Chapter 5

Decomposition of growth of output in NER and Manipur

5.1 Introduction

The question pertaining to whether employment growth accompanies economic growth is of utmost priority. Economist like Ahluwalia (2011:105), Papola (2013:2) stated that there is absolute economic growth in India, however the question is whether it has been inclusive by increasing employment growth. Since reforms in 1991, India's employment growth is declining, i.e an inverse relationship of economic growth and employment generation especially in formal sector is witnessed. Papola (2013) argues that the new employment has to be at increasing levels of productivity in order that it is not poverty perpetuating. Employment oriented growth cannot be separated from productivity growth. Economic growth in India has failed to strike a balance between growth of productivity and employment. As growth of labour force persistently exceeded growth of employment, unemployment was accumulating during the first three decades of planning (Papola 2013:2). During the 80s, 5.5% growth of GDP, was accompanied by 2% growth of employment and in the 90s growth of 6%, accompanied by 1.8% growth of employment and in the 2000s with growth of 7.5% the contribution of employment growth was only 1.5%. Thus it shows a growth with low and declining content of employment. The growth during this period is accompanied by moderate productivity growth. Therefore output growth is a composite output and can be decomposed into various components. The output growth overtime is a result of increase in labour force, capital stock, technological progress, managerial aspects and the policy changes. Various studies have been conducted at the international as well as Indian Economy level. Researchers such as Yam et al., (2002), Gereffi and Sturgeon (2004), Perugini and Signorelli (2005), Choi (2007), Rangarajan and Sen (2007), Sen and Kirkpatrick (2009), Garrett and Rhine (2011), etc., have also touched upon different aspects of economic growth and employment in India and elsewhere.

The results are diverse in nature depending on the time period of analysis and the methodology adopted. The present chapter analyses the North Eastern Region and the states of Manipur in detail. The growth of this region and the decomposition of growth is taken up.

North East India the relationship between economic growth and employment generation with the help of Employment Elasticity approach and Shapley's decomposition of growth of output is taken up. These methods not only figure out the relationship between the economic growth and employment scenario, but also the quality of jobs being created across the sectors. Decomposition analysis can distinguish whether the economic growth has been contributing more to productivity per worker of the existing ones or whether it is contributing in employment generation. The traditional approach i.e. Elasticity approach is somewhat limited however the results of both the approaches are presented in the subsequent sections. The next section 5.2 presents the methodology adopted. This is followed by Analysis of the results in section 5.3. Section 5.4 is the summary and conclusion.

5.2 Methodology

During analyzing how employment generation and productivity growth can help determine the effectiveness of growth in reducing poverty, there are few questions to be asked, they are: Firstly, how is the growth being reflected in terms of employment generation and in changes in productivity per worker, secondly, how is growth being reflected in the sectoral patterns of growth and thirdly what are the sources of changes in productivity of a worker. Answers to these questions are sought after whether the pattern of growth observed is employment generating and beneficial to poverty reduction. (World Bank, 2010)

Empirical test of economic growth and employment with the help of two methods is conducted in this chapter. First method is Employment Elasticity approach and the second method is the Job generation and growth decomposition tool (JoGGD) also known as the Shapely's Decomposition Analysis approach.

For the Employment Elasticity Approach the data had been collected from NSS rounds of 50th, 55th, 61st, 66th and 68th and the national population had been taken from 1991, 2001 and 2011 census. The absolute figures of employment are generated with the help of census data by intrapolation method. The NSDP for respective states had been derived from CSO data.

Employment Elasticity is given by:

$$E = \frac{\Delta L/L}{\Delta Y/Y}$$

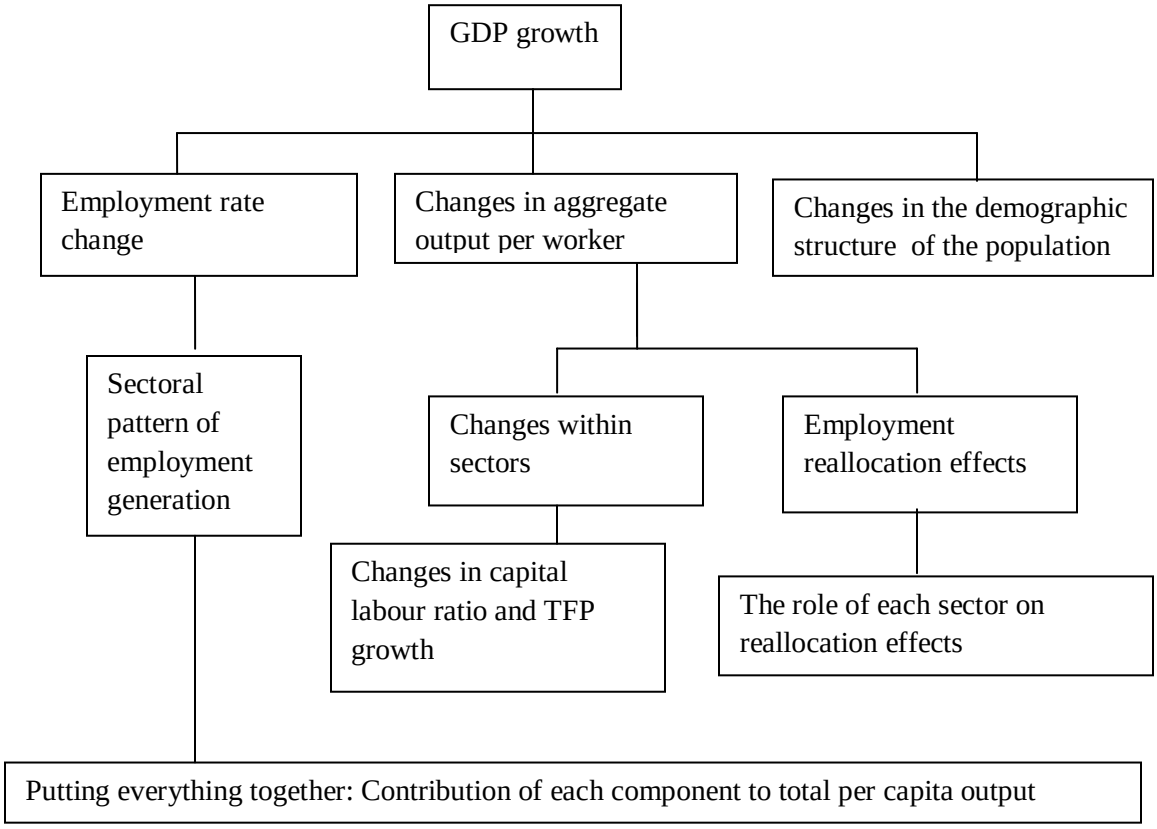
Where E stands for the elasticity, L stands for employment while Y denotes GDP for the economy as a whole. The numerator as shown above can be interpreted as the percentage change of employment, while the denominator represents to the percent change of income, i.e., the growth rate of GDP. Thus the elasticity E is presented as the percentage change of employment for every one per cent change of GDP at a period of time. The elasticity approach here is based on arc elasticity and not point elasticity.

For the Shapley Decomposition analysis various NSS rounds i.e. from 1993 to 2012 have been taken. The sub period analysis is taken up for various sectors and various regions in the North East Regions of India. The NSS rounds of 50th (1993-94), 55th (1999-00), 61st (2004-05), 66th (2009-10) and 68th (2011-12) have been used for the analysis.

