Changes in Levels of Living in North-East India

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Abstract

India has experienced a lot of changes in different spheres ranging from production and employment to growth and welfare during the period of last one and half decades. Being a federal country, India has experienced a wide degree of disparity among its constituent states as evidenced from different studies. Most of the studies have concentrated on the conditions of major Indian states in the chosen fields of interest. On the other hand, this study has concentrated on the eight north-east Indian states namely, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim, which are not at all major in terms of population and production, employment and trade. Levels of living of the people in these states are examined during 2000-2012 in the context of demographic changes and economic growth. Specifically, the impact of demographic changes and growth divergence on the levels of living is examined.

Key words: *Levels of living, demographic changes, growth convergence.*
JEL Classification: *I31*

1. Introduction

In the federal structure, India's overall development is monitored at the central level. Total development funds are allocated among different states according to priorities and needs of the states.

Rural development schemes are undertaken by the states as formulated centrally by the Government of India towards development of infrastructure and generation of employment and income. But implementation of these schemes does not occur equally in the states. States vary in the speed as well as in the extent of implementation of the schemes, particularly infrastructure development and employment generation. Such differences create differences in the per capita income, particularly rural per capita income across the states. Per capita income determines per capita expenditure on consumption which is indicative of levels of living of the people (Varian 1992).Per capita consumption consists of different food and non-food items. The composition of the consumption basket differs from household to household in a state and from state to state in a country. Changes in per capita income are manifest in changes in the composition of the consumption basket and hence in the living pattern (welfare) of the people.

Per capita income and hence per capita consumption expenditure vary across the states in India .So also the living pattern. The specific objectives of the paper are:

a) To examine the extent and the nature of variation in per capita consumption expenditure and hence level of living across states in India during 2000-2012with special reference to rural urban differentials.
b) To examine the effects of changes in the household– size on per capita consumption.
c) To examine the nature of inter-state divergence in the growth of consumption expenditure.

Except few (**Pal and Chakraborty, 2010**), the existing studies discuss some of the above issues mainly in respect of the major states of India and ignore the issues in respect of minor states ***(Meenakshi and Ray 1999,*** **Chakraborty, Pal and Sen 2004).** Our purpose is to consider the issues in the minor states of India in the north-east region. The states are Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim. These are minor states in terms state domestic product, population and size .The combined share of these states in country's net domestic product is only 3% in 2011-12. Assam (1.87%) is ranked first among these states followed by Tripura (0.31%). The table containing the percentages of Net State Domestic Product data is provided in the annexure (Table A1).
The study has been undertaken for the period of 1999-2000 to 2011-12. 55th (for 1999-2000 data), 61st (for 2004-05 data) and 68th (for 2011-12 data) rounds of NSSO data on monthly per capita household consumption expenditure (MPCE) have been used. MPCE data are deflated at 1999-2000 prices. In **section 2** per capita consumption divergences have been examined across the north-eastern states. The demographic changes with respect to family size have been explained in **section 3**. Engel functions for food and non-food items have been estimated in **section 4**. The change in per capita consumption expenditure has been separated into changes in household size and total expenditure using a decomposition model formulated in a comparative static framework. in **section 5. Section 6** examines the proposition of MPCE growth divergence among the north-eastern states. Finally, in **section 7** findings have been summarized.

2. Per Capita Consumption

Monthly Per Capita Consumption Expenditure (MPCE) serves as a proxy for income to measure wellbeing of the people. It differs **across the states and across different income groups in a state. At the household level the composition of the consumption basket differs among income groups in a state and also across states (Chakrabarty and Pal 2008). It also changes over time.**

2.1 Divergence Across States

It is observed (Table 1) that ***except in 1999-2000 Nagaland occupied the top position in respect of MPCE in rural as well as urban areas***. Tripura slipped to the last position in rural areas in 2011-12, and ***in urban areas the last position is all through occupied by Manipur. In all the states under consideration MPCE and hence level of living have increased during the period*** **irrespective of the regions**. Judged by the level of MPCE

Nagaland people are in a position to have better level of living while the people of Manipur lag behind among the states under comparison.

The Coefficient of Variation (CV) of MPCE across states has declined from 34.87% in 1999-2000 to 26.02% in 2004-05 and to 23.54% in 2011-12 in case of rural areas. But in case of urban areas, CV has increased from 14.85% in 1999-2000 to 18.81% in 2004-05 and then to 21.34% in 2011-12 .***While in case of rural areas disparity in MPCE among the north-east states has been declining,, in case of urban areas it has been increasing as in the major Indian states (*****Chakraborty, Pal and Sen 2004).**

Table 1: MPCE of Different North East States (Rs)

Year/States	1999-2000		2004-05		2011-12	
	Rural	Urban	Rural	Urban	Rural	Urban
Arunachal Pradesh	316.85 (6)	494.12 (5)	446.90 (3)	525.97 (7)	412.58 (3)	471.18 (7)
Assam	258.11 (8)	458.57 (7)	293.88 (8)	561.46 (6)	290.47 (7)	565.77 (5)
Manipur	391.17 (1)	319.55 (8)	370.90 (5)	488.12 (8)	328.45 (6)	388.44 (8)
Meghalaya	356.98 (4)	530.55 (2)	388.59 (4)	670.47 (3)	350.43 (5)	636.41 (3)
Mizoram	389.55 (3)	549.51 (1)	497.82 (2)	728.71 (2)	416.23 (2)	641.98 (2)
Nagaland	441.46 (2)	510.01 (4)	649.18 (1)	856.82 (1)	540.54 (1)	801.32 (1)
Sikkim	298.72 (7)	518.44 (3)	366.74 (6)	624.61 (4)	368.20 (4)	591.87 (4)
Tripura	343.93 (5)	489.94 (6)	364.42 (7)	604.55 (5)	260.76 (8)	535.05 (6)
Coefficient of Variation (%)	34.87	14.85	26.02	18.81	23.54	21.34

Figure in the () indicate rank in descending order

Source: NSSO Reports and Author's Calculation

2.2. Divergence Across Expenditure Classes

People in a state have different income levels .They have hence different MPCE. MPCE varies across different expenditure classes (Table 2). The coefficient of variation of MPCE across expenditure classes is indicative of the size-class variation in the level of living. Its high (low) value reflects the high (low) degree of size-class disparity in the level of living. The CV is all through higher in urban areas than in rural areas. It has increased almost everywhere during the period. It thus emerges that the size-class disparity in the level of living has been more in urban areas than in rural areas and it has risen during the period.

