government of Assam 2012)

Literacy rate (as per census)

States	2011	2001	1991	1981	1971	1961	1951
India	74.04	65.38	52.2	43.57	34.45	28.3	18.33
Assam	73.18	63.25	52.9	NA	33.94	32.95	18.53
Arunachal Pradesh	66.95	54.34	41.6	25.55	11.29	7.13	NA
Manipur	79.85	70.53	59.9	49.66	38.47	36.04	12.57
Meghalaya	75.48	62.56	49.1	42.05	29.49	26.92	NA
Mizoram	91.58	88.8	82.3	59.88	53.8	44.01	31.14
Nagaland	80.11	66.59	61.6	50.28	33.78	21.95	10.52
Sikkim	82.2	68.81	56.9	34.05	17.74	NA	NA
Tripura	87.75	73.19	60.4	50.1	30.98	20.24	NA

NA not available

of state initiatives. Another notable feature is that while most of the NE states had begun with lower level of literacy compared to Assam, they well surpassed Assam's score over the decades (Table 6.1). Arunachal Pradesh is another state which started with a much lower level of literacy during 1961 and also bore the brunt of the Chinese attack during the decade, but subsequently improved its position by several notches even though it has remained lower than the all-India average till date. Most other NE states have shown far higher improvement over the years and achieved much greater levels of literacy. It is to be noted in this context that the comparison of hilly states of NER and relatively plain states (viz., Assam, Manipur and Tripura) with respect to any indicator of development does not reveal a uniform picture and hence such an exercise does not appear to be a fruitful one.

The important point from this simple exercise is that certain states say, for example, Mizoram have very high literacy rates and cannot be stated as backward in this respect. Strategies needed for development for a state like Mizoram may be to have a well-developed skill formation training which can encourage entrepreneurship. Arunachal Pradesh on the other hand needs policies for both skill development and improvement of basic education level.

One more issue needs to be highlighted here. From Table 6.6, we observe that while Arunachal Pradesh receives substantial central assistance, its achievements in health or education are rather poor. This raises the general question of utilization of funds. Do we need performance budgeting and conditional release of funds based on certain achievements? This is particularly important as several authors have highlighted large-scale corruption and pilferage in these states.

Moving from education to health, another important component of human development index (HDI), it is seen that life expectancy at birth in Assam is much lower than the all-India average. Also, Assam is the only NE state whose performance in health is below the all-India average (Fig. 6.1).
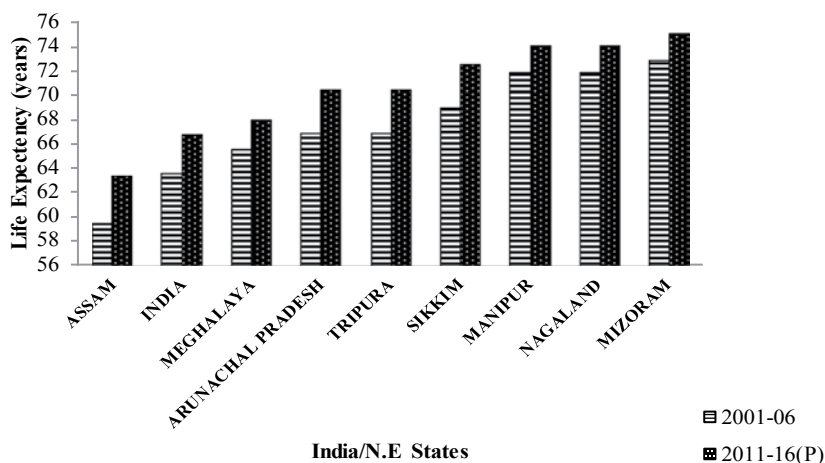
Life Expectency (years) — chart with Life Expectency (years) on the vertical axis (56–76) and India/N.E States on the horizontal axis: ASSAM, INDIA, MEGHALAYA, ARUNACHAL PRADESH, TRIPURA, SIKKIM, MANIPUR, NAGALAND, MIZORAM. Legend: 2001-06, 2011-16(P)

Fig. 6.1 Life expectancy at birth: NE states versus India. *NE* northeastern. (Source: Selected socioeconomic indicators of northeastern states in India, Directorate of Economics and Statistics, Government of Assam 2012)

Some of the hilly states such as Nagaland, Mizoram and Manipur have a high life expectancy rate, and the relatively plain state of Tripura has also substantially improved on this count over the years. Though there is some visible improvement in the case of Assam as well, it has remained far behind the all-India average all through.

Another important indicator of health is infant mortality rate, data for which is presented in Table A.1 in the Appendix. The table reveals again that Assam is the state with the highest infant mortality rate (55) in the NER followed by Meghalaya at 52. All other NE states have a much lower level of infant mortality rate, way below the all-India average at 44. The important question is why Assam lags far behind? This is particularly important due to the fact that per capita expenditure on medical and public health in rupees during 2009–2010 (as revealed by the Selected socioeconomic indicators of Northeast States of India published by the Directorate of Economics and Statistics, Assam) at ₹ 467 for Assam is far higher than ₹ 297 at the all-India level. Other states such as Manipur (with ₹ 501) or Tripura (₹ 514) are quite close to Assam in terms of expenditure but having a much better performance (see Fig. 6.1). Thus, it appears that the issue is not only of resources but also its proper utilization, and this is one aspect which is of critical importance for some of the states.

The most significant indicator of the HDI, viz., per capita income, is analysed separately in the next section. Assam's performance in this vital aspect was lacklustre to begin with, and has been deteriorating over the years. As revealed by the HDI, a combination of some of these indicators also indicates disparity between Assam and other states of India. Assam with an HDI of 0.444 is below the all-India HDI of 0.467 as per 2011 estimates (Suryanarayana et al. 2011). Further, disparity in the HDI is more pronounced between Assam and the other economically developed

Table 6.2 Percentage of households with selected amenities: NE states versus India. (Source: Selected socioeconomic indicators of northeastern states in India, Directorate of Economics and Statistics, Government of Assam 2012)

States	% Distribution of pukka household		[a]% Distribution of household on safe drinking water		[a]Sources of light		No light	[a]% Distribution of household by floor material	
					Electricity+solar	Oil		Mud	Non-mud
Years	1991	2001	1991	2001	2011	2011	2011	2011	2011
India	41.61	51.62	62.3	77.9	67.7	31.8	0.5	46.6	53.4
Assam	14.62	19.47	45.9	58.8	37.9	62	0.2	78.6	21.4
Arunachal	14.94	20.68	40	77.5	68.6	20.9	10.5	22.6	77.6
Manipur	5.4	8.39	38.7	37	70.3	29.1	0.6	68.6	31.4
Meghalaya	13.3	22.14	36.2	39	61.7	37.5	0.8	33.7	66.3
Mizoram	19.1	52.84	16.2	36	85.5	14.1	0.3	5.3	94.6
Nagaland	12.62	16.19	53.4	46.5	81.9	16.9	1.1	50.8	49.2
Sikkim	26.93	37.87	73.1	70.7	92.7	6.8	0.5	27	73
Tripura	5.5	9.81	37.2	52.5	70.3	29.3	0.3	76.9	23.1

[a] House listing and house census data highlights—2011 (Office of the Registrar General and Census Commission), India

states of India such as Gujarat and Maharashtra, as is evident from their HDI figures of 0.527 and 0.572, respectively. Though HDI within the state like Gujarat has immense contrast across its regions and needs more debate and clarity, the only consolation for Assam may be that its position is higher than some of the less developed states such as Bihar (0.367) and Uttar Pradesh (0.38).

However, as far as amenities are concerned, in regard to certain important indicators, disparity between NE states and the rest of India is pronounced with most NE states being below the all-India average, a few states like Sikkim being exceptions. We consider three important indicators in this connection, viz., condition of housing, availability of electricity and drinking water (Table 6.2).

On an average, about 78 % of the households at the all-India level have access to safe drinking water as per the 2001 census, and disparity on this count between the NE states in general and Assam in particular is huge. There is indeed not a single NE state that has scored above the all-India average. For example, a state such as Bihar has 86 % households with safe drinking water, which is even higher than the figures for states like Gujarat (84 %) and Maharashtra (80 %), showing much better amenities including drinking water. Similarly, figures with regard to pukka houses reveal the poor score of the NE states. In case of access to electricity, the position of Assam again is far lower than the all-India average though a number of NE states have a comparable or better score than the all-India average. Indeed, states like Mizoram, Nagaland and Sikkim have performed at par and can claim equal credit like Gujarat or Maharashtra. This signifies substantial disparity between Assam and these developed states of Northeast. It is, however, important to note that Assam is

Table 6.3 Work participation rate. (Source: Selected socioeconomic Indicators of India's north-eastern states. Directorate of Economics and Statistics, Government of Assam 2012)

Work participation rate							Labour force participation rate ('000) 2009–2010		
	Total		Male		Female		Male	Female	Total
Years	1991	2001	1991	2001	1991	2001	2009–2010	2009–2010	2009–2010
India	37.5	39.1	51.6	51.7	22.3	25.6	557	233	400
Assam	36.1	35.8	49.4	49.9	21.6	20.7	570	161	378
Arunachal	46.2	44	53.8	50.6	37.5	36.5	496	266	389
Manipur	42.2	43.6	45.3	48.1	39	39	513	203	363
Meghalaya	42.7	41.8	50.1	48.3	34.9	35.1	566	346	459
Mizoram	48.9	52.6	53.9	57.3	43.5	47.5	575	358	469
Nagaland	42.7	42.6	46.9	46.7	38	38.1	530	311	424
Sikkim	41.5	48.6	51.3	57.4	30.4	38.6	586	301	455
Tripura	31.1	36.2	47.5	50.6	13.8	21.1	615	226	423

below the all-India average in most of the development indicators, while the other NE states, especially Sikkim, Manipur, Nagaland and Mizoram, have better scores in majority of these indicators. This is true of the work participation rate as well (Table 6.3). Assam fares worse than the all-India average unlike other hilly states which have better figures.