The job generation and growth decomposition tool which works under the method of Shapley's decomposition tool has been used to analyse the growth of GDP. This will help understand 3 things, firstly, the association of employment creation, if the growth is contributed by employment or not, secondly, the demographic change, the ratio of working and ready to work to total population, this will enable to understand the potential of the economy from the working and looking for worker population, the more they are the less dependent population, thirdly, the output per worker or productivity. These components can be presented in a systematic manner using a flow chart. The flow chart (Figure 5.1) shows that the GDP growth can be decomposed into various components and sub components.

The following flow chart shows the details of the decomposition.

Fig. 5.1 Flow Chart of Stepwise decomposition approach



Source: World Bank (PREM) Job Generation and Growth Decomposition Tool Reference Manual and User's Guide p-5

The main objective usage of this method is to decompose the economic growth into output productivity, employment rate change and the change in the share of working population. It will deliver a result to know which factor has contributed the most or the least to economic growth. It can be derived as mentioned below.

1) Per capita income can be expressed as

$$\frac{Y}{N} = \frac{Y}{E} \cdot \frac{E}{A} \cdot \frac{A}{N}$$

where

Y stands for GDP

E Total employment

A Total population of working age or labour force

N Total population

Y/N Per capita GDP y

Y/E Total output per worker ω

E/A workforce participation rate e

A/N labour force as a fraction of total population or labour force participation rate a

$$y = \omega.e.a$$

Thus per capita GDP growth can be decomposed into growth associated with changes in output per worker, growth associated with changes in employment rates and growth associated with changes in the size of the working age population.

The total change in per capita GDP will be the total sum of the growth related to each of its components ω, e and a. If $\bar{\omega}$, $\bar{e}$ and $\bar{a}$ denote the fraction of growth linked to each component then the growth rate of an economy can be expressed as

$$\frac{\Delta y}{y} = \bar{\omega} \frac{\Delta y}{y} + \bar{e} \frac{\Delta y}{y} + \bar{a} \frac{\Delta y}{y}$$

and total growth can be written as

$$\Delta y = \bar{\omega}\,\Delta y + \bar{e}\Delta y + \bar{a}\Delta y \quad \text{.....(eq.1)}$$

$\bar{\omega}\,\Delta y, \bar{e}\Delta y$ *and* $\bar{a}\Delta y$ reflect the amount of growth consistent with output per worker, employment rate and share of population of working age.

2) To understand the way in which how each sectors have contributed to the employment generation and to total per capita growth it can be further decomposed into employment rate growth (Δe) by sectors.

$$\Delta e = \sum_{i=1}^{s} \Delta e \ldots\ldots\ldots\ldots \text{(eq. 2)}$$

Where $\Delta e_i = \Delta \frac{E_i}{A}$ is the change in employment in sector *i* as a share of total working age population. This gives a simple measure finding out where the employment generation is the highest among the three sectors. The total contribution of sector *i* will be its contribution to change in total employment times the contribution of employment rate changes to total growth mentioned in earlier equation no 1. This can be explained as the per capita growth consistent with a counterfactual scenario, in which all else (productivity, demographics and employment in the remaining sectors) remaining constant, and the only change had been from the employment growth in sector *i*.

3) The output per worker contributing to economic growth can also be decomposed into sectoral employment shifts and changes in output per worker within sectors.

$$\frac{Y}{E} = \sum_{i}^{s} \frac{Y_i}{E_i} \cdot \frac{E_i}{E}$$

Or equivalently:

$$\omega = \sum_{i=1}^{s} \omega_i s_i$$

where Y_i is Value Added of sector $I = 1 \ldots S$; E_i is employment in sector *I*; and E is total employment. This means that $\omega_i = \frac{Y_i}{E_i}$ will correspond output per worker in sector *i*, $s_i = \frac{E_i}{E}$ is the share of sector *i* in total employment. According to this equation the total output per worker is the weighted sum of output per worker in all the sectors, where the weights are simply the employment share of each sector.

With the help of JoGGD which is based on Shapley approach, the aggregate output per worker is decomposed into changes in output per worker within sectors (also known as within component), and movements of labor between sectors. Average output per worker will increase once there is increase in output per worker within a sector. The intensity of the effect, will directly depend on the size of each sector (i.e. its share in total employment). On the other hand, when there is shifting of workers across sectors from lower productivity to higher productivity the levels can also increase average output per worker.

4) The overall contribution of inter-sectoral shifts to rise or fall in per capita growth or output per worker can be explained by finding out the changes in the share of employment in the different sectors. Several studies have found that structural change (which is movements of labour force shares from low productivity sectors to high productivity sectors) is an important factor for growth and development of an economy. On the contrary movements of labour from high productivity sectors to low productivity sectors will impede growth. The inter sectoral shift is explained as given below:

$$\Delta\omega_B = \sum_{i=1}^{s} \Delta s_i \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right)$$

The term in the parenthesis is the difference between a sector i's productivity and the average productivity of all the economy. Therefore, the contribution of sector i to the inter-sectoral shifts term will be: $s_i \left(\frac{\omega_{i,t=0} + \omega_{i,t=1}}{2} - \frac{\omega_{t=0} + \omega_{t=1}}{2} \right)$ as mentioned above.

5.3 Analysis, Results and Discussion

In this section the author has examined five post reform NSS rounds of employment and unemployment in India viz 50th round (1993-94), 55th round (1999-2000), 61st round (2004-05), 66th round (2009-10) and 68th round (2011-12). The number of persons in the labour force and in the workforce have been derived by using the labour force participation rates and work participation rates from the surveys and population

estimated by using the compound annual growth rate of the relevant time period. The study period has been divided into three parts. The first sub period is from 1994-95 to 1999-2000, the second from 1999-2000 to 2004-05 and the third from 2004-05 to 2011-12. The first sub period captures the immediate impact of structural reforms and the second and third sub periods cover the time when India achieved its highest GDP growth. While GDP at factor cost has been used for all India , NSDP has been used for states. All monetary values are at 2004-05 prices. The study based on economic growth and employment linkages based on these approaches i.e. Employment Elasticity approach and Shapley Decomposition approach for the North Eastern Region of India is yet to be found. In order to fill the gap in the research and literature an attempt has been made using these two approaches.

5.3.1 Employment Elasticity Approach

Employment elasticity is a measure of the percentage change in employment associated with one percentage point change in economic growth. It indicates the ability of an economy to generate employment opportunities for its population during its growth and development process.

Padalino and Vivarelli (1997) in their study had found that there was evidence of a 'structural difference' between North America, Europe and Japan with respect to employment elasticities, with North America historically being characterized by more employment-intensive growth than the others. Covering the period from 1968 to 1988, Walterskirchen (1999) observed a direct association between GDP growth and change in employment, on one hand, and an indirect association between change in employment and unemployment, on the other, for EU countries. Islam and Nazara (2000) estimated employment elasticity for Indonesia, using arc elasticity of employment and OLS regression methods over the period from 1977 to 1996. Based on alternative measures of employment (provided by NSSO), Bhattacharya and Sakhtivel (2003) noticed a significant decline in employment elasticity at All-India level, as also across the states, and observed delinking of growth and employment during post-reforms period. Sethi and Kaur (2002) studied the economic growth and employment elasticity in India with special reference to Punjab and Haryana. The study found that economic growth in the post

reform period for the All India level was productivity growth driven and for Haryana and Punjab it was employment growth driven. They also used employment elasticity approach.