Table 2: Coefficient of Variations (%) among different income classes within a state

Year/States	1999-2000		2004-05		2011-12	
	Rural	Urban	Rural	Urban	Rural	Urban
Arunachal Pradesh	67.65 (2)	73.08 (4)	67.08 (2)	62.80 (8)	70.65 (1)	87.97 (3)
Assam	60.17 (5)	76.23 (1)	59.72 (3)	74.37 (3)	64.18 (5)	100.14 (1)
Manipur	62.00 (4)	68.49 (5)	55.17 (5)	114.17 (1)	65.03 (3)	77.93 (6)
Meghalaya	111.79 (1)	75.06 (2)	52.22 (6)	63.59 (6)	56.51 (7)	81.36 (5)
Mizoram	52.21 (7)	58.90 (8)	51.92 (7)	63.58 (6)	58.99 (6)	71.87 (7)
Nagaland	45.77 (8)	60.97 (7)	49.79 (8)	66.11 (7)	54.17 (8)	65.44 (8)
Sikkim	57.01 (6)	65.59 (6)	59.37 (4)	72.75 (2)	67.69 (2)	82.88 (4)
Tripura	62.50 (3)	74.27 (3)	70.25 (1)	70.25 (4)	64.63 (4)	89.58 (2)

Figure in the () indicate rank in descending order

Source: Author's Calculation

3. Demographic Change

Household consumption depends on, among others, household income and household size. In tables 3A to 3C the household size of different income classes in the states has been enlisted. It is observed that **for both rural and urban areas, Sikkim is all through having the smallest household size. Manipur is having the highest household size in both rural and urban areas till 1999, and thereafter Mizoram and Nagaland have enjoyed the prime position.**

Nagaland has exhibited the highest CV (80.1%) in household size among different income classes in 1999-2000 in rural areas. In case of urban areas Mizoram (64.67%) has the highest CV. In 2004-05 also Nagaland is having the highest variation in case of rural areas (62.6%) as well as in urban areas (62.56%). It is also true in 2011-12: in rural and urban Nagaland CV is 89.7% and 62.7% respectively. The lowest variation is observed in case of Assam in rural areas (11.4%) and in Tripura in urban areas (19.05%) in 2011-12. In general, ***the household size is higher in lower income groups in rural areas as well as in urban areas. But in urban areas, the variation among different expenditure classes is higher than in rural areas than in urban areas. In most of the states considered the household size has declined over time.***

Table 3A: Family Size of Different MPCE Classes in 1999-2000

States/ Size Class (Rs.)	Arunachal Pradesh		Assam		Manipur		Meghalaya		Mizoram		Nagaland		Sikkim		Tripura	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Overall	4.59	3.64	5.09	4.30	5.33	5.08	4.44	3.97	5.01	4.60	5.29	4.99	4.11	3.58	4.45	4.32
1	4.85	5.05	6.01	6.39	3.46	8.00	1.60	4.00	0.00	0.00	0.00	0.00	0.00	0.00	5.80	4.84
2	7.18	4.40	5.59	5.87	4.00	5.95	4.51	3.01	0.00	0.00	0.00	0.00	6.44	0.00	5.13	5.43
3	6.10	5.84	5.93	5.49	6.20	6.36	5.51	6.33	7.00	0.00	0.00	9.00	6.04	4.98	5.64	5.34
4	5.07	5.22	5.62	5.57	6.24	5.89	5.49	6.97	6.50	6.03	0.00	7.50	5.13	5.89	4.95	5.09
5	4.54	5.79	5.70	5.47	5.97	5.59	5.27	5.36	4.62	5.47	9.35	7.18	5.65	5.85	4.69	4.64
6	5.81	3.60	5.40	4.85	5.85	5.55	5.52	5.10	5.23	5.44	5.84	5.58	4.76	4.94	4.60	4.49
7	5.01	3.46	4.93	4.96	5.55	4.30	5.01	4.32	5.71	5.27	6.53	6.29	4.73	4.70	5.01	4.57
8	3.82	4.90	5.16	4.64	5.42	3.87	4.80	4.85	5.66	4.97	7.12	6.48	4.31	4.94	4.80	4.84
9	4.79	3.20	4.56	3.47	5.44	3.60	4.90	3.64	5.71	4.74	6.11	4.80	4.13	3.21	4.33	4.61
10	3.71	3.04	4.31	3.27	4.66	2.21	3.96	3.54	5.05	4.04	5.70	3.90	3.63	2.39	4.17	3.70
11	3.85	2.59	3.94	2.57	4.64	2.23	3.26	2.64	4.78	3.20	4.84	2.65	2.96	2.04	4.09	3.11
12	3.32	1.98	3.66	2.95	3.43	4.73	2.37	2.07	3.18	3.44	3.98	2.24	1.74	2.08	3.64	2.92
Coefficient of Variation (%)	23.14	31.4	15.6	27.18	20	35.23	29.9	34.06	51.42	64.67	80.1	63.06	44.7	61.68	13.3	18.17