From indicators of development turning to drivers of growth and development, viz., physical and financial infrastructure, we take two indicators, viz., surfaced road length and banking infrastructure. Though with regard to total road length per '000 km, Assam (at 294 km) and Tripura (at 303 km) fare better than the all-India average of 125 km (Table A.2), Assam's position is abysmal as far as the extent of properly surfaced road length is concerned (Table 6.4).

Thus, in terms of physical infrastructure, such as general road connectivity, the plain states of Assam and Tripura fare better, though the quality of roads remains a serious issue. On the other hand, the hilly states display a much lower level of connectivity vis-à-vis the all-India average with some states revealing substantial quality deficiency. This is a well-discussed issue in the literature (see NE Vision 2020) which clearly indicates that physical infrastructure is an area where substantial improvement is needed for new investment to come into the region. Given the geopolitical importance of the region and general deficiency of infrastructure across the NER, improvement of physical infrastructure is of critical importance.

In the case of financial infrastructure, availability of banking facility is measured in terms of the number of bank branches per '000 population, and here too, population per bank branch is higher in Assam than the all-India average, clearly showing the deficiency in expanding the banking network (Table 6.5). While this is the case with a number of NE states which could partly be due to lower credit off take; in this case also the state of Sikkim stands out with better results than not only the all-India average but also some of the developed states. Credit off take being much

Table 6.4 Road length and surfaced road length (as percentage of total area), 2010. (Source: Data collected from Directorate of Economics and Statistics, Assam 2011; 2011 Census; Ministry of Road Transport and Highways 2010)

	Surfaced road length in km per ('00) sq. km of area	Total road length in relation to per ('00) sq. km of area
India	71.2	142.68
Assam	48.2	308.26
Arunachal Pradesh	17.1	25.74
Manipur	36.4	85.7
Meghalaya	75.8	53.43
Mizoram	33.2	46.53
Nagaland	93.3	205.96
Sikkim	58.5	65.25
Tripura	135.4	322.07

Table 6.5 Financial infrastructure (schedule commercial bank). (Source: Compiled using RBI data)

	Population per bank office		Credit per office (lakhs)	
Years	2009	2010	2009	2010
India	14,683	14,009	3615	3983
Assam	21,778	21,054	1104	1277
Arunachal Pradesh	15,740	15,338	1187	1395
Manipur	29,913	29,889	1145	1384
Meghalaya	12,800	12,457	851	939
Mizoram	10,548	10,237	1102	1202
Nagaland	26,470	25,261	1283	1439
Sikkim	8423	8176	1501	1574
Tripura	16,660	16,099	899	1004

lower than the all-India average in this region, the level of investment and in turn the scale of economic activity is lower in the region. The region is also characterised by a much lower level of financial inclusion.

Turning to the finances for development, one observes that the size of central transfers to the NE states is much higher for the NE states (Table 6.6) compared to the all-India average (at around ₹ 2000).[2] The absence of adequate economic activities in the region makes central transfers vital for the region's survival. However, proper utilization of the resources needs to be ensured, and a mechanism should be developed to achieve the same.

The above analysis shows that the states of the NER have a substantial amount of disparity within themselves and that amongst the NE states Assam has had a much

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[2] We also provide figures for two other hilly states that are not in the NER.

Table 6.6 Per capita gross transfers from centre (in Rs). (Source: (Gross Transfer) from Budget Documents of the State Governments, RBI 2012. Population data are taken from the Central Statistical Office (CSO). All-India average around ₹ 2000)

	2009 (Accounts)	2010 (Revised estimates)	2011 (Budget estimates)
Arunachal Pradesh	27,342	44,556	39,201
Assam	3995	6384	7369
Manipur	13,229	19,133	19,877
Meghalaya	9674	12,724	15,654
Mizoram	26,358	31,997	30,797
Nagaland	17,201	24,829	26,154
Sikkim	28,298	36,461	43,608
Tripura	13,916	12,787	13,811
Jammu and Kashmir	12,664	15,206	16,655
Himachal Pradesh	9054	10,673	11,799

lower level of achievements throughout, and this pattern is discernible with regard to its income as well. Thus, while we need general policies concerning drivers of growth such as infrastructure, in many respects, local-level policies are necessary as revealed from the above analysis.

6.4   Inequality in Income

Although there are several important dimensions to deprivation and underdevelopment, income remains the primary indicator of well-being and hence of inequality and deprivation. Given the varied size of the states, the per capita gross state domestic product (GSDP) is a useful indicator of the stage of economic development of a state at the aggregative level. An analysis of per capita income of the states during the past decade (2000–2001 to 2010–2011) reveals that the relative position of the states has shown some noticeable change. As of 2000–2001, the per capita income of six out of eight NE states was below the all-India average level, but their number came down to five by 2005–2006 and further to four by 2010–2011, and currently, the performance of Arunachal Pradesh, Sikkim, Nagaland and Meghalaya is better than the all-India average (see Table A.3 in the Appendix, and Fig. 6.2).

The performance score of two NE states, viz., Sikkim and Mizoram, which was above all-India average during 2000–2001, was, however, quite close to the average value (of NE states), but by 2010–2011, their score had surpassed that of Andhra Pradesh and Karnataka. Many attribute Sikkim's achievements to its effective governance system.

Assam on the other hand is a matter of concern, as it has shown relative deterioration; it was in the eighth position from the bottom in 2000–2001, and went further
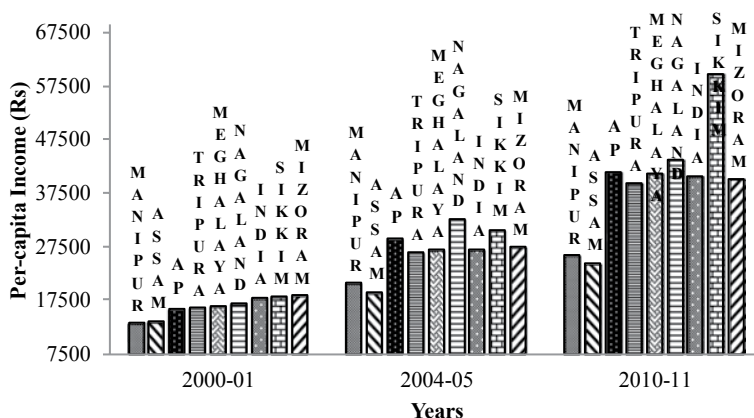
Fig. 6.2 Per capita income (at constant prices 2004–2005; NE states and India). *AP* Arunachal Pradesh. (Source: Computed using data from Economic and Political Weekly (EPW) Research Foundation 2009)

Table 6.7 Average decadal growth rate (percent increment) of net state domestic product at constant prices of 2004–2005. (Source: Computed using data from CSO)

	Arunachal Pradesh	Assam	Manipur	Megha-laya	Mizoram	Nagaland	Sikkim	Tripura
1981 to 1989–1990	8.06	4.13	4.64	4.91	–	8.36	–	5.30
1989–1990 to 1999–2000	6.66	2.50	5.53	6.09	–	5.75	5.75	7.20
2000–2001 to 2011–2012	8.03	5.33	6.43	6.87	7.76	8.68	8.07	8.52

down to the fourth position from the bottom by 2005 and to third from the bottom by 2010–2011.

Of course, the state of Assam receives much less central transfers than other states of the region and therefore per capita income of the NE states may not be a proper reflection of the productive economic activities in the region. Nonetheless, deteriorating position of Assam is a matter of serious concern, especially given various state initiatives for the development of the region.

If one examines the growth rate of the NE states over the years starting from 1981, the poor performance of Assam is evident from this as well (see Table 6.7). As mentioned above, average growth rates for the hilly and relatively plain states do not show any uniform pattern. For example, while the growth rates of Assam and Manipur have been lower, the state of Tripura shows a relatively high growth. However, average gross domestic product (GDP) growth at 7.4 % for the nation
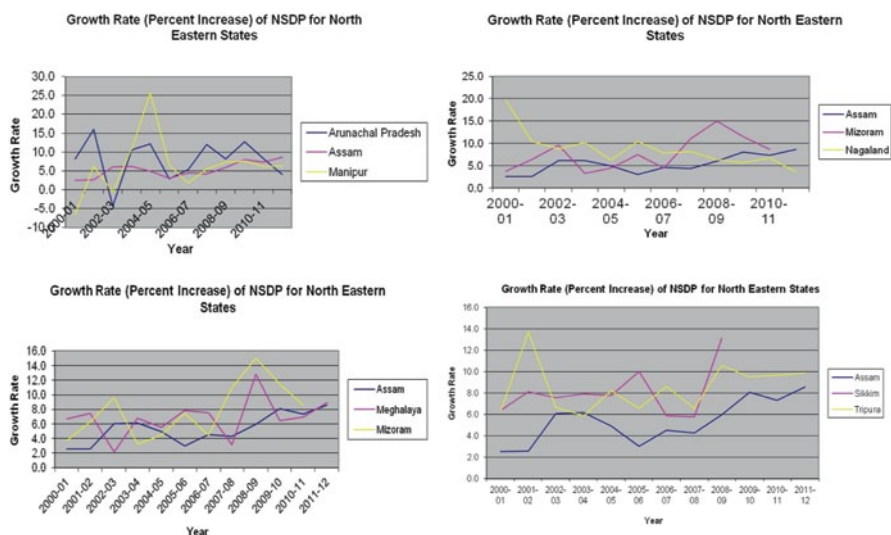
Fig. 6.3 Growth rates of Net state domestic Product (NSDP, percent increment) for the NE states at constant prices of 2004–2005: comparative picture. (Source: Computed using CSO data)

(from 2000–2001 to 2010–2011) compares well with the growth of most states of the NER, Assam again being an exception (see also Kundu and Varghese 2010).

Figure 6.3 presents the growth rate over the years for the NE states which also shows that Assam lags behind other states of the region in terms of growth rate as well. Thus, Assam not only has a lower per capita income but the growth of income is also sluggish.