In the table 5.1 given below shows that during the period (1993-94 to 1999-2000) Arunachal Pradesh had largest amount of elasticity of employment with respect to economic growth for agriculture with 2.13 which means for every 1% increase in GDP growth there will be 2.13% increase in employment in agriculture. However the productivity of each worker is falling. Even for the industry it was high with 3.359 for Arunachal Pradesh. Assam had negative employment elasticity for agriculture at -3.094 which means for every increase of 1% in GDP there will be a fall in employment of 3.094% in agriculture. The industry sector had performed well with 7.156 for Assam. Nagaland is also one of the states which performed well in terms of elasticity overall. Overall Arunachal Pradesh and Nagaland had better average performance of employment elasticity than the national average. In case of compound annual growth of NSDP five states viz. Manipur, Meghalaya, Nagaland, Sikkim and Tripura had better growth than the national average which meant during the span of 6 years the pace of growth was faster. Tripura had the fastest growth rate, Meghalaya and Manipur following along. Arunachal Pradesh had least growth rate. However the concern was that the compound annual growth of employment during that period was very low almost similar to the rate of national average for all the states. Exceptionally only Nagaland had a high significant growth rate of 11.2% per annum.

Table 5.1: Elasticity of employment w.r.t economic growth (1993-94 to 1999-00)

States/Sectors	Agriculture	Industry	Service	Employment rate	NSDP growth rate
Arunachal Pradesh	2.13	3.36	0.34	-1.25	1.82
Assam	-3.09	7.16	2.49	1.68	2.04
Manipur	1.44	-0.268	-0.07	1.87	6.85
Meghalaya	0.05367	0.06	0.01	0.39	7.42
Mizoram	-	-	-	3.75	-
Nagaland	1.65	3.28	3.83	11.2	4.26
Sikkim	-1.74	0.06	0.12	2.15	6.26
Tripura	-0.29	-0.18	0.24	0.05	7.53
All India	0.02	0.32	0.81	4.32	4.2

Note: Data for Mizoram not available prior to 1999-2000
Source: Computed from the Various NSS rounds and CSO data

Table 5.2 shows that 5 states out of 8 states have improved in the employment elasticity in terms of agriculture and also in service sector whereas four states namely Manipur, Nagaland, Sikkim and Tripura have improved in the employment elasticity in terms of industry. All India average also showed improvement from the previous period. The compound annual growth rate of NSDP for the period showed improvement from the earlier period, it can be attributed to major reforms in early 90s. The interesting part about compound annual growth of employment is that all the states have improved its growth rate of employment with exception of Nagaland. Nagaland grew at a fast rate of 11.2% during the previous time period. The post reform era of deregulation and more market oriented focusing on growth and employment can be observed not only at All India average but also in the states of the North East India.

Table 5.2: Elasticity of employment w.r.t economic growth (1999-2000 to 2004-05)

States/Sectors	Agriculture	Industry	Service	Employment rate	NSDP growth rate
Arunachal Pradesh	5.26	-0.01	1.66	6.64	7.33
Assam	6.32	0.53	-0.36	3.71	5.34
Manipur	0.61	2.44	0.79	4.63	5.45
Meghalaya	0.69	2.52	1.26	4.57	5.87
Mizoram	-9.99	-0.29	0.23	3.13	4.91
Nagaland	0.19	0.76	-0.01	2.72	10.98
Sikkim	0.59	0.57	0.63	4.21	7.72
Tripura	0.26	0.83	0.11	2.5	8.13
All India	0.94	0.89	2.69	2.86	3.07

Source: Computed from the Various NSS rounds and CSO data

Table 5.3 shows that during this period (2004-05 to 2011-12) there were 5 out of 8 states which had a fall in employment elasticity than previous time period for agriculture as well as service sector. For industry sector it was a different scenario as there were 5 states whose performance in terms of employment elasticity was better than the previous time period viz. Arunachal Pradesh, Assam, Manipur, Mizoram and Tripura. All India average was below the previous period. This concluded that the overall employment elasticity was falling in most of the states. It was the time period where the GDP growth was the highest in the history of Indian economy and it could not deliver it to employment generation. The compound annual growth rate of NSDP was higher in 5 states compared to the previous period and overall the NSDP was significantly high during this period for all the states compared to All India. However the compound annual growth rate of employment is extremely low for all the states and it should be noticed that the growth rate of employment became relatively lower than the previous period for all the states and for the national average.

Table 5.3: Elasticity of employment w.r.t economic growth (2004-05 to 2011-12)

States/Sectors	Agriculture	Industry	Service	Employment rate	NSDP growth rate
Arunachal Pradesh	-0.07	0.24	0.11	0.14	6.59
Assam	-0.73	5.34	0.24	-0.11	5.12
Manipur	-2.19	33.47	0.24	0.69	4.85
Meghalaya	-0.92	0.39	0.63	0.62	8.43
Mizoram	-0.05	1.26	0.39	1.95	9.07
Nagaland	0.39	0.08	-0.09	-4.15	8
Sikkim	0.64	0.04	-0.003	3.92	17.05
Tripura	0.03	4.31	-0.36	4.32	8.46
All India	-0.35	0.41	0.36	0.34	5.77

Source: Computed from the Various NSS rounds and CSO data

Table 5.4 showed the employment elasticity throughout the two decades i.e. 1993-94 to 2011-12. The employment elasticity is very low as it can be seen that in many states and sectors most of it was below the 1%, except for cases like in Assam, Manipur and Tripura in industry sector. It can be concluded that since the elasticity of employment in every sector was low the robust GDP growth during some of the years of the two decades time could not generate employment. The time period of 2005-06 to 2011-12 saw a significant fall in the growth rate of employment. However the NSDP growth rate was higher than any other period during these period. This gives a clear picture that economic growth is not the sufficient condition for employment growth. Had there not been modest growth of employment rate during the period 1999-2000 to 2004-05, there would have been lower rate of employment during the time period of almost two decade, 1993-94 to 2011-12.

Table 5.4 : Elasticity of employment w.r.t economic growth (1993-94 to 2011-12)

States/ Sectors	Agriculture	Industry	Service	Employment rate	NSDP growth rate
Arunachal	**0.35**	**0.11**	**0.35**	**1.43**	**5.18**
Assam	**0.14**	**2.32**	**0.38**	**1.54**	**4.14**
Manipur	**0.06**	**1.49**	**0.16**	**2.17**	**5.68**
Meghalaya	**0.003**	**0.51**	**0.44**	**1.63**	**7.38**
Mizoram	**-**	**-**	**-**	**2.88**	**4.82**
Nagaland	**-1.01**	**0.62**	**0.20**	**2.67**	**7.55**
Sikkim	**0.96**	**0.057**	**0.098**	**3.4**	**10.75**
Tripura	**0.029**	**4.31**	**-0.36**	**2.37**	**8.06**
All India	**-0.06**	**0.39**	**0.80**	**1.27**	**4.49**

Note: Mizoram data not available prior to 1999-2000
Source: Computed from the Various NSS rounds and CSO data

5.3.2 The Job generation and growth decomposition approach (JoGG) using Shapley Decomposition

Shapley decomposition provides the necessary details pertaining to the quality of job created and whether there is increase in productivity. Shapley decompositions is a simple but effective method that links changes in a particular component to changes in per capita GDP by taking into account the relative size of the sector. It gives a unique way of looking at all the components and is an exercise in growth accounting. The accounting identities reveal great information and should be interpreted with caution. Shapley decomposition has been used by Byiers et al (2015) for analyzing 13 countries viz. Thailand, South Africa, Brazil, Mauritius, Chile, Vietnam, Indonesia, India, Sri Lanka, Mongolia, Ethiopia, Cambodia and Uganda. The period covered differ across countries. In the case of India the period covered is 1994-2012. Baye (2006) also studied using the Shapley's decomposition of poverty changes in Cameroon. The study reviewed theoretical frameworks for growth of Cameroon using Cameroon's household survey. Gutierrez et.al (2009) studied how the employment/ productivity profile of growth and its

sectoral pattern are correlated with poverty reduction. The study used a sample of 104 short-run growth spells in developing countries, between 1980 and 2001 using Shapley decomposition approach. Malunda (2013) used Shapley's decomposition approach to study the links between economic growth, employment and productivity in Rwanda for two periods i.e. 2006 and 2011. Ahsan et.al (2010) studied long term links between poverty reduction and trends in labour markets using state level data for India's major states, for the decades spanning 1983 to 2003. The study found that long term labour productivity are positively correlated with a decrease in poverty, increases in labour productivity in the agriculture and commerce sectors is positively and robustly correlated with poverty reduction, the role of employment in the manufacturing sector in reducing poverty is not significant.