Source: Author's Calculation

Table 3B: Family Size of Different MPCE Classes in 2004-05

States/ Size Class (Rs.)	Arunachal Pradesh		Assam		Manipur		Meghalaya		Mizoram		Nagaland		Sikkim		Tripura	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Overall	4.93	4.21	5.41	4.03	5.18	5.40	5.05	4.04	5.21	4.83	5.01	4.17	4.62	3.99	4.63	4.15
1	8.29	5.71	7.05	6.68	6.95	0.00	6.00	0.00	0.00	0.00	0.00	0.00	6.09	7.64	4.38	5.77
2	6.19	0.00	6.50	5.43	3.00	8.23	0.00	0.00	0.00	0.00	0.00	0.00	5.92	5.41	5.64	5.13
3	6.93	6.56	6.12	5.30	6.06	5.91	5.95	7.00	5.32	5.99	0.00	8.00	6.50	7.01	5.43	5.31
4	5.89	4.94	6.01	5.28	6.39	6.25	6.30	5.41	7.30	6.50	5.00	3.00	5.94	4.77	5.12	5.01
5	5.96	4.73	5.70	4.74	5.09	5.55	6.09	6.72	5.74	5.14	7.00	5.00	5.40	5.48	4.58	4.70
6	5.72	3.66	5.54	4.05	5.43	5.47	5.77	5.52	6.29	5.61	6.38	7.74	5.99	6.47	5.19	4.32
7	6.19	3.88	5.36	4.28	5.68	4.93	5.94	4.28	6.42	5.18	6.67	5.79	5.12	4.94	4.83	4.25
8	5.76	4.41	4.92	3.59	5.31	5.68	5.59	4.33	6.08	5.42	6.10	5.29	4.76	3.54	5.13	4.36
9	4.77	2.86	4.89	3.71	5.20	5.12	5.06	3.63	5.80	4.88	5.58	4.97	4.75	3.13	4.56	3.91
10	4.49	3.37	4.43	2.87	4.59	4.55	4.53	3.80	5.81	4.18	5.78	4.40	3.52	3.59	4.05	3.37
11	4.71	3.43	3.98	3.21	4.62	4.42	3.53	3.71	4.76	4.06	5.72	3.11	4.09	2.58	3.80	3.27
12	3.29	3.83	3.32	2.77	4.64	3.75	3.33	1.40	3.68	4.17	4.19	2.28	2.37	2.09	3.83	3.00
Coefficient of Variation (%)	22.46	41.27	20.2	27.51	19.4	38.67	37.6	60.94	50.3	49.8	62.6	62.56	24.2	37.58	13.1	19.84

Source: Author's Calculation

Table 3C: Family Size of Different MPCE Classes in 2011-12

States/ Size Class (Rs.)	Arunachal Pradesh		Assam		Manipur		Meghalaya		Mizoram		Nagaland		Sikkim		Tripura	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Overall	4.85	3.78	5.13	3.84	5.07	4.80	4.84	4.30	4.32	4.88	5.38	4.88	4.34	3.40	4.38	3.89
1	7.95	1.41	5.76	6.03	5.00	5.24	0.00	0.00	0.00	0.00	0.00	0.00	2.96	1.00	5.10	4.57
2	6.59	4.45	5.82	4.57	7.00	5.02	0.00	5.23	0.00	6.00	0.00	0.00	8.00	6.32	5.42	4.36
3	5.83	4.19	5.59	4.71	4.75	5.80	5.00	5.29	6.12	5.80	0.00	0.00	6.58	1.98	4.66	4.91
4	6.59	4.40	6.08	4.35	5.30	4.90	7.13	5.99	4.79	5.96	0.00	4.12	6.39	5.54	4.70	4.27
5	6.23	4.31	5.43	5.26	5.74	5.08	5.37	6.34	5.99	6.22	0.00	5.31	5.70	4.88	4.71	4.49
6	5.97	4.73	5.02	4.62	5.42	5.01	5.89	5.11	5.73	5.52	6.07	6.37	5.15	3.64	4.44	4.28
7	5.48	3.70	5.14	4.00	5.72	4.48	5.75	5.81	5.64	5.48	6.83	5.59	4.74	3.97	4.42	4.00
8	5.71	3.04	5.11	4.13	5.36	4.32	5.49	4.51	5.28	4.98	6.40	4.93	4.56	3.61	4.38	3.42
9	5.07	3.70	5.00	3.02	4.92	4.14	5.10	3.94	4.51	4.67	5.96	5.21	4.47	4.16	3.98	3.60
10	4.53	3.27	4.76	3.14	4.54	3.10	4.31	3.87	4.02	4.44	5.75	4.37	3.81	3.37	3.70	3.56
11	4.17	2.95	4.33	3.17	4.22	3.02	3.61	3.16	3.67	4.08	5.09	4.91	3.91	1.91	3.64	2.92
12	3.61	2.03	4.13	1.84	3.97	6.79	2.70	1.51	2.96	3.08	4.73	4.01	2.80	1.00	2.89	2.37
Coefficient of Variation (%)	21.03	29.13	11.4	27.77	15.6	22.14	53.9	44.9	52.42	37.14	89.7	62.7	31.2	49.48	16	19.05

Source: Author's Calculation

Note: It may be noted that the expenditure class varies between rural and urban areas. Expenditure class also changes over the period of time Expenditure classes are described in Table A2.

4. Engel Functions: Engel Elasticities

Engel functions have been estimated with the household size and MPCE as explanatory variables for food and nonfood groups for three years (1999-2000, 2004-05, and 2011-12) in rural and urban areas separately. **Here our main objectives are (a) to estimate the expenditure-elasticities of food and non-food consumption so as to examine the changing importance of the items in consumption and (b) to estimate the effects of household size on consumption so as to examine how the economization effects (size-effects) of household-size on consumption vary depending upon the nature of the goods in consumption.**

There are numerous studies, both national and international, on the effects of household- size on consumption. To mention a few Tobin (1950), Houthakker (1957), David (1962), Iyengar, Jain & Srinivasan (1968), Iyengar (1968), Nelson (1988), Figini (1998), Tasciotti (2007) are cited. They have studied how family- size affects consumption of a household. Most of the studies have taken the headcount number of the family as the size of the household. But in Houthakker's and in Nelson's studies the equivalent scale has been used to determine the family size. The importance of relationships among the household members has been studied by David. Below we demonstrate the model to be used in estimating the effects of MPCE and household size on consumption.