An examination of the sectoral share of GDP over the years for the NER shows a similar trend as that of India, that is, the share of agriculture diminishing and services increasing. But for most states, recent data (of 2011–2012) reveal that the share of agriculture has remained higher than the national average and the share of industry is also higher for several states. In this regard, Assam stands out for having a much lower share of industries in the manufacturing sector (Table A.3 in the Appendix).

That 50 % of the NE states remain below all-India level even today is a matter of great concern; an increase of intra-regional disparity within individual NE states also needs to be addressed. One standard way of measuring disparity in terms of income is to compute coefficient of variations (CVs). A few interesting trends emerge from our analysis in this regard: First, inequality in per capita income (measured in terms of CV) for all-India as well as the Northeast region has increased over the years, excepting the latest year, figures for which are based on provisional results (Fig. 6.3). Increase in inequality (measured in terms of CV) between the period 2000–2001 and 2010–2011 for all the Indian states is about 21 %, whereas for NE states, it is as high as 49 %. Thus, this high rate of increase in income inequality is a matter of serious concern even though in absolute terms, CV figures remain much lower than the all-India figures. (See Fig. 6.4 and Table A.4 in the Appendix).
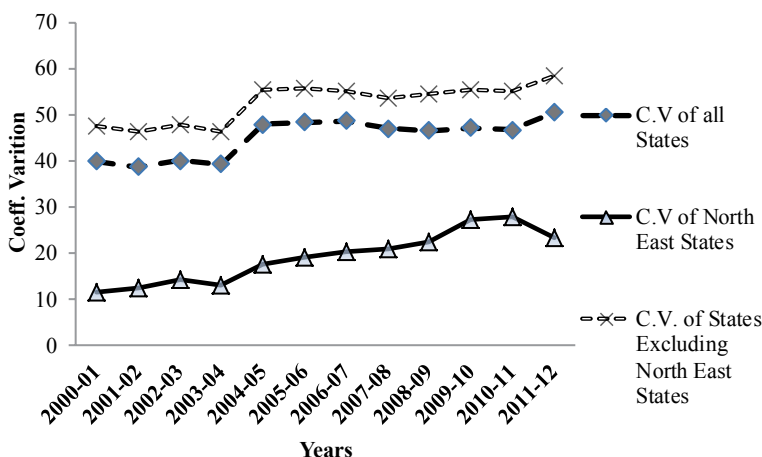
Fig. 6.4 Coefficient of variations (*CVs*) of per capita income at constant prices, 2004–2005. (Source: Computed by author using EPW Research Foundation data and data collected from the Directorate of Economics and Statistics, Assam)

Per capita income no doubt is an aggregative figure, and a study of poverty figures together with per capita income could reveal the distributional aspects to some extent. We have therefore presented the percentage of people below poverty line for the NER versus all India, through two sets of statistics (see Table A.6 in the Appendix). The first two columns of Table 6.8 refer to Planning Commission estimates (See Government of India (2014)) while the next two are estimates based on the method proposed by Prof. S. Tendulkar. It is worth noting in this context that with regard to the percentage of people below the poverty line, the Planning

Table 6.8 Percentage of population (total) below poverty line. (Source: Planning Commission Government of India (2014) and NSSO data (61st round))

Years	2004–2005 (URP)[a]	2004–2005 (MRP)[a]	(2004–2005)[b]	(2009–2010)[b]
India	27.50	21.80	37.20	29.80
Assam	19.70	15.00	34.40	37.90
Arunachal Pradesh	17.60	13.40	31.40	25.90
Manipur	17.30	13.20	37.90	47.10
Meghalaya	18.50	14.10	16.10	17.10
Mizoram	12.60	19.50	15.40	21.10
Nagaland	19.00	14.50	8.80	20.90
Sikkim	20.10	15.20	30.90	13.10
Tripura	18.90	14.40	40.00	17.40

URP uniform recall period, *MRP* mixed reference period
[a] Lakadwala methodology
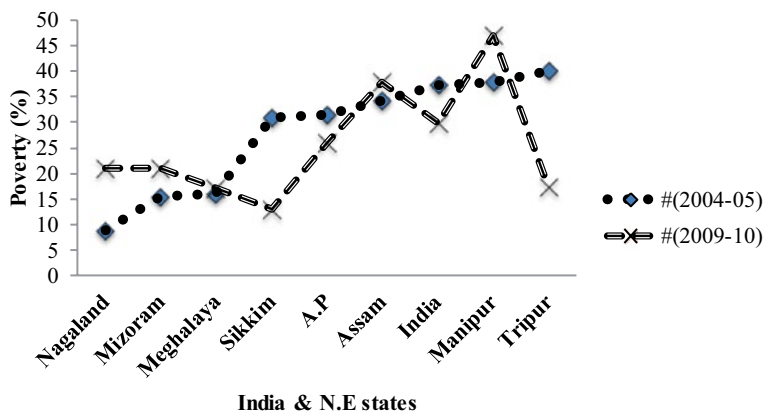[b] Tendulkar methodology

Fig. 6.5 Percentage of people below poverty line (Tendulkar method). (Source: Presented using Planning Commission data)

Commission's calculations show identical figures for all states of the NER for both rural and urban areas (see Table A.5 in the Appendix). In other words, the estimated figures do not vary across states for rural and urban regions but total figures (see Table 6.8) vary due to variations in percentage of the population living in rural and urban areas across states. Figures arrived at through the Tendulkar method, however, provide separate (nonidentical) estimates for rural and urban regions of different NE states. Thus, concentrating on the latter estimates, we observe that for a number of NE states, the percentage of people living below the poverty line has increased between 2004–2005 and 2009–2010, which is in contrast to what is observed at the national level. The state of Assam shows an increment from 34 % to almost 40 %, while the increment for Nagaland, that is, from 8.8 to 21 %, is phenomenal. In addition, Meghalaya, Mizoram and Manipur also showed a moderate increase during this period. In contrast, decline in poverty ratios is seen for Arunachal Pradesh, Tripura and Sikkim, the decline being quite drastic in case of Tripura and Sikkim (also see Table A.5 in the Appendix). *It is important to study in depth the success stories within the region and examine whether these can be replicated elsewhere in the region.*

It can be seen that in comparison with all-India figures (Fig. 6.5), Assam had lower poverty ratios during 2004–2005 but currently, its poverty ratio is above the all-India average figure by 8 %. Such trend of Assam needs to be probed further for addressing the problem through appropriate policies. Manipur is another state which has had very high poverty figures, and it is above the all-India figure by about 17 %. This is somewhat surprising as literacy rates and workforce participation rates in Manipur are rather high and much above the all-India average. Such observations as revealed from this study need to be further explored to have effective measures for combating regional disparity. Meghalaya shows much lower poverty figures than the all-India average; so also Mizoram and Nagaland. Both Tripura and Sikkim have been able to reduce both rural and urban poverty over the years, and are now placed much below the all-India level (Fig. 6.4).

In order to look at the level of inequality from the micro perspective, we use NSSO household consumption data for the NER.

6.5   Regional Disparity in NER: A Study of NSSO Data

This section considers two recent rounds of NSSO consumption expenditure data (61st and 66th rounds) and analyses unit record data in order to understand the level of disparity across households. The NSSO consumer expenditure survey has been generating estimates of household monthly per capita expenditure (MPCE) and its distribution separately for the rural and urban sectors of the country, for states and union territories, and for different socioeconomic groups. These indicators are amongst the principal measures of the level of living of the respective domains of the population and are crucial inputs for estimation of poverty by the Planning Commission.

The 61st round (July 2004–June 2005) of NSSO was meant to survey 'household consumer expenditure' and covered the whole of the Indian Union excluding a few selected regions in which interior villages of Nagaland situated beyond 5 km of the bus route are also included. The period under survey is 1 year, commencing on 1 July 2004 through 30 June 2005. A stratified multistage design is the format for the 61st round survey. The first-stage units (FSU) are the 2001 census villages in the rural sector and urban frame survey (UFS) blocks in the urban sector. The ultimate stage units (USU) are households in both the sectors. In the case of large villages/blocks requiring a hamlet-group (hg)/subblock (sb) formation, one intermediate stage is the selection of two hgs/sbs from each FSU.

Similarly, the NSSO, Ministry of Statistics and Programme Implementation, has now released the key indicators of household consumer expenditure in India, generated from the data collected in its 66th round survey during July 2009–June 2010. The key indicators are based on the central sample consisting of 7524 villages in rural areas and 5284 urban blocks spread over all states and union territories except in (i) interior villages of Nagaland situated beyond 5 km of a bus route (ii) villages in Andaman and Nicobar Islands which remain inaccessible throughout the year and (iii) Leh, Kargil and Poonch districts of Jammu and Kashmir.

Sample sizes for the NE states are presented in the Appendix which shows that the shares of sample households in total households of the state are much higher for the NE states.

Two measures of income inequality are computed (Table 6.9 and Fig. 6.6) using the consumption expenditure data, viz., Gini coefficient and Atkinson's measure of inequality, details of which are presented in the Appendix (A.2), and for sake of brevity Gini coefficients are ordered and presented through Figs. 6.6 and 6.7.
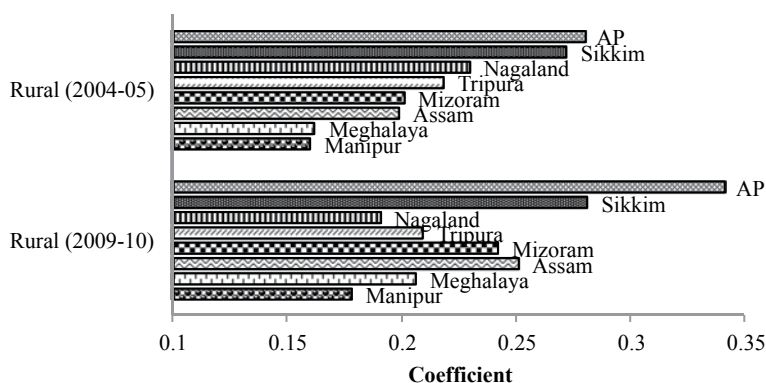
Gini coefficients and Atkinson's[3] measure of inequality were computed to understand the level of consumption inequality amongst people in the NE states. At-

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[3] Details of Atkinson's measure is presented in the Appendix A.2.