Aggarwal (2014) with the help of NSS data of 1972-73,1983,1993-94,2004-05 and 2011-12 studied using Shapley decomposition to disentangle the sources of GDP growth per capita into employment and labour productivity growth effects, it also discovered the sources of labour productivity growth, movements of employment from one sector to another. The result suggested that growth per capita in India is being essentially driven by labour productivity growth. Employment effects have been small. Mazumdar and Chantreuil (2017) uses Shapley decomposition to trace the inequality of GDP and productivity growth of the different states of India and for different sub-sectors of the economy. The analysis uses the data of 15 major Indian states for the period from 1960-61 to 2008-09 at the aggregate and sectoral levels. The study found that overall inequality in India would have been 46.44% lower if the GDP of the Primary sector would have been equally distributed across Indian States and in the next 40 years it was found that tertiary sector contributes most to the overall inequality of the economy. The contribution from sectoral productivity growth and contributions from employment shifting across the sectors are the principal cause for the increase in inequality for the states. The productivity growth in manufacturing and the contribution from technological growth has played a significant role in the falling of inequality of the society.

In this section the decomposition analysis is conducted using Shapley method. The decomposition analysis is done for various NSS rounds Table 5.5 shows that post reforms

growth was largely associated with growth in output per worker. Over the entire time period (1994-2012) 114.13% of the change in per capita GDP can be linked to change in output per worker. If everything else had remained the same, growth in output per worker would have generated a growth more than 114.13 % of the actual observed growth. Growth linked to Employment rate and share of population in working age shows negative contribution. A negative contribution of share of working age population implies more dependents (minors, elderly and people outside labour force) per working age adult. The contribution of employment rate is negative over the entire period and for sub periods of the study except for the time period of 2000-05 period. The contribution of share of working age population too was positive for sub period which of 2000-05, indicating that the time period had a lesser dependency ratio. The last column of table 5.5 shows the decomposition of Growth in per capita into three parts i.e. growth that is linked to output per worker or productivity, growth linked to changes in employment rate and the growth linked to change in share of working population. The table shows the experience over the entire period of 1994-2012. It supports the general skepticism about the employment content of growth. Jobless growth has been the phenomenon during the Post-reform period at All India level.

Table 5.5: Decomposition of Growth of GDP- India

Growth linked to changes in (%)	**Study period**			
	1993-2000	**2000-05**	**2005-2012**	**1993-2012**
Output per worker	98.86	-68.90	97.35	82.62
employment rate	-1.36	0.05	-4.14	-2.07
Inter-sectoral shifts	44.22	83.87	35.42	31.51
Demographic component	-41.72	84.98	-28.63	-12.07
Total % change in per capita	13.87	6.85	32.17	94.7

Source: Computed from the Various NSSO rounds and Census reports

During the post-reform period on poverty trends by the World Bank, it is concluded that poverty declined faster in post 1991 compared to pre 1991. In addition the study

concludes that poverty declined by 1.36% per annum in post 1991 against 0.44% per annum in pre 1991 era. The second conclusion is that within post reform period, poverty declined faster in 2000s than in 1990s the declining rising from 0.74 % per annum during 1993-94 to 2004-5 to 2.2 % per annum during 2004-5 to 2011-12. Poverty is concentrated in few states of India. Social groups like SCs and STs and casual labourers in agriculture and non agriculture are the most vulnerable sections. (Dev 2016:3)

The table 5.6 below shows the data on employment by sector. The employment in agriculture has in all the periods except during 2000-05 there was positive change. The Industry as well as Service sector showed a positive change in all the year periods. The total change in employment were also positive however for all the sectors combined the share of working population shrinked in all the time period stating that the probability of each person to get employed decreased as the share of working population to the share of labour force has declined.

Table 5.6: Employment by sectors of Economic activity

Sectors	**1993-2000**		**2000-2005**		**2005-2012**		**1993-2012**	
	TE	**E/LF**	**TE**	**E/LF**	**TE**	**E/LF**	**TE**	**E/LF**
Agriculture	0.48	-5.66	8.17	-11.80	-11.56	-14.63	-4.34	-24.71
Industry	15.62	8.56	54.34	25.84	31.96	27.38	103.66	60.3
Service	17.56	10.37	43.33	16.86	12.03	8.14	60.57	26.38
Total	6.32	-0.18	22.43	-0.17	2.42	-1.13	25.40	-1.3

TE = Total employment change in % , E/LF = Share of working population in %
Source: Author's calculation

Table 5.7 presents the sectoral employment changes to total per capita GDP growth for India during 1993-2012 and sub-periods. Here in the second column showing the post reform immediate period of 1994- 2000 it shows positive contribution from industry and service sector to employment generation, however the overall contribution of the sectors (consolidated) consisting of agriculture, industry and service gave a negative contribution which means the fall out in the agriculture sector was huge and it could not be compensated by the growth in industry and service sectors.

Table 5.7: Sectoral employment contribution to total per capita GDP growth of India

Sectoral contribution	1993-2000	2000-2005	2005-2012	1993-2012
Agriculture	-28.05	-59.53	-30.25	-25.09
Industry	9.88	39.02	18.82	14.27
Service	16.81	20.57	7.29	8.76
Subtotal	-1.36	0.05	-4.14	-2.07

Source: Computed from the Various NSSO rounds and Census reports

According to Lewis model when the economy grows workers move from the low paying subsistence agriculture to high paying industry and service sector. During 2000-05 there was a boom in industry sector especially the manufacturing and it has been reflected on significant amount of contribution from industry to employment. In the next 7 years which is during the 2005-2012, there was a positive contribution from industry and service sector but the magnitude of negative growth from agriculture sector offset the sectoral contribution to employment. In the last column during the two decades (1993-2012) overall contribution of sectors to employment shows that though the industry and service sectors contributed positively, the overall impact is negative for All India.

The table 5.8 presents the percent contribution of each factor (output productivity, employment rate and working population share) to total changes in GDP per capita.

The sectoral contribution to growth in per capita GDP is presented in Table 5.6. The contribution of three broad sectors viz. agriculture, industry and services and demographic component is analyzed. Demographic component refers to the situation where more people enter the labour force and subsequently help raise output. Sectorally the growth has largely come from services followed by industry. For the span of almost two decade the sectoral contribution were positive, however for sub-time periods there were negative contributions, viz. agriculture and service during the time period of 2000-05. The contribution of services has risen to 56.53 % along with that of industry increased during the same period. The negative contribution of demographic

component may have to do with the observed withdrawal from the labour force for various reasons.