Model for Estimation:

Suppose that X_i^h is the expenditure on item i by household h, X^h is the total expenditure of household h, and N^h is the total number of family members of household h.

Then the specific expenditure function is

$$X_i^h = f(X^h, N^h) \qquad \text{---------- (1)}$$

In estimation we may take the logarithmic form or any other form depending upon the purpose and theoretical necessity. We take here the logarithmic form:

$$\ln X^h{}_i = \beta_0 + \beta_1 \ln X^h + \beta_2 \ln N^h + u^h \qquad \text{---------- (2)}$$

By OLS we estimate $\hat{\beta}_0$, $\hat{\beta}_1$ & $\hat{\beta}_2$

The problem of this estimation is that ln X^h and ln N^h are directly related. Multicollinearity problem appears in the estimation. Precision of estimates is reduced; it is no doubt a serious problem. However, if one can tolerate such problem, one can get the effects of total expenditure and family size on specific expenditure. It is possible to overcome the problem to some extent if we assume that the specific expenditure function is one degree homogeneous in X^h and N^h.

Using this relation we get,

$$f\left(\frac{X^h}{N^h}, \frac{N^h}{N^h}\right) = \frac{1}{N^h} f(X^h, N^h) = \frac{X_i^h}{N^h} = x_i^h$$

Hence $x_i^h = \varphi(x^h, 1) = \varphi(x^h)$ --------- (3)

As before we take the logarithmic form:

$$\ln x_i^h = \alpha_0 + \alpha_1 \ln x^h + u^h \qquad \text{---------- (4)}$$

which is the specific expenditure function in terms of per capita variables, in contrast to the earlier one where total variables are used. This form does not contain *explicitly* the family size variable (N^h). But N^h is implicitly used in per capita terms. OLS estimates are

$\hat{\alpha}_0, \quad \hat{\alpha}_1$

Here multicollinearity is avoided, but the family size effect on specific expenditure is not explicitly determined.

However, we can proceed further. We go back to the original functional form

$$\ln X^h{}_i = \beta_0 + \beta_1 \ln X^h + \beta_2 \ln N^h + u^h$$
$$\Rightarrow \ln X^h{}_i = \beta_0 + \beta_1 \ln X^h + \beta_1 \ln N^h - \beta_1 \ln N^h - \ln N^h + \ln N^h + \beta_2 \ln N^h + u^h$$
$$\Rightarrow \ln X^h{}_i - \ln N^h = \beta_0 + \beta_1 \ln X^h - \beta_1 \ln N^h + (\beta_1 + \beta_2 - 1) \ln N^h + u^h$$
$$\Rightarrow \ln(\frac{X_i^h}{N^h}) = \beta_0 + \beta_1 \ln(\frac{X^h}{N^h}) + (\beta_1 + \beta_2 - 1) \ln N^h + u^h \text{ ---------- (5)}$$

This contains family size variable explicitly and other variables in per capita terms.

Comparing (5) with (4), we observe that (5) gives more information than (4). Here, effect of family size together with the effect of total per capita expenditure is estimated and multicollinearity problem seems to have been minimised. Furthermore, when $\beta_1 + \beta_2 - 1 = 0$ the form reduces to (4), which is one degree homogeneous. Thus, one can test the hypothesis, against the alternative hypothesis in the form (5) and calculate whether the original form is one degree homogeneous.

$$H_0 : \beta_1 + \beta_2 - 1 = 0$$

$$H_1 : \beta_1 + \beta_2 - 1 \neq 0$$

So, to infer whether the household size affects consumption or not we must test the hypothesis $H_0 : \beta_1 + \beta_2 - 1 = 0$ against the hypothesis $H_1 : \beta_1 + \beta_2 - 1 \neq 0$. If H_0 is true we can infer that the household size does not have any effect on the consumption of the i-th item, otherwise the household size affects positively or negatively the consumption of the i-th item, depending on the sign of $(\beta_1 + \beta_2 - 1)$, whether it is positive or negative.

In tables 4A to 4C, the estimate of Engel function has been provided. As the log-log form has been considered, the coefficients are Engel elasticities: expenditure elasticities and household-size elasticities. If the coefficients are significant in 5% level of significance, they are marked by asterisks in the table.

Taking food and non-food items together in comparison, we can say that the demarcation line between the necessary items and the luxury items shifts over time towards the latter if elasticities (expenditure) of the non-food items decrease and come down below unity. This means that although to start with a low level of income only food items of low value remain necessary items, over time as income increases, many food items of high value and some luxury items become necessary items and still at a later stage many of the nonfood items

enter into the basket of necessary goods. The living standard improves. This phenomenon is called Engel's Law.

Our estimates (Tables 4A to 4C) reveal that only in few states the expenditure- elasticity of the nonfood items has come down below unity, i.e., non-food items have turned out as necessary items during the period. In case of Assam in rural areas, non-food expenditure-elasticity has come down from 1.070 in 1999-2000 to 0.115 in 2004-05, although it has again increased above unity (1.384) in 2011-12. For Manipur in rural areas, it was 0.998 in 1999-2000, but it has then increased to 1.253 in 2011-12. Only in case of Sikkim, it has consistently declined from 1.606 in 1999-2000 to 1.251 in 2004-05 and then to 0.987 in 2011-12 in urban areas. So, it can be inferred that ***in case of north-east states, there are few states where the levels of living as judged by declining non-food expenditure-elasticity have improved during 2000 - 2012.***