Table 6.9 Gini coefficients representing consumption inequality and Atkinson measure of inequality. (Source: Computed by author using NSSO data)

	Gini coefficient				Atkinson's measure of inequality			
	66th Round (2009–2010)		61st Round (2004–2005)		61st Round Rural	66th Round Rural	61st Round Urban	66th Round Urban
States	Rural	Urban	Rural	Urban	A(0.5)	A(0.5)	A(0.5)	A(0.5)
Arunachal Pradesh	0.341	0.332	0.280	0.249	0.065	0.097	0.051	0.088
Assam	0.251	0.330	0.199	0.320	0.033	0.061	0.089	0.085
Manipur	0.178	0.219	0.160	0.177	0.023	0.031	0.025	0.043
Meghalaya	0.206	0.260	0.162	0.263	0.022	0.038	0.055	0.053
Mizoram	0.242	0.234	0.201	0.249	0.034	0.047	0.048	0.044
Nagaland	0.191	0.241	0.230	0.242	0.044	0.030	0.046	0.046
Tripura	0.209	0.299	0.218	0.342	0.040	0.038	0.097	0.070
Sikkim	0.281	0.201	0.272	0.257	0.061	0.065	0.054	0.035

Note: At all India level during 2004–2005: Urban Gini—0.341, Rural—0.302; for 2009–2010: Urban—0.393 and Rural—0.229

Fig. 6.6 Rural Gini coefficient. *NSSO* National Sample Survey Organisation. (Source: Computed by authors using NSSO data)

kinson's measure (Bellu and Paolo 2006) provides a welfare-linked measure of inequality based on assumed utility functions of the form:

$$U(y_i) = \frac{1}{1-\varepsilon} y_i^{1-\varepsilon} \quad \varepsilon \neq 1$$
$$U(y_i) = \log y_i \quad \varepsilon = 1$$

Assuming different values of ε, different values for Atkinson's measure can be obtained. Here, the measure for ε is 0.5. (Two measures, viz., Gini and Atkinson's,
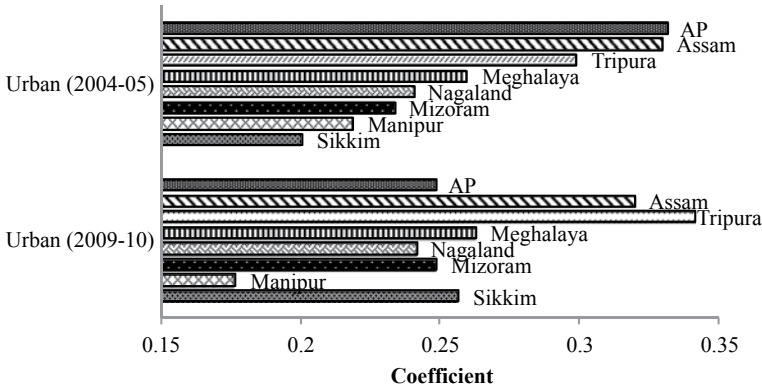
Fig. 6.7 Urban Gini coefficient. (Source: Computed by authors using NSSO data)

are used to see whether the ordering of inequality across states varies depending on the measure used). A number of interesting features are evident from the above analysis of NSSO data. The first observation is that amongst the NE states, there is substantial amount of difference in the level of inequality as can be seen from the measurement of Gini coefficients; Arunachal Pradesh shows a coefficient as high as 0.34, while Manipur shows a coefficient of only 0.17 (see column 1 of Table 6.9). *Thus, it is clear that in certain states of Northeast one needs to address the problem of both inequality and poverty, while in certain others poverty is the major issue not inequality.* As far as level of rural inequality is concerned, Arunachal Pradesh has the highest level of inequality, followed by Sikkim. Urban inequality is higher than rural inequality in most Indian states individually as also at the all-India level (see Tables A.7, A.8 and A.9 in the Appendix for income inequality measures at the all-India level and for selected states of India). However, as can be seen from the figures of the 66th round, rural inequality is higher in both Arunachal Pradesh and Sikkim; these states are also characterised by general high inequality; thus disparity in rural regions of these states need special focus. In addition, for Mizoram, inequality is higher in the rural regions. In contrast, as per the 66th round, urban inequality is higher than rural in Assam, Meghalaya, Nagaland and Tripura. Atkinson's measure also confirms the above trends.

Another interesting observation is with regard to change in inequality between the 66th and 61st rounds. Inequality has been increasing over time for most of the states except for Nagaland and Tripura and urban Sikkim. As Nagaland and Sikkim are the states with high per capita income, reduction of inequality in these two states is indicative of enhancement of welfare to different sections of the society.

Table 6.10 shows the decomposition of the Gini coefficient for the NE states which corroborates what has been found above; viz., that inequality amongst the NE states is not too high or low between states with a score of 0.04. The framework proposed by Araar and Timothy (2006) has been used to decompose the Gini index. Looking at the relative contribution, one observes that the contribution of Assam is the highest as it has the highest share of population and comparatively not a very low inequality level.

Table 6.10 Decomposition of income inequality (Gini coefficient), 2009–2010. (Source: Author's calculation using DASP software and 66th round unit level data of National Sample Survey in 2009–2010 on consumer expenditure)

States	Gini index	Population share	Income share	Absolute contribution	Relative contribution
Arunachal Pradesh	0.3355	0.0268	0.0366	0.0003	0.0012
Assam	0.2711	0.7214	0.6823	0.1334	0.4915
Manipur	0.188	0.0549	0.0547	0.0006	0.0021
Meghalaya	0.2221	0.0658	0.0684	0.001	0.0037
Mizoram	0.2634	0.0202	0.0292	0.0002	0.0006
Nagaland	0.2069	0.0252	0.0378	0.0002	0.0007
Tripura	0.2413	0.0732	0.0763	0.0013	0.005
Sikkim	0.2648	0.0125	0.0147	0.0000	0.0002
Within	–	–	–	0.1371	**0.5049**
Between	–	–	–	0.046	**0.1693**
Overlap	–	–	–	0.0884	0.3258
Population	0.2715	1.0000	1.0000	0.2715	1.0000

The Gini index decomposed by the eight NE states shows that within-group inequality contributes a higher percentage (50 %) than between-group inequality (17 %) to total inequality.

6.6   Disparity in the State of Assam: A District-Level Analysis

Given the fact that Assam is the highest contributor of inequality, it is necessary to examine income inequality in Assam at a disaggregated level by considering the districts separately. Currently, the state has 27 districts and the per capita income of the districts has remained low over the years. The highest per capita income during 2007–2008[4] is that of Kamrup district at ₹ 41,180 (at current prices), and the lowest is that of Dhubri district at ₹ 12,473. This clearly shows that there exists a noticeable disparity in terms of per capita income across districts in Assam. While the CVs across the NE states is rather low, it is considerably high for the districts of Assam. During 1999–2000, the CV across district per capita income (at constant prices) was as high as 43 %; it further increased to 48 % in the subsequent years but it is heartening to note that this has declined in recent years to 34 % (Fig. 6.8). This decline in CV has motivated us to examine whether there is any validity of convergence hypothesis for the districts of Assam, which is presented in the next section.

Inequality measured using micro-level information (NSSO household data) in terms of Gini coefficient for consumption expenditure, shows that urban inequalities

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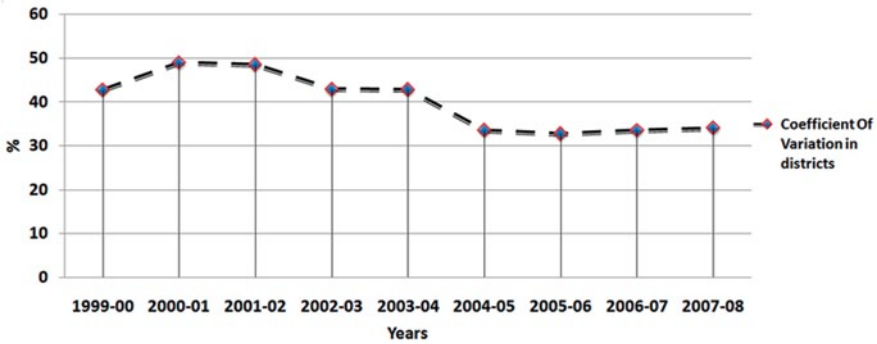[4] Latest available data at the time of writing this chapter.

Fig. 6.8 Coefficient of variation in per capita income in districts of Assam (yearly) at constant price (1999–2000). (Source: Computed by author using district income data collected from Directorate of Economics and Statistics, Guwahati, Assam)

in most districts are higher than rural inequality except for two of the predominantly urban-centric districts, viz., Guwahati and Dibrugarh, presumably because there are only a few households in the rural regions of these two districts. Our discussion with the NSSO official suggests that due to having small sample sizes, district-level Gini for the NE states may not be reliable. However, sample size of Assam being relatively large, the current exercise at the district level has been carried out. The exercise reveals that income inequality figures for the districts are lower than the all-India average and much lower than most of the developed states of India. Urban-centric districts like Dibrugarh, Jorhat and Kamrup have comparatively higher urban inequality, but, within the districts, consumption expenditure inequality has remained low. This gives us a feeling that inequality is not a serious concern within the state, while underdevelopment is. *But it is also noteworthy from our analysis that inequality over the years has increased substantially between the 61st and 66th rounds, and some of the districts have shown a much higher increase over the years* (Figs. 6.9 and 6.10 and Tables A.11, A.12 and A.13 in the Appendix). This is a trend which needs to be checked before it becomes another cause of concern.