Table 5.8: Contribution to total growth in GDP per capita; India

Sectoral contribution	**1993-2000**	**2000-2005**	**2005-2012**	**1993-2012**
Agriculture	24.78	-21.93	17.97	9.28
Industry	66.30	80.85	71.57	46.26
Service	50.73	-43.90	39.09	56.53
Subtotal	141.72	15.02	128.63	112.07
Demographic component	-41.72	84.98	-28.63	-12.07
Total	100	100	100	100

Source: Computed from the Various NSSO rounds and Census reports

5.3.3 Experience of the states in NER

In the following sub-sections, it is the decompositional analysis using Shapley's method for all the states of the North Eastern Region. The variables considered for analysis are growth of per-capita NSDP, output per worker, Employment rate and share of working population for various sectors at different time periods. Table 5.9 presents the decomposition of growth in per capita income into components of growth associated with output per worker, employment rate, inter-sectoral shifts and demographic components across the eight north eastern states. The table is categorized into 3 sub intervals, starting from 1993-94 to 1999-2000, 1999-2000 to 2004-05, 2004-05 to 2011-12 and the overall time period from 1993-94 to 2011-12. The time period 1993-94 to 1999-2000 shows that while output per worker is the main factor behind growth of per capita NSDP in Manipur, Meghalaya, Nagaland, Sikkim and Tripura, however the output per worker contribution goes negative in Arunachal Pradesh and Assam. Labour force has played an important role in Arunachal Pradesh however the negative effect of

other factors viz. Output per worker, employment rate and Inter-sectoral contribution are so large that it dominated leading to negative growth rate in the state. In Nagaland the growth in per capita NSDP during 1993-4 to 1999-2000 comes almost entirely from per capita output. The contribution of from labour force is negative. In Sikkim the contribution of output per worker component is the only positive one. Arunachal is the only state in NER where higher participation in labour force contributed to growth in per capita NSDP. Negative contribution implies withdrawal from the labour force , a phenomenon which needs to be looked into. It has implications for inclusivity of growth. From this perspective the quality of growth in Assam, Manipur, Meghalaya, Mizoram, Nagaland and Sikkim may be relatively less inclusive than that in Arunachal Pradesh. Except for Assam, Nagaland and Tripura, growth in the other states over the entire period seem to be jobless growth. It has been so even in Sikkim, one of the fastest growing states in India. In terms of inter-sectoral contribution Nagaland is the only state showing positive contribution to per capita GDP growth. A large number of studies have found that structural change, is an important factor behind growth which is movements of labour force shares from low productivity sectors to high productivity sectors. Simply it can be explained as an increase in the share of employment in above average productivity sectors will increase overall productivity and it will contribute positively to the inter-sectoral shift. On the one hand when there is movement of workers out of sectors with above average productivity to lower productivity will just have the opposite effect leading to fall or decline of overall productivity. Therefore, increases in the share of employment in sectors with below average productivity should reduce growth, while reductions in the share from lower productivity sectors will contribute positively to growth. (World Bank, 2010)

During 1993-94 to 1999-2000, except for Arunachal Pradesh and Assam all the NER states have positive contribution of output per worker, which means the productivity of the worker increased during these years which is a good sign. For example if one look at Manipur the contribution of output per worker and employment rate to the growth are positive and if only the share of population working had not decreased, there would have been more growth. Similarly a look at the cases of Nagaland and Tripura the share of working population declined, which means high dependence on output per worker. In

case of Manipur, Meghalaya and Sikkim not only there is a decline of share of working population but there is also fall in employment rate as it is shown in the table that the contribution of employment rate is negative. This can imply that as employment rate is falling many people have been discouraged and left the labour force during that period. The data shows classification of the states with similar patterns. For example Manipur, Meghalaya and Sikkim have one pattern whereas Assam, Nagaland and Tripura have another patterns but in different way. However the magnitudes are very much different from one state to another.

In the period of 1999-2000 to 2004-05 shows that the output per worker of all the states in North East are positive except for Manipur and Meghalaya even though the magnitudes are not similar. The share of working population increased positively in all these states which implies that people are more optimistic of getting a job or may be the urgency. It could be because of new opportunities after the reforms of 1990s and their taking shape. However the employment rate is not all positive as states like Arunachal Pradesh and Tripura had negative contribution to the growth, especially Tripura has a very high magnitude of -51.04%. Had it been even zero Tripura would have had higher growth. This time span showed almost similar patterns in all the states except for employment. Productivity has increased so does the labour force participation. In terms of inter-sectoral shifts Manipur, Meghalaya, Sikkim and Tripura had positive value which implies there is major shift of workers from low productive sectors to high productive sectors.

For the time period 2004-05 to 2011-12, data shows that a similar pattern to the previous phase. There has been an improvement in terms of output per worker for all the states. All the states had positive contribution from output per worker. However the employment rate contribution is negative for the four states viz. Arunachal Pradesh, Assam, Manipur and Nagaland. The states with positive contribution are Meghalaya, Mizoram, Sikkim and Tripura but very small in magnitude. Similarly the share of working population declined which means the labour force declined again for all the states except for Sikkim and Tripura. During this phase all the states has increased the productivity per worker however they could not fulfill the employment generation objective which led to many

opting out of labour force. Sikkim and Tripura did relatively better in terms of employment generation and instilling optimism of job availability in people. The inter-sectoral shifts are negative in only two states viz. Sikkim and Tripura, the remaining states are negative which implies there has been higher shifting of workers with more productivity to lower productivity.

The period 1993-94 to 2011-12 shows the overall change since the early post reform which is 1993-94 until the 2012. Here it can be seen that contribution of output per worker which is the productivity per worker have risen in all the states, this result complies with the all India average. In terms of contribution of employment states like Arunachal Pradesh, Assam and Mizoram showed positive contribution whereas all other states have negative contribution. However the labour force participation seems to be contributing positively in most of the states except for Arunachal Pradesh, Assam and Meghalaya. The data showed that the productivity had increased however there is heterogeneity in terms of employment and labour force participation. In Arunachal Pradesh the contribution from employment rate was the highest at 27.77% but the labour force participation became negative with the high magnitude amongst all these states. The reason could be female and children opting out of labour force as more and more male working age members in the family get employed. Overall the two decade performance can be summed up to rise in productivity but slow or negative growth of employment and labour force participation. In Assam and Meghalaya sectoral shift from low productivity to high productivity played an important role in change in per capita NSDP. Only Sikkim and Tripura had negative contribution from inter-sectoral shifts.

Table 5.9: Decomposition of growth in per capita NSDP

Growth linked to						
STATES	**Period of study**	**Out put per worker**	**Employment rate**	**Inter-Sectoral contribution**	**Demographic component**	**Total % change in per capita**
Arunachal Pradesh	1993-4 to 1999-2000	-285.46	-314.86	-187.8	888.11	-3.87
	1999-2000 to 2004-05	29.71	-0.12	-16.11	86.52	26.67
	2004-05 to 2011-12	139.11	-4.36	15.36	-50.11	32.95
	1993-94 to 2011-12	115.28	27.77	22.69	-65.74	61.9
Assam	1993-4 to 1999-2000	-972.28	68.02	-1123.25	-118.99	1.39
	1999-2000 to 2004-05	88.24	10.41	-44.63	45.98	19.64
	2004-05 to 2011-12	77.32	-7.42	72.62	-42.52	27.06
	1993-4 to 2011-12	46.50	2.47	59.15	-8.12	54.13
Manipur	1993-4 to 1999-2000	134.58	-2.37	-30.10	-2.11	65.17
	1999-2000 to 2004-05	-54.01	5	79.20	69.82	16.81
	2004-05 to 2011-12	19.2	-8.80	140.33	-50.73	19.49
	1993-4 to 2011-12	79.88	-3.35	21.99	1.48	81.82
Meghalaya	1993-4 to 1999-2000	156.40	-1.65	-1.68	-53.06	30.26