Economization in consumption (household size effect being negative) is significantly observed mostly in nonfood items in the rural regions of Assam, Manipur and Meghalaya in 1999-2000; in Assam, Sikkim and Tripura in 2004-05; in Nagaland and Sikkim in 2011-12. Interestingly all the states under consideration have exhibited the negative size-effect indicating the presence of economization in non-food consumption (though not all statistically significant). **In some states economization in food consumption has also been observed**. These are Sikkim in urban areas in 1999-2000, Arunachal Pradesh in rural areas and Meghalaya in urban areas in 2004-05, Meghalaya and Manipur in urban areas in 2011-12. So, ***economization in consumption due to household size is more pronounced in rural areas than in urban areas and for nonfood items than for food items***

Table 4A: Estimates of Engel functions: 1999-2000

States		Food			Nonfood		
		Coefficient of Total Expenditure	Coefficient of Household Size	R^2	Coefficient of Total Expenditure	Coefficient of Household Size	R^2
Arunachal Pradesh	Rural	0.790 (27.181)	-0.071 (-0.940)	0.996	1.470 (17.060)	0.311 (1.382)	0.987
	Urban	0.833 (9.186)	0.159 (0.879)	0.967	1.344 (8.564)	-0.121 (-0.387)	0.970
Assam	Rural	0.973 (8.720)	0.564 (1.517)	0.987	1.070 (6.627)	-1.107* (-2.058)	0.991
	Urban	0.817 (17.347)	0.101 (0.930)	0.997	1.313 (19.450)	-0.125 (-0.804)	0.998
Manipur	Rural	1.308 (8.803)	1.792 (4.065)	0.912	0.998 (8.842)	-1.663* (-4.967)	0.920
	Urban	0.602 (13.078)	-0.117 (-1.519)	0.984	1.522 (19.298)	-0.045 (-0.345)	0.991
Meghalaya	Rural	0.746 (13.973)	0.611 (5.820)	0.960	1.238 (46.617)	-0.819* (-15.685)	0.997
	Urban	0.772 (32.005)	0.114 (2.457)	0.994	1.394 (23.580)	-0.101 (-0.888)	0.991
Mizoram	Rural	0.732 (16.701)	0.021 (0.216)	0.991	1.571 (17.978)	0.170 (0.897)	0.992
	Urban	0.801 (5.234)	0.108 (0.286)	0.983	1.236 (6.733)	-0.083 (-0.183)	0.991
Nagaland	Rural	0.801 (20.696)	0.050 (0.780)	0.997	1.426 (15.351)	-0.116 (-0.753)	0.995

	Urban	0.745 (11.170)	0.004 (0.053)	0.996	1.529 (7.546)	0.138 (0.555)	0.990
Sikkim	**Rural**	0.883 (15.496)	0.161 (2.059)	0.997	1.491 (10.591)	0.038 (0.195)	0.995
	Urban	0.540 (5.267)	-0.262* (-1.840)	0.981	1.606 (21.755)	0.386 (3.764)	0.997
Tripura	**Rural**	0.843 (8.991)	0.282 (0.697)	0.986	1.336 (10.276)	-0.548 (-0.975)	0.992
	Urban	0.796 (18.249)	0.170 (1.139)	0.994	1.436 (37.909)	0.189 (1.451)	0.999

Source: Author's Calculation

Table 4B: Estimates of Engel functions: 2004-05

States		**Food**			**Nonfood**		
		Coefficient of Total Expenditure	**Coefficient of Household Size**	**R^2**	**Coefficient of Total Expenditure**	**Coefficient of Household Size**	**R^2**
Arunachal Pradesh	**Rural**	0.580 (8.536)	-0.578* (-3.569)	0.993	1.699 (18.390)	1.072 (4.865)	0.995
	Urban	0.817 (13.629)	-0.006 (-0.037)	0.982	1.260 (15.149)	-0.015 (-0.062)	0.985
Assam	**Rural**	1.649 (7.487)	2.087 (3.789)	0.992	0.115 (0.449)	-2.956* (-4.632)	0.996
	Urban	0.633 (7.796)	-0.260 (-1.282)	0.992	1.316 (12.577)	-0.133 (-0.511)	0.996
Manipur	**Rural**	0.627 (24.951)	0.053 (0.890)	0.986	1.781 (24.557)	-0.190 (-1.104)	0.986
	Urban	0.270 (1.083)	-0.962 (-1.023)	0.730	1.366 (7.690)	0.166 (0.248)	0.973
Meghalaya	**Rural**	0.908 (16.745)	0.153 (1.261)	0.993	1.187 (13.567)	-0.168 (-0.857)	0.991
	Urban	0.655 (11.876)	-0.192* (-2.696)	0.993	1.352 (16.539)	0.178 (1.690)	0.994
Mizoram	**Rural**	0.835 (22.626)	0.182 (2.031)	0.993	1.299 (10.981)	-0.325 (-1.132)	0.980
	Urban	0.678 (10.812)	-0.298 (-1.312)	0.992	1.317 (32.812)	0.182 (1.253)	0.999
Nagaland	**Rural**	0.827 (12.012)	0.038 (0.197)	0.974	1.331 (8.429)	-0.060 (-0.136)	0.950
	Urban	0.882 (14.325)	0.051 (0.563)	0.980	1.126 (18.431)	-0.041 (-0.453)	0.989
Sikkim	**Rural**	0.938 (16.681)	0.217 (2.114)	0.993	1.090 (15.718)	-0.249* (-1.963)	0.995
	Urban	0.772 (22.571)	-0.020 (-0.360)	0.997	1.251 (25.720)	0.040 (0.497)	0.998
Tripura	**Rural**	0.900 (39.588)	0.235 (2.612)	0.997	1.183 (26.348)	-0.456* (-2.569)	0.994
	Urban	0.868 (9.859)	0.363 (1.295)	0.996	1.249 (15.078)	-0.345 (-1.310)	0.999