Given the increasing trend in income inequality, it is of interest to examine whether districts of Assam diverged as a result of increased disparity in terms of income; if so, then backward districts would need special attention of the policy makers. To test this hypothesis, an exercise has been carried out (see also Rao et al. 1999).

6.7 Growth and Convergence Across the Districts of Assam[5]

Neoclassical growth theorists like Solow (1956), Swan (1956) and other scholars propounded that in a no-trade situation with no disparity in technology and preferences in an economy, the growth rate of per capita income and initial levels of per capita income tend to display an inverse relation.

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[5] While writing this section, we have benefited greatly from Rao et al. (1999).
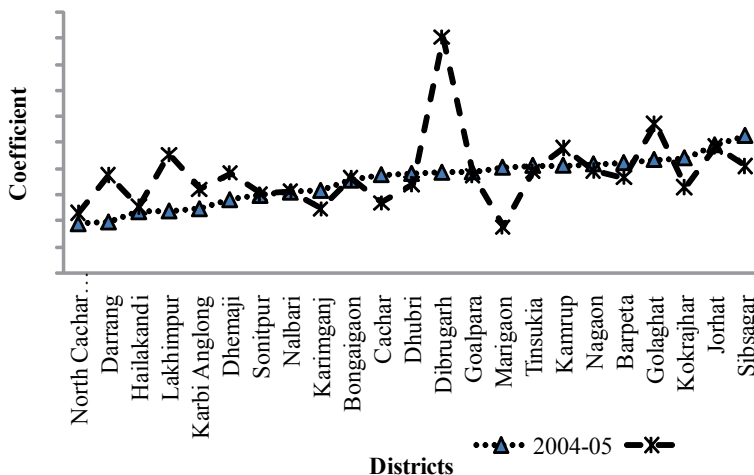
Fig. 6.9 Rural Gini-coefficient: district-wise analysis. (Source: Computed by authors using NSSO data)
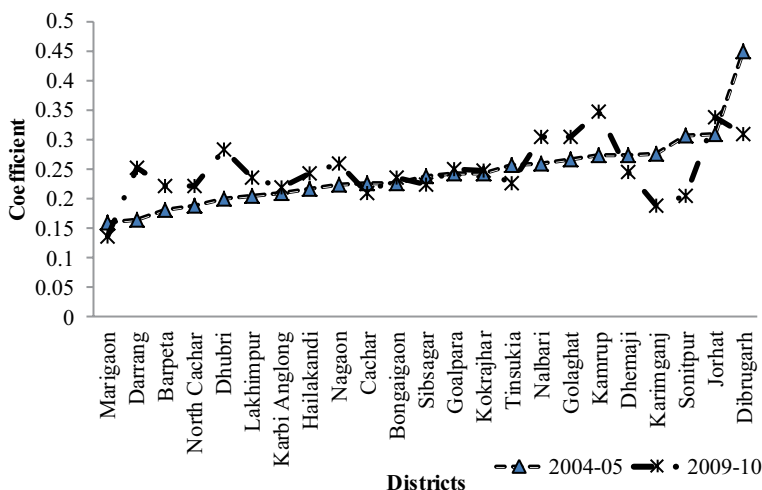
Fig. 6.10 Urban Gini-coefficient: district-wise analysis. (Sources: Computed by authors using NSSO)

Barro and Sala-i-Martin (1991) approximated log-linear model of the steady state average growth rate with a Cobb–Douglas technology as

$$\frac{1}{T}.\log\left[\frac{y_{it}}{y_{i,t-T}}\right] = x_i^* + \log\left[\frac{y_i^*}{y_{i,t-T}}\right]\left[\frac{1-e^{-\beta T}}{T}\right] + U_{i,t}, \tag{6.1}$$

where

i is the index for the economic units (districts of Assam here),

t is the index for time,

y_{it} is the per capita income,

x^*_i is the steady-state growth rate of per capita income,

y_i^* is the steady-state level of output per effective worker,

y_{it} is also the output per effective worker,

y_i^* is the length of time period,

β is the rate of convergence and

U_i is the error term.

A greater value of β indicates higher receptiveness of the growth rate to the difference between y^*_i and y_i, and it in turn can be used to measure speed of convergence. We note that β is uniform across economies of the districts of Assam even if they differ in other aspects. The driving force behind the convergence is the diminishing return to the factor of production; in this case, capital. Economies with lower initial level of capital–labour ratios will have high marginal products of capital and therefore tend to grow at a higher rate (Evans and Karras 1996). This would cause capital to move to such regions of high return.

Thus, for the given steady-state values x and y, per capita income growth rate would be higher, the lower the level of initial per capita income $y_{i,t-T}$. Owing to the difference that exists with regard to saving rate or technology, convergence may not be uniform across regions; therefore, most of the empirical studies neutralize this difference and infer absolute convergence from the β estimates (Barro 1991; Barro and Sala-i-Martin 1991).

An alternative measure of convergence is σ-convergence. It measures the cross-sectional dispersion of per capita income across economies. Thus, β-convergence

Fig. 6.11 Convergence in per capita income level

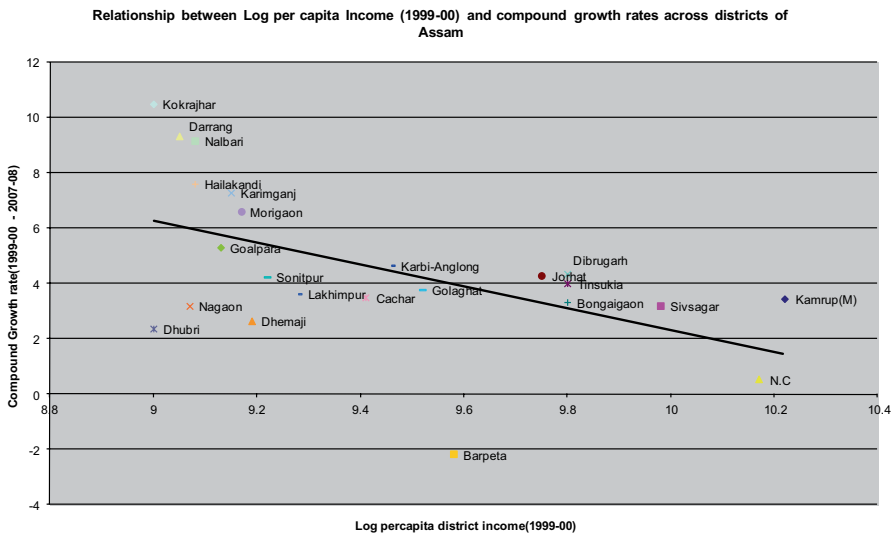measures the speed at which the poorer region catches up with reach one, σ measures interregional inequality in incomes at a given point in time.

Figure 6.11 depicts the relation between growth and per capita income. Here, we have indexed the per capita income of districts with respect to Kamrup (M) as the base which has a high per capita income level.

From Fig. 6.11, we observe a tendency of β-convergence. Barring a few exceptions, the fitted trend line reveals that the districts with a low level of per capita income have higher growth rates than rich districts.

6.8   Convergence of Per Capita Income Across Districts of Assam

We estimate β-convergence coefficient from the following model:

$$1/T.\log[y_{it} \, / \, y_{i,t-T}] = a - [\log(y_{i,t-T})(1-e^{-\beta T})(1/T) + X_i + U_i, \qquad (6.2)$$

where $\left(y_{it} \right)$ refers to the per capita district domestic product (DDP) of the districts of Assam in the ith district at constant (1999–2000) price, $\left(y_{i,t-T} \right)$ denotes the per capita DDP in the ith district in the beginning of interval. The vector X_i consists of other variables that control variation in the steady state values of x^* and y_i^*, and T is the length of the interval. To measure the interregional inequality, we measure the standard deviation of the log of per capita DDP. In this cross-sectional data, we test for the heteroscedasticity with three variable models, and we find it is insignificant.

Breusch-Pagan test for heteroscedasticity	chi2(1)=0.01
	Prob>chi2=0.9286

6.9   Regression Analysis

In our analysis (See table 6.11) we have taken 23 districts of Assam from the period 1990 to 2007. The estimates of regression analysis of Eq. (6.2) present an interesting insight in the growth process. The most important finding is that per capita DDPs have a tendency to converge. This is in accordance with the neoclassical hypothesis. On regressing $\log\left[y_{it} \, / \, y_{i,t-T} \right]$ on $\log\left[y_{i,t-T} \right]$, the estimates show significantly negative coefficients, thus indicating that the growth of per capita DDP is negatively related to their initial levels. In other words, districts with initially high per capita DDP tended to grow faster than those with lower per capita DDP. This is unconditional convergence.

We add the variable of primary sector at the initial level of income $\left(Agri_{i,t-T} \right)$ in the model to neutralize the effect of exogenous shocks. Though the primary sector

Table 6.11 Regression results for convergence

$\log\left[y_{it} / y_{i,t-T} \right]$	Coefficients	Standard error	t stat	P value	Significance F	R square
Intercept	3.193	0.994	3.211	0.004	0.009	
$\log\left[y_{i,t-T} \right]$	−0.301	0.105	−2.857	0.009		0.2800
$\log\left[y_{it} / y_{i,t-T} \right]$						
Intercept	3.302	0.809	4.083	0.0006	0.00037	0.5472
$\log\left[y_{i,t-T} \right]$	−0.347	0.087	−4.008	0.0007		
$\log\left[Agri_{i,t-T} \right]$	−0.390	0.113	−3.435	0.0027		

includes other minor sectors such as forestry, fisheries, etc., it primarily captures the movement of agricultural GDP. On regressing $\log\left[y_{it} / y_{i,t-T} \right]$ on $\log\left[y_{i,t-T} \right]$ and $\log\left[Agri_{i,t-T} \right]$, we find that the conditional coefficients are also negatively related and significantly influence the dependent variable. By adding the primary sector, R-square increases significantly, which signifies a better-fit model.