	1999-2000 to 2004-05	-70.23	0.51	109.08	60.64	17.27
	2004-5 to 2011-12	70.06	0.50	63.62	-34.18	48.33
	1993-4 to 2011-12	70.92	-0.21	52.36	-23.07	126.58
Mizoram	1993-94 to 1999-2000	n.a	n.a	n.a		
	1999-2000 to 2004-5	114.22	5.51	-48.29	28.55	13.81
	2004-5 to 2011-12	67.24	2.2	35.52	-4.97	58.39
	1999-2000 to 2011-12	80.03	2.97	14.47	2.52	80.26
Nagaland	1993-4 to 1999-2000	682.87	22.85	182.10	-787.82	-4.46
	1999-2000 to 2004-05	86.61	1.77	-5.20	16.83	60.66
	2004-5 to 2011-12	134.63	-33.09	23.04	-24.59	72.08
	1993-4 to 2011-12	84.49	-18.91	1.63	32.78	164.12
Sikkim	1993-4 to 1999-2000	137.70	-12.99	-14.87	-9.84	21.28
	1999-2000 to 2004-05	45.68	3.44	10.53	40.35	34.25
	2004-5 to 2011-12	92.79	1.33	-11.74	17.61	176.53
	1993-4 to 2011-12	85.13	-0.15	-4.71	19.73	350.23

Tripura	1993-4 to 1999-2000	128.94	3.84	-2.61	-30.17	41.03
	1999-2000 to 2004-05	68.46	-51.04	15.52	67.07	37.75
	2004-5 to 2011-12	88.58	9.54	-30.96	32.84	60.23
	1993-94 to 2011-12	114.62	-9.95	-29.49	24.82	211.27

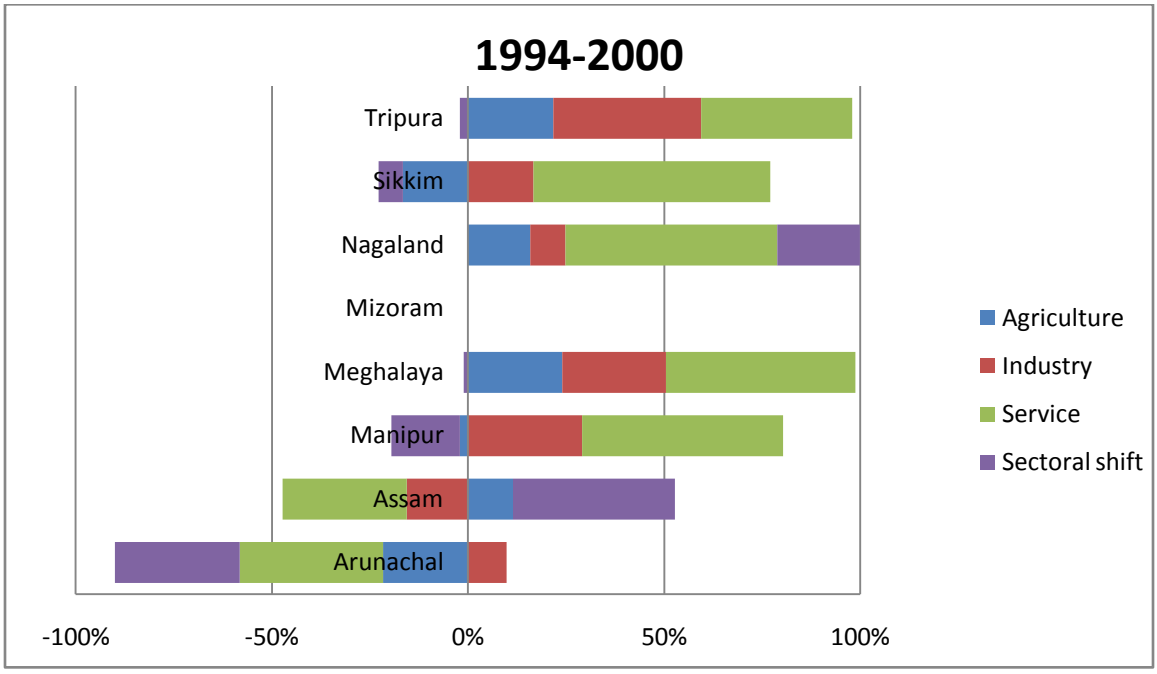
Source: Computed from the Various NSSO rounds and Census reports

The output per worker is measure of productivity. The aggregate measure of productivity in a state can be decomposed into the sectoral compositions and inter-sectoral shifts. In normal circumstances productivity of labour would either increase or remain constant depending on the economic conditions in general and application of newer methods of production and management. It is only in the adverse condition the productivity of labour in every sector declines.

Table 5.10 shows the results of growth decomposition for different periods of intervals where sectoral contribution in output per worker and the intersectoral shifts of employment contributed to the per capita NSDP growth. In the year period 1993-94 to 1999-2000 except for Arunachal Pradesh there had been positive contribution of total change in output per worker, however sector wise it differs from state to state. During this time period Arunachal Pradesh shows positive change in output per worker only in industry. In the case of Assam there had been positive change in output per worker only in Agriculture and the industry and service had negative changes, but one thing to be noted is that a major contributor to the output per worker is from sectoral shift. Meghalaya and Nagaland had positive contribution from all the sectors contributing to positive change in output per worker. Overall even though the total change in output per worker had been positive for all the states except for Arunachal Pradesh, there had been differences in terms of sectoral contributions. States like Arunachal Pradesh, Manipur and Sikkim which exhibited negative growth in agriculture sector implies many people

getting worse off as most of the workers depend for their livelihood from agriculture sector. (Figure 5.2)

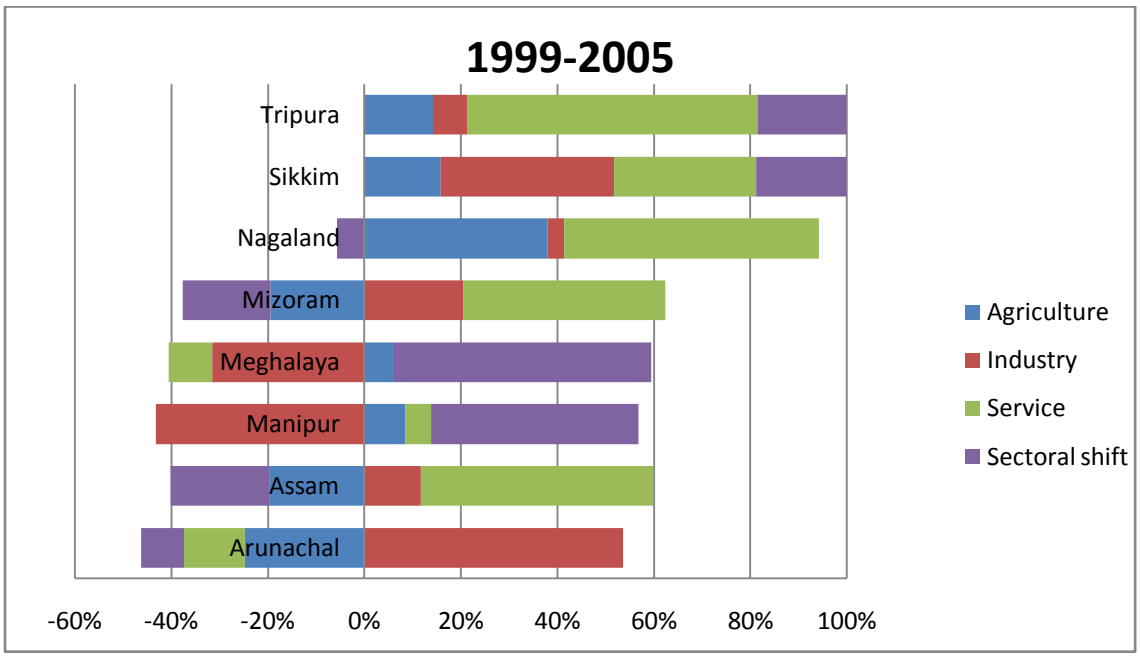
Figure 5.2: Growth decomposition of NSDP per capita (1993-4 to 1999-2000)