Source: Author's Calculation

Table 4C: Estimates of Engel functions: 2011-12

States		Food			Nonfood		
		Coefficient of Total Expenditure	Coefficient of Household Size	R^2	Coefficient of Total Expenditure	Coefficient of Household Size	R^2
Arunachal Pradesh	Rural	0.716 (8.401)	-0.010 (-0.043)	0.992	1.415 (10.044)	0.096 (0.249)	0.994
	Urban	0.670 (20.605)	-0.105 (-1.551)	0.980	1.475 (37.475)	0.613 (7.455)	0.994
Assam	Rural	0.803 (6.668)	0.319 (0.544)	0.974	1.384 (12.120)	-0.195 (-0.350)	0.993
	Urban	0.788 (7.680)	0.410 (1.588)	0.971	1.345 (29.857)	-0.015 (-0.132)	0.999
Manipur	Rural	0.742 (5.938)	0.442 (0.959)	0.871	1.253 (8.107)	-0.437 (-0.767)	0.948
	Urban	0.415 (12.132)	-0.268* (-2.604)	0.955	1.415 (63.548)	-0.069 (-1.037)	0.998
Meghalaya	Rural	0.764 (24.662)	0.094 (1.664)	0.997	1.388 (70.832)	0.051 (1.435)	1.000
	Urban	0.521 (13.871)	-0.243* (-3.816)	0.994	1.518 (60.851)	0.401 (9.499)	0.999
Mizoram	Rural	0.807 (6.318)	0.261 (0.961)	0.966	1.278 (9.212)	-0.280 (-0.949)	0.990
	Urban	0.856 (12.809)	0.597 (2.874)	0.992	1.223 (15.691)	-0.264 (-1.090)	0.997
Nagaland	Rural	0.784 (9.836)	0.844 (2.899)	0.989	1.131 (7.887)	-2.152* (-4.110)	0.996
	Urban	0.670 (17.148)	0.247 (1.609)	0.983	1.313 (29.572)	-0.249 (-1.425)	0.995
Sikkim	Rural	0.792 (23.472)	0.274 (4.330)	0.987	1.261 (24.195)	-0.500* (-5.115)	0.992
	Urban	1.250 (11.168)	0.641 (4.593)	0.936	0.987 (18.851)	-0.289* (-4.417)	0.979
Tripura	Rural	0.833 (10.769)	0.306 (1.176)	0.993	1.523 (12.721)	0.386 (0.960)	0.995
	Urban	0.726 (12.574)	0.471 (2.286)	0.990	1.480 (17.089)	0.292 (0.946)	0.996

Source: Author's Calculation

5. Decomposition of Change in MPCE into Change in Total Consumption Expenditure and Change in Household Size: Comparative Static analysis

MPCE (x) is monthly total expenditure (X) divided by the number of household members (household-size, N) .The change in MPCE during the period t to t+1 can thus be divided into two parts: change due to family size and change due to total expenditure. This can be estimated using the following decomposition scheme in respect of household h:.

$$\Delta X_t = X_{t+1} - X_t = x_{t+1}N_{t+1} - x_t N_t$$
$$= x_{t+1}N_{t+1} - x_{t+1}N_t + x_{t+1}N_t - x_t N_t$$
$$= x_{t+1}\Delta N_t + N_t \Delta x_t \quad \text{.....(6)}$$

where x=X/N

Also,

$$\Delta X_t = X_{t+1} - X_t = x_{t+1}N_{t+1} - x_t N_t$$
$$= x_{t+1}N_{t+1} - x_{t+1}N_t + x_{t+1}N_t - x_t N_t$$
$$= x_{t+1}N_{t+1} - x_t N_{t+1} + x_t N_{t+1} - x_t N_t$$
$$= x_t \Delta N_t + N_{t+1}\Delta x_t \quad \text{.....(7)}$$

Now by adding (6) and (7) and dividing by 2, we get,

$$\Delta X_t = \frac{1}{2}(N_{t+1} + N_t)\Delta x_t + \frac{1}{2}(x_{t+1} + x_t)\Delta N_t$$

$$\Rightarrow \Delta x_t = \frac{2}{N_t + N_{t+1}}\Delta X_t - \frac{x_t + x_{t+1}}{N_t + N_{t+1}}\Delta N_t \quad \text{---------- (8)}$$

where Δx is the change in MPCE of household h. x_{t+1} and x_t are the MPCE of household h at time t+1 and t respectively. N_t and N_{t+1} total household size of household h at time t and t+1 respectively. Again, ΔN_t is the change in household size of household h and ΔX_t is the change in total consumption of household h. **The first term of (8) indicates the change due to total income or income effect (X) and the second term indicates the change due to family size or family- size effect (N). Change in MPCE (x) is the weighted change in total expenditure net of the weighted change in household-size.**

In table 5, the decomposition of changes in MPCE has been provided during the period 1999-2000 to 2011-12.

In Manipur, Meghalaya and Tripura MPCE has declined in rural areas by Rs 62.72, Rs 6.55 and Rs 83.17 respectively. In urban areas, only in case of Arunachal Pradesh MPCE has declined by Rs. 22.94. Otherwise in case of Nagaland it has increased by Rs 99.08 in rural areas and by Rs 291.31 in urban areas. This was the maximum increase across all north east states.

For Manipur in rural areas, both total expenditure and family-size have declined; but the negative expenditure effect has more than offset the negative family-size effect resulting in the fall in MPCE ***and thus the situation is too vulgar in this case. The same thing is true for the case of Tripura in rural areas.*** MPCE has declined (by Rs.83.17) as total expenditure has declined (by Rs.87.90) more than the family size (Rs.4.73).

In urban areas, the decline in MPCE in Arunachal Pradesh has occurred because of decline in total expenditure i.e., negative expenditure effect (by Rs.5.37) and positive family size effect (by Rs.17.57). For Assam, Manipur, Nagaland, Sikkim, the increase in MPCE in urban areas is due to the negative family size effect and positive expenditure effect. But for Tripura, the rise in MPCE (by Rs.45.11) is due to the negative family size effect (- Rs.53.44) which has more than offset the negative expenditure effect (- Rs 8.33).