Since, the β-coefficient in both models is negative and significant, we therefore can conclude that the per capita income of the districts of Assam tend to converge over the period of time. *This indicates possible presence of factor mobility to the regions with higher productivity and eventual reduction of inter district inequality in terms of per capita income.*

6.10 Summary and Policy Focus at Substate/Local Levels for Northeast India

In most analyses at the all-India level, NE states (barring Assam) often get excluded presumably due to the fact that they are smaller in size with hilly terrains, and consequently with low population density. But the region has undeniable geopolitical importance; instability, in this region can cost the nation heavily. Social unrest in the region leading to instability, which is a cause of major concern, can get aggravated further due to regional disparity within the regions as well as between NER and the rest of India. It is therefore necessary to have a closer examination of the levels of development and areas of disparity in this region. This chapter is primarily expository in nature and is a modest attempt to fill this gap.

The chapter considers a selected set of indicators to examine the state of the region. It is observed that in terms of household amenities, the region lags behind several states of the nation and with regard to physical infrastructure especially connectivity, there are severe deficiencies that require prioritised attention. Several policy initiatives like creation of Non-Lapsable Central Pool of Resources (NLCPR) for the development projects in the NER (see www.nlcpr.mdoner.gov.in) were made to restore such imbalances. These funds if utilized efficiently can enable considerable infrastructure development in the region.

More importantly, the exercise reveals that within the NER, however, the status of all states is not the same; while some states such as Assam fare badly, states like Sikkim are often much above the all-India average level in terms of infrastructure. Therefore, while there is a need for strategies for overall development of the region, it is also necessary to have localised policies according to the needs at the local level. For example, states like Mizoram or Nagaland fare very well in terms of basic education (literacy rate) and therefore need job-based training and entrepreneurship development for self-sustaining growth. On the other hand, states like Assam or Arunachal Pradesh, which lag behind in basic education, need a different set of policy strategies.

In terms of one of the major indicators of disparity, viz., income, though the region shows a lower level of inequality vis- à-vis the rest of India, *it is important to note that inequality has been increasing in this region over the years and often at a much higher rate than in other Indian states*. Our analysis reveals that in certain states it is the rural inequality which is a major cause of concern, while in certain other parts urban inequality needs to be tackled more effectively. Thus, policy at the state level needs to be geared towards these specific concerns.

As mentioned above, within this region, Assam fares the worst and therefore a closer look at the state of Assam is deemed appropriate. In terms of per capita income, the position of the state has not shown any improvement over the years and indeed deteriorated in the recent past; it was in the eighth position from the bottom in 2000–2001, and went further down to the fourth position from the bottom by 2005 and to the third from the bottom by 2010–2011. Cause for such performance needs to be probed further. Also, inequality as measured in terms of consumption expenditure across districts of Assam has increased over the years.

It is noteworthy here that though fund allocation from the Centre to the NE states is rather high, the states have not been able to utilize the resources appropriately. Our discussions with various officials also reveal that large-scale corruption and misuse of funds in the region are partly responsible for economic backwardness of the region.[6] It is therefore necessary to have performance and outcome budgeting for the region starting from the local level; success stories should be publicised so that a sense of competition grows within the region.

Many scholars argue that economic backwardness and the consequent low level of employment opportunities created a feeling of deprivation and a sense of alienation from the mainstream. The sense of deprivation particularly in a climate of cultural and ethnic differences has over time given rise to insurgency, causing further deterioration of economic conditions in the Northeast. Insurgents today extort funds from entrepreneurs such as tea garden owners, businessmen which in turn negatively impacts new investments (see Bhattacharya 2011, for a detailed discussion on the issue).

Observing that development of the region through private participation would take some time, the Ministry of Development of NER (the Ministry of DONER) has been set up with a vision to accelerate the pace of socioeconomic development of the region. The ministry takes note of the fact that 98 % of the border of the region is with international neighbours and the region being hilly, challenges of development

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[6] See also Baruah (2007) for a discussion on corruption in the Northeast.

need special attention (www.mdoner.gov.in). The 'look east policy' of India also implicitly provides the region to take advantage of trade opportunities with neighbouring countries and thereby ensure development. While several scholars talk about international trade-based development model for the region (see Hans-Peter and Boni 2010; Rao 2009), some authors, however, are sceptical of the idea (see Barua and Das 2008). Finance minister Mr. P. Chidambaram in his 2013–2014 budget speech, in a first decisive step in this direction, talked about linking the region with Myanmar through financial assistance from international funding agencies. Security analysts argue that given India's growing influence in Myanmar, this is an intelligent move which will help India to counter the influence of China in the country (Times of India, Feb 28, 2013). However, not much has been achieved in this front till today. Several other policy steps like formation of the Northeast Council way back in the 1970s till the creation of North East Vision 2020 in 2008 (See North Eastern Council (2008)) have also not ushered in much change at the ground level.

This experience has made it clear that mere pumping of resources or creation of additional institutions is not going to uplift the status of the region. It is necessary to ensure that institutional mechanisms exist for proper implementation of the plans and programmes and evaluate performance periodically. While taking up development programmes for the region, a bottom-up approach with performance appraisal is deemed essential. Given the sociocultural diversity of the region, it is essential to have a policy process that takes note of such distinctive characteristics of the NER. A bottom-up approach can also make the stakeholders responsible and thereby ensure minimal leakage. Further, some of the political problems like insurgency, illegal immigrations, etc. need to be resolved with determination so that the region can take advantage of its rich natural resources and develop at par with the other states in the country.

6.11   Appendices

6.11.1   Appendix A.1

Table A.1 State-wise infant mortality rates in India. (Source: Ministry of Health and Family Welfare, Govt. of India)

State-wise infant mortality rate in India (2001 to 2011)					
States/UTs	2001	2005	2009	2010	2011
Andhra Pradesh	66	57	49	46	43
Arunachal Pradesh	39	37	32	31	32
Assam	74	68	61	58	55
Bihar	62	61	52	48	44
Delhi	29	35	33	30	28
Gujarat	60	54	48	44	41
Haryana	66	60	51	48	44
Karnataka	58	50	41	38	35
Kerala	11	14	12	13	12
Manipur	20	13	16	14	11
Meghalaya	56	49	59	55	52
Mizoram	19	20	36	37	34
Nagaland	N.A	18	26	23	21
Odisha	91	75	65	61	57
Rajasthan	80	68	59	55	52
Sikkim	42	30	34	30	26
Tamil Nadu	49	37	28	24	22
Tripura	39	31	31	27	29
Uttar Pradesh	83	73	63	61	57
Uttarakhand	48	42	41	38	36
West Bengal	51	38	33	31	32
India	*66*	*58*	*50*	*47*	*44*

UTs union territories, *NA* not available

Table A.2 Road length statistics for NE states. (Source: Directorate of Economics and Statistics (2011) Census: NE States, *Ministry of Road Transport and Highway (2010), *Census of India 2011)

Road length in relation to per ('00) sq. km of area		
Years	2008	2010
India	125	142.68
Assam	294	308.26
AP	20	25.74
Manipur	74	85.7
Meghalaya	44	53.43
Mizoram	29	46.53
Nagaland	135	205.96
Sikkim	26	65.25
Tripura	303	322.07

India includes JRY and PMGSY

JRY Jawahar Rozgar Yojana, *PMGSY* Pradhan Mantri Gram Sadak Yojana

Table A.3 Per capita income: NE states versus all India (constant price 2004–2005). (Source: Calculated from EPW State Data set, EPW research foundation)

Per capita income	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
Assam	13,544	13,635	14,362	15,006	18,993	19,369	19,997	20,684	21,589	23,019	24,402	26,133
Manipur	13,420	14,033	13,689	14,869	20,786	21,669	21,672	22,524	23,548	24,873	25,918	27,031
Tripura	16,105	18,334	19,157	20,028	26,586	27,795	29,725	31,629	34,210	36,719	39,464	42,469
Mizoram	18,509	19,219	20,680	20,814	27,560	28,752	29,370	31,774	35,117	37,798	40,231	NA
Meghalaya	16,441	17,139	17,684	18,647	27,024	28,794	30,651	31,652	35,327	38,070	41,151	44,563
Arunachal Pradesh	15,819	17,988	17,044	18,679	29,114	29,237	30,056	32,949	35,057	39,371	41,601	42,227
Nagaland	17,062	17,855	18,386	19,270	32,788	35,560	37,709	39,814	41,646	42,762	43,764	44,757
Sikkim	18,127	18,846	20,113	21,387	30,721	33,327	34,836	37,099	42,603	55,446	59,798	NA
All India average	18,054	18,763	19,236	20,544	27,056	29,159	31,469	34,070	35,787	38,258	40,689	42,965

Percentage of sectoral share in GDP at constant prices (2004–2005)

Arunachal Pradesh

	2004–2005	2007–2008	2011–2012
Agr and allied	35.109	34.8053	28.7501
Industry	31.9064	31.2336	36.0928
Services	32.9846	33.9612	35.1571

Manipur

	2004–2005	2007–2008	2011–2012
Agr and allied	24.7448	23.6348	24.7606
Industry	36.6629	36.0987	32.2821
Services	38.5923	40.2665	42.9573

Tripura

Assam

	2004–2005	2007–2008	2011–2012
Agr and allied	25.5735	24.2308	22.4203
Industry	27.5388	23.5675	21.8776
Services	46.8877	52.2017	55.7021

Meghalaya

	2004–2005	2007–2008	2011–2012
Agr and allied	23.2505	20.1521	16.2279
Industry	26.1411	28.8885	32.1037
Services	50.6083	50.9594	51.6684

Nagaland

Table A.3 (continued)