Note: For Mizoram there is no data available prior to 1999- 2000
Source: NSS rounds, CSO and author's own calculation

Further in period 1999-2000 to 2004-05, the total output per worker change is positive however there are differences from state to state in sectoral contribution. Arunachal Pradesh, Assam and Mizoram have negative contribution from agriculture which can only mean the productivity has fallen in this sector which will eventually hurt the majority as most of the workers depend on agriculture for their livelihood. Service sector shows negative contribution in states like Arunachal Pradesh and Meghalaya, this will hinder the growth of these state. Contribution from the sectoral shift had been negative for the states namely Arunachal Pradesh, Assam, Mizoram and Nagaland. This implies that there had been decline of workers moving from low paying jobs to higher paying jobs, e.g. the rate at which a worker going from agriculture related work to industry related work had declined. (Figure 5.3)

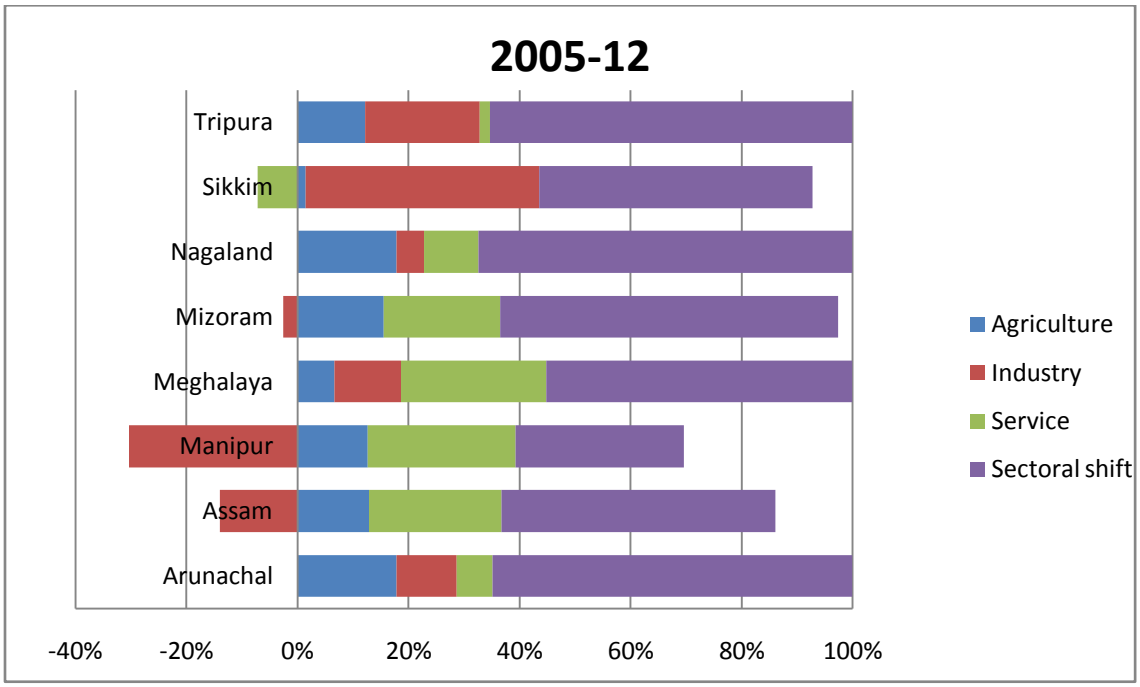
Figure 5.3: Growth decomposition of NSDP per capita (1999-2000 to 2004-2005)



Source: NSS rounds, CSO and author's own calculation

The phase of 2004-05 to 2011-12 had highest growth rate of GDP all over India which is also reflected in North East. The contribution to growth had been mostly from the productivity increase per worker. Sectoral shift showed a positive change in productivity except for Sikkim which implied that many existing workers experienced transfer of jobs from low paying to higher pay jobs. Overall this phase showed a better productivity in comparison with previous time periods. (Figure 5.4)

Figure 5.4: Growth decomposition of NSDP per capita (2004-05 to 2011-2012)



Source: NSS rounds, CSO and author's own calculation

For the span of around two decades from early reform until 2012, there had been positive change in total output per worker, agriculture sector experienced all positive change which is good because many are still dependent on agriculture for livelihood. In industrial sector there had been negative change only in Assam and Manipur. The service sector showed all positive change that is rise in productivity for the interval of time. Sectoral shift were positive for all except for Sikkim and Tripura. Overall as discussed earlier, there was rise in productivity and most of it came from agriculture, service and sectoral shifts.

In the first phase, as expected the industry sector and the service sector were the pillars for high positive change in the output per worker. In the second phase agriculture also showed a rise in productivity, it can be so because of the disguised employment effect. The workers are shifting to other non agricultural sector and are also shifting to industry and service sectors. States like Manipur and Assam showed negative contribution of industry sector. (Figure 5.5)

Figure 5.5: Growth decomposition of NSDP per capita (1993-94 to 2011-12)

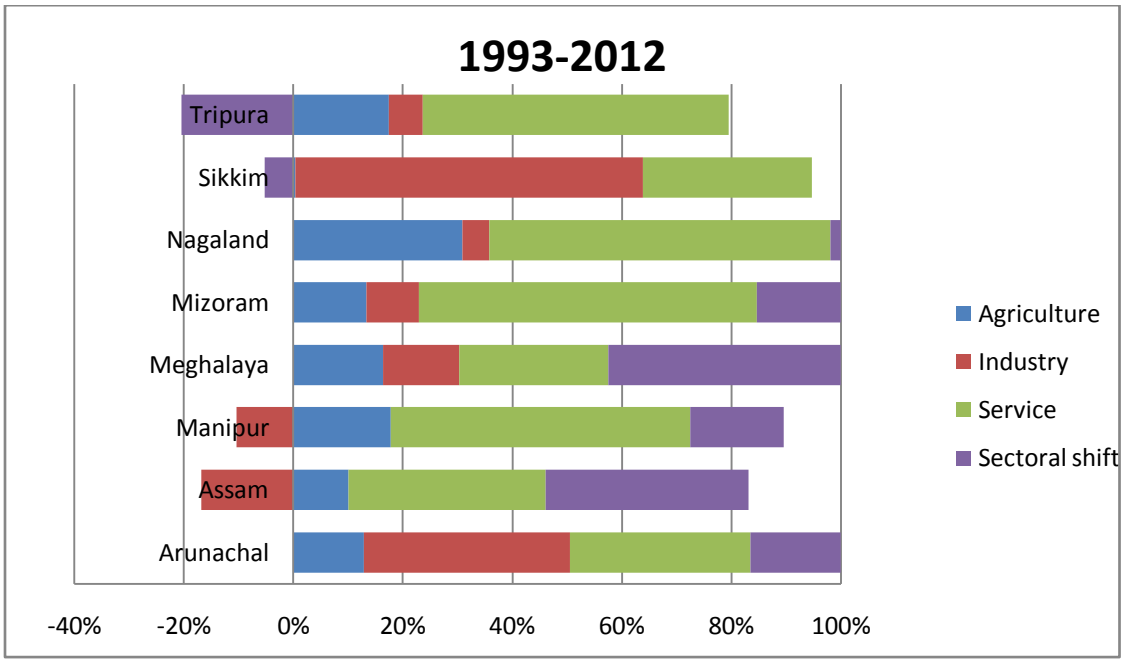


Table 5.10: Sectoral Contribution to Total growth in NSDP per capita (1993-4 to 2011-12)