6. MPCE Growth Divergence

We have earlier said that the states have been divergent in monthly per capita household consumption. The question in which we are now interested is whether **such inter-state divergence in consumption has been disappearing or exploding over time**. If the previous year's expenditure determines the next year's expenditure, it may have very serious implication for the state-wise expenditure distribution in the economy. This, in effect, means that **inequality in expenditure distribution will increase across states and divergence in MPCE growth will explode over time**.

Table 5: Decomposition of Changes in MPCE into Changes due to Family Size and Total Expenditure (Rs)

State	Change due to Family Size		Change due to Total Income		Change in MPCE	
	Rural	Urban	Rural	Urban	Rural	Urban
Arunachal Pradesh	19.95	17.57	115.69	-5.37	95.73	-22.94
Assam	2.16	-58.23	37.66	55.08	35.5	113.31
Manipur	-25.89	-20.44	-88.61	48.45	-62.72	68.89
Meghalaya	30.88	45.63	24.33	151.50	-6.55	105.86
Mizoram	-60.01	35.59	-33.33	128.06	26.68	92.47
Nagaland	8.06	-14.51	107.14	276.80	99.08	291.31
Sikkim	18.35	-29.91	87.83	43.52	69.48	73.43
Tripura	-4.73	-53.44	-87.90	-8.33	-83.17	45.11

Source: Author's Calculation

To examine whether the consumption-expenditure growth divergence among the states has exploded or disappeared over time, we have estimated the following equation, separately for rural and urban areas (taking state as the unit):

$$\ln\left(\frac{MPCE_t}{MPCE_{t-1}}\right) = a + b \ln MPCE_{t-1} + u \qquad \text{---------- (9)}$$

where $MPCE_t$ is the monthly per capita consumption expenditure of the t-th year, and $MPCE_{t-1}$ is the MPCE of the (t-1) th year and u is the standard error term spherically distributed. If the coefficient b (in Table 6) is significant, we can infer that MPCE of year t-1 determines its value in the t-th year. Again **if the value of b is positive we can conclude that more consumption expenditure in the current year induces more growth in the next year; that means growth divergence happens. If b is negative, then we can say that consumption in the next year declines and growth divergence disappears.**

Here we have considered the years 1999-2000, 2004-05 and 2011-12. MPCE growth rate for each state has been determined using terminal values during 2000-2005, 2005-2012 and 2000-2012. For each period Equation (9) is estimated using the OLS technique.

In Table 6 the coefficients of $MPCE_{t-1}$ are presented. It is observed that only when t=2011-12 and t-1=1999-2000, in rural areas the coefficient of $MPCE_{t-1}$ is negative and significant at the 5% level of significance. At 10% level of significance, for t=2004-05 and t-1=1999-2000, in rural areas the coefficient of $MPCE_{t-1}$, becomes negative and significant. In urban areas the value of the coefficient (b) is negative, though not significant. **This reveals that there is no statistical evidence of consumption growth divergence among the states to explode particularly in the rural areas of the north-east states.**

Table 6: Estimation of Equation: $\ln(\frac{MPCE_t}{MPCE_{t-1}}) = a + b \ln MPCE_{t-1} + u$

Cases	Rural			Urban		
	Coefficient	Constant	R^2	Coefficient	Constant	R^2
t=2011-12 t-1=1999-2000	-0.837 (-2.796)	4.932 (2.781)	0.566	-0.039 (-0.116)	0.410 (0.199)	0.002
t=2011-12 t-1=2004-05	-0.155 (-0.906)	0.807 (0.783)	0.120	0.143 (0.968)	-1.015 (-1.066)	0.135
t=2004-05 t-1=1999-2000	-0.730 (-2.372)	4.422 (2.426)	0.484	-0.296 (-0.914)	2.089 (1.046)	0.122

Source: Author's Calculation

7. Discussion

In case of Manipur, the urban areas has occupied the last position among all north-east states all-through the years. In rural areas, both total expenditure and family-size have declined; but the negative expenditure effect has more than offset the negative family-size effect resulting in the fall in MPCE and thus the situation is too vulgar in this case. Since the MPCE in urban areas is less, it has probably impacted the living in the rural areas as well, since the rural people have not got any alternative livelihood in their urban counterparts.

It is observed, while in case of rural areas disparity in MPCE among the north-east states has been declining, in case of urban areas it has been increasing in those Indian states. As we observe in major Indian states as well, the urban population consists of variety of different kinds of household who may not be having same kind of livelihood. So, their consumption patterns and thus the levels of living differ unlike the case of rural areas. In general, the household size is higher in lower income groups in rural areas as well as in urban areas, but the household size has declined over time in all cases. But in urban areas, the variation among different expenditure classes is higher in rural areas than in urban areas.

In case of north-east states, there are few states where the levels of living as judged by declining non-food expenditure-elasticity have improved during 2000 - 2012. As expected, economization in consumption due to household size is more pronounced in rural areas than in urban areas and for nonfood items than for food items. This is very evident since in rural areas MPCE is lesser and so people tend to share the non-food items, as food items are not sharable.

8. Conclusion

In conclusion we can summarize our findings as follow:

Irrespective of the regions in the north- east states of India the level of living has been improving since 2000. In case of rural areas, inter- state disparity in consumption and hence wellbeing among north-east states has been declining declining, and in case of urban areas, it tends to be increasing.

In case of urban areas the variation of consumption (wellbeing) among different expenditure classes has increased over time, but in rural areas it has declined.

The household size is higher in lower expenditure group than in higher expenditure group in rural areas as well as in urban areas. But variation in household-size among different expenditure classes is higher in urban areas than in rural areas.

The economization effect of household –size on consumption is more pronounced in rural areas than in urban areas and in case of nonfood items than in case of food items. There is no evidence of consumption growth divergence among the north –east states in India to explode during the period of on-going reforms particularly in rural areas.

Minimizing the rural-urban differentials in levels of living is the major challenge. For this, we recommend the following policy measures:

- Selective appropriate rural employment policy should be undertaken so that per capita income (expenditure) is raised and inequality in income (expenditure) distribution is reduced.
- Skill enhancement programmes through education and training may lead to higher income in the rural areas.
- Rural institutions like Panchayets should be more and more involved in the formulation, implementation and monitoring of the programmes.