Per capita income	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010	2010–2011	2011–2012
		2004–2005	2007–2008	2011–2012				2004–2005	2007–2008	2011–2012		
Agr and allied		25.0647	26.5518	21.1484		Agr and allied		34.7521	28.3939	27.0487		
Industry		24.247	24.5369	26.8567		Industry		12.8844	14.9342	17.9084		
Services		50.6883	48.9113	51.9949		Services		52.3635	56.6719	55.0429		
Mizoram[a]		2004–2005	2007–2008	2010–2011		*Sikkim*[a]		2004–2005	2007–2008	2010–2011		
Agr and allied		23.4995	21.9584	20.1606		Agr and allied		18.5944	16.079	11.1771		
Industry		16.6031	19.5812	20.1004		Industry		28.8355	30.2829	38.983		
z		59.8974	58.4603	59.739		Services		52.5701	53.6382	49.8399		

Agr agriculture

[a] Data for Mizoram and Sikkim are up to 2010–2011

Table A.4 Coefficient of variation of per capita income. (Source: Computed by author using data from EPW research foundation and Directorate of Economics and Statistics, Assam)

Years	CV of all states	CV of Northeast states	CV of states excluding Northeast states
	At constant price of 2004–2005	At constant price of 2004–2005	At constant price of 2004–2005
2000–2001	39.81	11.66	47.42
2001–2002	38.71	12.45	46.32
2002–2003	40.09	14.36	47.93
2003–2004	39.3	13.18	46.34
2004–2005	47.92	17.59	55.35
2005–2006	48.33	19.18	55.52
2006–2007	48.58	20.38	55.16
2007–2008	46.96	21.05	53.61
2008–2009	46.53	22.44	54.47
2009–2010	47.08	27.28	55.37
2010–2011	46.65	27.87	55.03
2011–2012	50.42	23.25	58.51

CV coefficient of variation

Table A.5 Percentage of population below poverty line by states, 61ˢᵗ NSSO round, 2004–2005 (Planning Commission). (Source: Planning Commission and NSSO Data, 61ˢᵗ round)

States/U.T.s	Mixed reference period		
	Rural	Urban	Combined
Andhra Pradesh	7.5	20.7	11.1
Arunachal Pradesh	17.0	2.4	13.4
Assam	17.0	2.4	15.0
Bihar	32.9	28.9	32.5
Chhattisgarh	31.2	34.7	32.0
Goa	1.9	20.9	12.0
Gujarat	13.9	10.1	12.5
Haryana	9.2	11.3	9.9
Himachal Pradesh	7.2	2.6	6.7
Karnataka	12.0	27.2	17.4
Kerala	9.6	16.4	11.4
Madhya Pradesh	29.8	39.3	32.4
Maharashtra	22.2	29.0	25.2
Manipur	17.0	2.4	13.2
Meghalaya	17.0	2.4	14.1
Mizoram	17.0	2.4	9.5
Nagaland	17.0	2.4	14.5
Orissa	39.8	40.3	39.9
Punjab	5.9	3.8	5.2
Rajasthan	14.3	28.1	17.5
Sikkim	17.0	2.4	15.2
Tamil Nadu	16.9	18.8	17.8
Tripura	17.0	2.4	14.4
Uttar Pradesh	25.3	26.3	25.5
West Bengal	24.1	11.2	20.6
Delhi	0.1	10.8	10.2
Puducherry	16.9	18.8	18.2
All India	*21.8*	*21.74*	*21.8*

UTs union territories

Table A.6 Percentage of population below poverty line by states, 61st NSSO round, 2004–2005 (Tendulkar Method). (Source: 61st NSSO round)

States/U.T.s	Tendulkar methodology (2009-2010)			Tendulkar methodology (2004-2005)		
	% age of persons Rural	% age of persons Urban	% age of personsTo-tal	% age of personsRu-ral	% age of personsUr-ban	% age of personsTo-tal
Andhra Pradesh	22.8	17.7	21.1	32.3	23.4	29.6
Arunachal Pradesh	26.2	24.9	25.9	33.6	23.5	31.4
Assam	39.9	26.1	37.9	36.4	21.8	34.4
Bihar	55.3	39.4	53.5	55.7	43.7	54.4
Delhi	7.7	14.4	14.2	15.6	12.9	13.0
Gujarat	26.7	17.9	23.0	39.1	20.1	31.6
Haryana	18.6	23.0	20.1	24.8	22.4	24.1
Jharkhand	41.6	31.1	39.1	51.6	23.8	45.3
Karnataka	26.1	19.6	23.6	37.5	25.9	33.3
Kerala	12.0	12.1	12.0	20.2	18.4	19.6
Madhya Pradesh	42.0	22.9	39.1	53.6	35.1	48.6
Maharashtra	29.5	18.3	24.5	47.9	25.6	38.2
Manipur	47.4	46.4	47.1	39.3	34.5	37.9
Meghalaya	15.3	24.1	17.1	14.0	24.7	16.1
Mizoram	31.1	11.5	21.1	23.0	7.9	15.4
Nagaland	19.3	25.0	20.9	10.0	4.3	8.8
Orissa	39.2	25.9	37.0	60.8	37.6	57.2
Punjab	14.6	18.1	15.9	22.1	18.7	20.9
Rajasthan	26.4	19.9	25.8	35.8	29.7	34.4
Sikkim	15.5	5.0	13.1	31.8	25.9	30.9
Tamil Nadu	21.2	12.8	17.1	37.5	19.7	29.4
Tripura	19.8	10.0	17.4	44.5	22.5	40.0
Uttar Pradesh	39.4	31.7	37.7	42.7	34.1	40.9
West Bengal	28.8	22.0	26.7	38.2	24.4	34.2
All India	*33.8*	*20.9*	*29.8*	*42.0*	*25.5*	*37.2*

Population as on 1 March 2010 has been used for estimating number of persons below poverty line (interpolated between 2001 and 2011 population)

UTs union territories

Table A.7 Gini coefficient for monthly per capita consumer expenditure (MPCE)—rural state, up to 2004–2005. (Source: NSSO)

	1972–1973	1977–1978	1983	1987–1988	1993–1994	1999–2000	2004–2005	Col. (8) –col. (2)
−1	−2	−3	−4	−5	−6	−7	−8	−9
Andhra Pradesh	0.273	0.298	0.294	0.301	0.284	0.233	0.288	0.015
Assam	0.18	0.179	0.192	0.222	0.176	0.2	0.197	0.017
Bihar	0.288	0.259	0.256	0.264	0.223	0.206	0.208	−0.08
Gujarat	0.302	0.285	0.257	0.233	0.236	0.234	0.268	−0.034
Haryana	0.277	0.288	0.272	0.281	0.301	0.238	0.323	0.046
Karnataka	0.273	0.321	0.303	0.292	0.265	0.241	0.264	−0.009
Kerala	0.31	0.353	0.33	0.323	0.287	0.27	0.341	0.031
Madhya Pradesh	0.306	0.331	0.295	0.29	0.277	0.243	0.269	−0.037
Maharashtra	0.31	0.462	0.285	0.331	0.303	0.258	0.31	0
Odisha	0.312	0.301	0.267	0.267	0.243	0.244	0.282	−0.03
Punjab	0.307	0.303	0.279	0.295	0.265	0.239	0.278	−0.029
Rajasthan	0.316	0.464	0.343	0.303	0.26	0.208	0.248	−0.068
Tamil Nadu	0.272	0.319	0.325	0.323	0.306	0.279	0.315	0.043
Uttar Pradesh	0.277	0.299	0.29	0.279	0.278	0.245	0.287	0.01
West Bengal	0.305	0.292	0.286	0.252	0.252	0.225	0.273	−0.032
All India	0.302	0.337	0.298	0.291	0.281	0.26	0.297	−0.005

Table A.8 Gini coefficient for monthly per capita consumer expenditure (MPCE)—urban state, up to 2004–2005. (Source: NSSO)

	1972–1973	1977–1978	1983	1987–1988	1993–1994	1999–2000	2004–2005	Col. (8) –col. (2)
−1	−2	−3	−4	−5	−6	−7	−8	−9
Andhra Pradesh	0.297	0.319	0.327	0.361	0.32	0.313	0.37	0.073
Assam	0.267	0.324	0.276	0.337	0.287	0.31	0.314	0.047
Bihar	0.323	0.304	0.301	0.297	0.306	0.323	0.33	0.007
Gujarat	0.242	0.308	0.264	0.285	0.287	0.287	0.304	0.062
Haryana	0.315	0.317	0.313	0.297	0.28	0.287	0.361	0.046
Karnataka	0.323	0.342	0.334	0.334	0.315	0.323	0.365	0.042
Kerala	0.39	0.395	0.374	0.387	0.337	0.321	0.4	0.01
Madhya Pradesh	0.348	0.377	0.306	0.331	0.327	0.315	0.393	0.045
Maharashtra	0.367	0.362	0.337	0.352	0.352	0.348	0.371	0.004
Odisha	0.347	0.323	0.296	0.324	0.304	0.292	0.348	0.001
Punjab	0.313	0.38	0.319	0.278	0.276	0.29	0.393	0.08
Rajasthan	0.333	0.301	0.304	0.346	0.29	0.28	0.367	0.034
Tamil Nadu	0.315	0.333	0.348	0.348	0.344	0.381	0.358	0.043
Uttar Pradesh	0.312	0.327	0.319	0.329	0.322	0.329	0.37	0.058
West Bengal	0.338	0.317	0.327	0.353	0.333	0.342	0.376	0.038
All India	0.341	0.345	0.33	0.352	0.34	0.343	0.373	0.032

Table A.9 Gini coefficient and Atkinson's measure of inequality for selected states, 2009–2010. (Source: Author's calculation using NSSO data)

66th Round	MPC30							
	Gini		Atkinson					
			Rural			Urban		
	Rural	Urban	A(0.5)	A(1)	A(2)	A(0.5)	A(1)	A(2)
Karnataka	0.23996	0.34124	0.04852	0.0903	0.16122	0.09366	0.17415	0.30496
Maharashtra	0.27581	0.42308	0.06813	0.12005	0.20084	0.15272	0.25674	0.39452
Punjab	0.29708	0.38204	0.0776	0.13514	0.22129	0.12033	0.2108	0.33667
Haryana	0.30985	0.36799	0.08189	0.14709	0.24927	0.10801	0.19538	0.32274
West Bengal	0.24511	0.39302	0.05484	0.09737	0.16578	0.12462	0.22136	0.35772
All India	0.2995	0.39348	0.08221	0.14085	0.23194	0.13483	0.22729	0.35802

Table A.10 Number of households surveyed in each state (sample households), estimated number of households and proportion of household surveyed, NSSO, 2009–2010. (Source: Computed by author using NSSO data)

		Rural	
State	Sample households	Estimated households	Sample/Total household (%)
Arunachal Pradesh	1072	178,300	0.60
Assam	2608	5,059,200	0.05
Manipur	1376	332,400	0.41
Meghalaya	856	413,800	0.21
Mizoram	640	108,100	0.59
Nagaland	672	144,800	0.46
Tripura	608	103,800	0.59
Sikkim	1312	720,400	0.18
India	*59,695*	*172,128,500*	*0.03*
		Urban	
Arunachal Pradesh	608	48,500	1.25
Assam	832	78,700	1.06
Manipur	1184	128,900	0.92
Meghalaya	403	111,400	0.36
Mizoram	896	92,100	0.97
Nagaland	352	86,600	0.41
Tripura	544	154,800	0.35
Sikkim	160	31,500	0.51
India	*41967*	*78,229,700*	*0.05*

Compared to national level, proportionately more number of households are surveyed in north-eastern states

Table A.11 Coefficient of variation in per capita income in districts of Assam yearly wise at constant price (1999–2000). (Source: Computed by authors using district income data collected from Directorate of Economics and Statistics, Guwahati, Assam)

Years	Co. var
1999–2000	42.79446
2000–2001	48.93973
2001–2002	48.53535
2002–2003	42.8822
2003–2004	42.82802
2004–2005	33.53327
2005–2006	32.7607
2006–2007	33.46907
2007–2008	34.05489

Co.var coefficient of variation

Table A.12 Gini coefficient district wise for Assam, rural and urban. (Source: Computed by authors using NSSO data)

Districts of Assam	61st RoundRural	66th RoundRural	61st RoundUrban	66th RoundUrban
	2004–2005	2009–2010	2004–2005	2009–2010
North Cachar Hills	0.097	0.118	0.189	0.222
Darrang	0.100	0.189	0.166	0.253
Hailakandi	0.119	0.128	0.218	0.243
Lakhimpur	0.121	0.228	0.205	0.235
KarbiAnglong	0.125	0.163	0.210	0.220
Dhemaji	0.142	0.193	0.274	0.245
Sonitpur	0.150	0.153	0.308	0.206
Nalbari	0.157	0.158	0.260	0.306
Karimganj	0.160	0.125	0.275	0.188
Bongaigaon	0.179	0.183	0.227	0.236
Cachar	0.190	0.137	0.226	0.210
Dhubri	0.192	0.172	0.201	0.284
Dibrugarh	0.195	0.452	0.449	0.310
Goalpara	0.195	0.187	0.243	0.251
Marigaon	0.204	0.090	0.160	0.137
Tinsukia	0.208	0.197	0.257	0.226
Kamrup	0.208	0.241	0.273	0.348
Nagaon	0.211	0.198	0.224	0.261
Barpeta	0.213	0.184	0.182	0.222
Golaghat	0.219	0.287	0.266	0.305
Kokrajhar	0.222	0.166	0.244	0.248
Jorhat	0.247	0.243	0.311	0.338
Sibsagar	0.264	0.206	0.238	0.224

Table A.13 Atkinson's measure of inequality for districts of Assam, urban. (Source: Computed by authors using NSSO data)

Districts of Assam	61st Round Rural			66th Round Rural			61st Round Urban			66th Round Urban		
	A(0.5)	A (1)	A (2)	A(0.5)	A (1)	A (2)	A(0.5)	A (1)	A (2)	A(0.5)	A (1)	A (2)
Lakhimpur	0.012	0.024	0.045	0.041	0.081	0.157	0.035	0.070	0.138	0.044	0.082	0.146
Dhemaji	0.016	0.031	0.058	0.030	0.059	0.111	0.074	0.126	0.190	0.050	0.095	0.172
Tinsukia	0.036	0.069	0.129	0.030	0.059	0.113	0.054	0.107	0.206	0.044	0.089	0.180
Dibrugarh	0.031	0.060	0.117	0.195	0.302	0.402	0.195	0.299	0.414	0.076	0.142	0.247
Sibsagar	0.056	0.106	0.190	0.033	0.066	0.127	0.052	0.108	0.236	0.042	0.085	0.173
Jorhat	0.047	0.090	0.163	0.048	0.091	0.162	0.078	0.155	0.292	0.101	0.177	0.289
Golaghat	0.040	0.076	0.138	0.064	0.122	0.218	0.058	0.113	0.216	0.082	0.148	0.250
Cachar	0.030	0.056	0.100	0.015	0.029	0.056	0.040	0.077	0.139	0.035	0.070	0.138
Karimganj	0.021	0.040	0.075	0.013	0.025	0.047	0.064	0.118	0.209	0.029	0.058	0.117
Hailakandi	0.013	0.024	0.044	0.014	0.027	0.053	0.041	0.075	0.130	0.048	0.098	0.197
Kokrajhar	0.043	0.080	0.142	0.023	0.044	0.082	0.047	0.091	0.170	0.051	0.096	0.172
Dhubri	0.030	0.058	0.109	0.024	0.047	0.090	0.033	0.063	0.118	0.066	0.121	0.203
Goalpara	0.030	0.057	0.108	0.029	0.055	0.101	0.047	0.092	0.173	0.050	0.096	0.172
Bongaigaon	0.027	0.055	0.116	0.029	0.054	0.096	0.041	0.077	0.139	0.046	0.093	0.192
Barpeta	0.036	0.069	0.125	0.028	0.054	0.100	0.031	0.058	0.102	0.041	0.077	0.140
Kamrup	0.037	0.071	0.135	0.045	0.089	0.170	0.061	0.121	0.239	0.096	0.187	0.336
Nalbari	0.021	0.042	0.082	0.020	0.039	0.074	0.057	0.106	0.186	0.077	0.155	0.304
Darrang	0.009	0.017	0.033	0.029	0.055	0.099	0.023	0.047	0.098	0.053	0.102	0.188
Marigaon	0.033	0.064	0.119	0.008	0.016	0.030	0.021	0.042	0.086	0.017	0.032	0.060
Nagaon	0.036	0.070	0.133	0.032	0.062	0.116	0.042	0.082	0.155	0.055	0.103	0.183

Table A.13 (continued)

Districts of Assam	61st Round			66th Round			61st Round			66th Round		
	Rural			Rural			Urban			Urban		
	A(0.5)	A(1)	A(2)	A(0.5)	A(1)	A(2)	A(0.5)	A(1)	A(2)	A(0.5)	A(1)	A(2)
Sonitpur	0.020	0.038	0.068	0.020	0.038	0.071	0.080	0.143	0.227	0.036	0.070	0.132
KarbiAnglong	0.015	0.028	0.050	0.022	0.042	0.075	0.034	0.067	0.124	0.040	0.078	0.149
North Cachar Hills	0.008	0.016	0.029	0.011	0.022	0.041	0.028	0.055	0.100	0.038	0.076	0.148
Chirang				0.020	0.038	0.067				0.052	0.099	0.181
Baksa				0.030	0.059	0.107						
Guwahati				0.086	0.154	0.248				0.057	0.117	0.249
Udalguri				0.026	0.049	0.093				0.055	0.104	0.186

6.11.2   *Appendix A.2*

Measures of Income Inequality
The uniform recall period refers to the consumption expenditure data collected using the 30-day recall or reference period. To measure inequality, we consider commonly used URP-based estimation as data collected for 30-day recall period are considered more authentic due to higher response from the respondents. URP has been used for the relevant periods.

Atkinson's Inequality Measures
The Atkinson inequality measure is considered a useful indicator of inequality as it can capture which end of the distribution contributed most to the observed inequality. Atkinson's measure depends on a parameter generally known as 'income aversion parameter', denoted often by ε.

In case $\varepsilon = 0$ (no aversion to inequality), it is assumed that no social utility is gained by complete redistribution and the Atkinson index (A_ε) is zero. On the other extreme if $\varepsilon = \infty$ (infinite aversion to inequality), it is assumed that infinite social utility is gained by complete redistribution in which case $A_\varepsilon = 1$. Thus, it is clear that Atkinson index (A_ε) lies between 0 and 1 and is a measure of the amount of social utility to be gained by complete redistribution of a given income distribution.

Thus, it can be inferred that relatively smaller values of A_ε point toward a more equal distribution than higher values, given a particular degree of inequality aversion.

The Atkinson index is defined as (www.wikipedia.org):

$$A_\varepsilon \left(y_1, \ldots, y_N \right) = \begin{cases} 1 - \frac{1}{\mu}\left(\frac{1}{N}\sum_{i=1}^{N} y_i^{1-\varepsilon}\right)^{1/(1-\varepsilon)} & \text{for } 0 \leq \varepsilon \neq 1 \\ 1 - \frac{1}{\mu}\left(\prod_{i=1}^{N} y_i\right)^{1/N} & \text{for } \varepsilon = 1, \end{cases}$$

where y_i is individual income ($i = 1, 2, \ldots, N$) and μ is the mean income.

Atkinson index has certain nice properties such as it is symmetric in its arguments and lies between 0 and 1. In particular, the index is equal to 0, if all incomes are of same value. Moreover, if the population is replicated (doubled or tripled), the index value remains the same. It is important to note that the index confirms to the principle of transfers. More precisely, if a transfer $\delta > 0$ is made from an individual with income y_i to another one with income y_j such that, $y_i - \delta > y_j + \delta$, then the inequality index cannot increase. The major advantage of Atkinson index is that it is subgroup decomposable. The class of the subgroup decomposable inequality indices is limited in number. For example, widely used Gini index does not satisfy this property.

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