This study concentrates on the average level of MPCE and household size and its changes and impact on food and non-food consumptions. It does not take into account the actual average social welfare as measured in terms of growth and inequality. So, a state apparently doing well in terms of MPCE may not be that well performer in terms of welfare when the inequality aspect is taken into consideration. So, to this end the present study has a serious limitation and further studies should take this aspect into consideration. Also, the variation in quality of consumption and the impact of the household size on the quality is not considered here. There is an intrinsic relation between MPCE and household size, which actually, in effect, decides the quality of living. This quality of living is also needs to be explored in future studies.

References

Atkinson, A.B (1970): On Measurement of Inequality, Journal of EconomicTheory, Vol 2.

Chakraborty, D; Pal, D. P & Sen, J (2004): "Changing Levels of Living in India in the 1990's"in 'Economic Reforms in India' Ed: Ravishankar Kumar Singh, Abhijit Publications, Delhi.

Chakraborty, D; Pal, D. P (2009): 'Changing Consumption Pattern In India' in Reforms and structural changes in India , Ed. Dr P K Pal, Regal Publications Ltd, New Delhi.

David, M. H (1962): Family Composition and Consumption, North Holland Publishing Company.

Figini, Paolo (1998): "Inequality Measures, Equivalence Scales and Adjustment for Household Size and Composition", Working Paper, Department of Economics, Trinity College.

Gupta, S. P (1996): "Recent Economic Reforms in India and their Impact on the Poor and Vulnerable Sections of Society" in Economic Reforms and Poverty Alleviation in India (Eds: C. H. Hanumanto Rao and Hans Linnemann), Sage Publications.

Houthakker, H. S (1957)" An International Comparison of Household Expenditure Patterns "Econometrica pp159-174.

Iyengar, N. S; Jain L. R and Srinivasan T. N (1968): "Economics of Scale in Household Consumption –A Case Study ", Indian Economic Journal vol.15.

Maity, P (1998): "Studies on Absolute Level of Living and Poverty in India", in Quantitative Economics (Eds: S. Chakravarty, D. Coondoo, R. Mukherjee), Allied Publishers Ltd.

Meenakshi, J. V & Ray, Ranjan (1999):'Regional Differences in India's Food Expenditure) Pattern: A Complete Demand Systems Approach',Journal of International Development ,vol 11.

Meenakshi, J.V and Ray, Ranjan (2000): Impact of Household Size and Family Composition on Poverty in Rural India, Australian Research Council.

Nelson, Julie A (1988): "Household Economies of Scale in Consumption: Theory and Evidence", Econometrica, Vol. 56, No. 6. (Nov., 1988), pp. 1301-1314.

NSSO: Level and Pattern of Consumer Expenditure 1999-2000, 2004-05, 2011-12

Pal, D.P & Sen, J (2002): "Social Sector Reforms and Relative Income Deprivation in India: A Note", Conference Volume, IEA, 2002.

Pal, D.P & Sen, J (2003): "On Dimensions of Poverty: A Cross-Section Study in India with Rural-Urban Disaggregation", Conference Volume, IEA, 2003.

Pal, D.P & Sen J (2003): "Relative Income Deprivation: An analysis of Sub-Group Decomposition" in 'Economic Reforms and Indian Economy: A Development Experience' Ed: Prof. K. Malla Reddy, Deptt. of Economics, Osmania University, India.

Pal, D. P. and Chakraborty D. (2010): "Levels of Living, Demographic Changes and Growth Divergence: A Study in the North-East States of India" in Rural Development in India: Retrospect and Prospects, edited by Komol Singha, Concept Publishing Company Pvt. Ltd., New Delhi.

Sandhu, H. S (1992): Consumer Demand in India, Guru Nanak Dev University, Amritsar.

Sen, A. K (1973): "On Economic Inequality", OUP.

Shorrocks, A. F (1983): "Ranking of Income Distributions" Econometrica, Vol 50, No. 197.

Tasciotti, Luca (2007): "Expenditure pattern in Italy, 1875-1960. A complete quadratic demand system estimation with demographic variables", Working Paper, University of Tor Vergata.

Tobin, James (1950): "A statistical Demand Function of Food in the USA" Journal of the Royal Statistical Society, 113.

Varian, H. (1992): "Micro Economic Analysis", 3rd Edition, W.W Norton and Company, New York.

Annexure

Table A1: Net State Domestic Product Percentages (at factor cost at 2004-05 prices), 2011-12

States	%age
Arunachal Pradesh	0.11
Assam	1.87
Manipur	0.19
Meghalaya	0.20
Mizoram	0.09
Nagaland	0.20
Sikkim	0.05
Tripura	0.31
Total of North East States	3.02
Indian NDP	100.00

Source: Author's Calculation

Table A2: Different Expenditure Classes (MPCE Rs.)

Years	Areas	1	2	3	4	5	6	7	8	9	10	11	12
1999-2000	Rural	<120	120-140	140-165	165-190	190-210	210-235	235-265	265-300	300-355	355-455	455-560	>560
	Urban	<160	160-190	190-230	230-265	265-310	310-355	355-410	410-490	490-605	605-825	825-1055	>1055
2004-05	Rural	<225	225-255	255-300	300-340	340-380	380-420	420-470	470-525	525-615	615-775	775-950	>950
	Urban	<300	300-350	350-425	425-500	500-575	575-665	665-775	775-915	915-1120	1120-1500	1500-1925	>1925
2011-12	Rural	<235	235-270	270-320	320-365	365-410	410-455	455-510	510-580	580-690	690-890	890-1155	>1155
	Urban	<335	335-395	395-485	485-580	580-675	675-790	790-930	930-1100	1100-1380	1380-1880	1880-2540	>2540

Source: NSSO Reports