STATES	Study period	Agriculture	Industry	Service	Intersectoral shift
Arunachal Pradesh	1993-4 to 1999-00	-128.2	58.6	-215.8	-187.8
	1999-00 to 2004-05	-44.9	97.5	-22.9	-16.1
	2004-5 to 2011-12	42.8	25.8	70.4	15.4
	1993-4 to 2011-12	17.8	52.0	45.5	22.7
Assam	1993-4 to 1999-00	316.3	-426.8	-861.8	1123.2
	1999-00 to 2004-05	-43.2	25.8	105.7	-44.6
	2004-5 to 2011-12	39.2	-42.2	80.3	72.6
	1993-4 to 2011-12	16.1	-26.9	57.3	59.1
Manipur	1993-4 to 1999-00	-3.4	49.9	88.0	-30.1
	1999-00 to 2004-05	15.9	-79.7	9.8	79.2
	2004-5 to	66.7	-159.3	111.8	140.3

	2011-12				
	1993-4 to 2011-12	22.9	-13.4	70.4	22.0
Meghalaya	1993-4 to 1999-00	38.2	41.8	76.4	-1.7
	1999-00 to 2004-05	12.7	-64.5	-18.5	109.1
	2004-5 to 2011-12	16.4	28.9	24.8	63.6
	1993-4 to 2011-12	20.2	17.2	33.5	52.4
Mizoram*	1993-94 to 1999-00	n.a	n.a	n.a	n.a
	1999-00 to 2004-05	-51.4	54.6	111.0	-48.3
	2004-5 to 2011-12	26.3	-4.3	45.2	35.5
	1999-00 to 2011-12	12.6	9.1	58.3	14.5
Nagaland	1993-4 to 2004-5	138.4	77.0	467.5	182.1
	1999-00 to 2004-05	34.9	3.2	48.5	-5.2
	2004-5 to 2011-12	42.0	11.4	81.2	23.0
	1993-4 to 2011-12	26.6	4.2	53.7	1.6
Sikkim	1993-4 to 2004-5	-37.6	38.1	137.2	-14.9
	1999-00 to 2004-05	8.9	20.2	16.5	10.5
	2004-5 to 2011-12	2.4	69.4	21.0	-11.7
	1993-4 to 2011-12	0.3	57.0	27.8	-4.7
Tripura	1993-4 to 2004-5	28.7	49.6	50.6	-2.6
	1999-00 to 2004-05	12.0	6.0	50.4	15.5
	2004-5 to 2011-12	19.8	33.7	49.5	3.0
	1993-4 to 2011-12	25.1	9.0	80.5	-29.5

Source: Computed from the Various NSSO rounds and Census reports

*Mizoram data is from 1999-2000 to 2011-12

Table 5.11 presents the decomposition of changes in output per worker into within sector changes and intersectoral shifts over the time period 1993-4 to 2011-12. Relative rankings and performance differ across the states. Industry is found to be important in Arunachal Pradesh and Sikkim. As much as 71% of growth in output per worker comes from industry in Sikkim. Sikkim had only 0.4% contribution to output per worker from agricultural sector, which is evident from the fact that in the table no. 5.9 the agriculture sector was the highest contributor to employment generation in Sikkim. In Assam and Manipur Industrial sector contribution is negative, given the fact that it was contributing highest employment, we can observe a case of disguised unemployment. Service sector has been the only sector which had contributed positively in all the seven states. The output per worker in this sector increased significantly in all the states. However employment generation was a mix. In Tripura 94.6% of growth in output per worker comes from Services. Intersectoral shifts are important in Assam and Meghalaya. Had everything else remained the same, inter sectoral migration from low productivity to high productivity sector - would have explained 56% of the growth of output per worker in Assam.

Table 5.11: Decomposition of Changes in output per worker (1993-94 to 2011-12)

States	Agriculture	Industry	Services	Intersectoral shifts	Total %
Arunachal Pradesh	12.9	37.7	33	16.4	100
Assam	15.2	-25.4	54.3	56	100
Manipur	22.4	-13.1	69.1	21.6	100
Meghalaya	16.4	14	27.2	42.5	100
Mizoram*	13.3	9.7	61.7	15.3	100
Nagaland	30.9	4.9	62.3	1.9	100
Sikkim	0.4	70.9	34.6	-5.9	100
Tripura	29.4	10.6	94.6	-34.6	100

Note: * 1999-2000 to 2011-12, the data for Mizoram prior to 1999 not available.
Source: NSS rounds, CSO and authors calculations

Table 5.12 presents the sectoral contribution to employment rate for the time period of 1993-94 to 1999-2000 for the 8 states. Arunachal Pradesh had a significant growth of employment rate which are contributed by all the sectors but service sectors outperforming the rest. Assam had huge growth of employment from service sector however due to large fall in agriculture sector the total employment growth rate was meagre. Manipur had growth in agriculture sector but declining rate in industry as well as service sector in terms of employment rate so overall there was a negative growth of employment. Similarly Meghalaya, Nagaland and Sikkim had the same negative growth of employment. Like Assam and Arunachal Pradesh, Tripura's employment rate was boosted by service sector. Mizoram because of data unavailability could not be concluded. The employment rate contribution was not similar as we can see the service sector was not generating employment in many of the states on the contrary places like Manipur , Nagaland, Arunachal Pradesh had significant contribution of employment from agriculture sector.

Table 5.12: Sectoral contribution to total employment rate (1993-94 to 1999-2000)

STATES	Agriculture	Industry	Services	Total employment rate change
Arunachal	2.19	2.91	6.32	11.42
Assam	-11.38	1.40	10.87	0.89
Manipur	7.29	-3.99	-4.44	-1.14
Meghalaya	-0.05	0.09	-0.47	-0.43
Mizoram*	--	--	--	--
Nagaland	4.23	-0.81	-4.40	-0.99
Sikkim	1.02	-1.37	-2.07	-2.44
Tripura	-2.25	-3.57	7.09	1.26

Note:. * 1999-2000 to 2011-12, the data for Mizoram prior to 1999 not available.
Source: NSS rounds, CSO and authors calculations

Table 5.13 on the next page shows the sectoral contribution to total employment rate for the time period of 1999-2000 to 2004-05. Arunachal Pradesh in the previous round was generating positive growth of employment however in this round only service sector had positive employment growth whereas the overall became negative. Assam had positive overall growth coming mostly from agriculture. Manipur is still lagging behind with meagre positive growth of employment however there was a positive significant growth in industry with 4.81% points which led to the positive growth. Meghalaya had a significant growth from industry however due to substantial negative growth in agriculture it made little contribution overall. Overall there was positive growth of employment rate for all the states except for Arunachal Pradesh but with a very meagre amount. It is as if there was no growth at all. It should be noted that India's economic growth was performing good during the period.

Table 5.13: Sectoral contribution to total employment rate (1999-2000 to 2004-05)

STATES	Agriculture	Industry	Services	Total employment rate change
Arunachal	-0.56	-2.52	3.05	-0.03
Assam	9.18	0.93	-8.31	1.79
Manipur	-2.71	4.81	-1.34	0.76
Meghalaya	-5.54	3.84	1.78	0.08
Mizoram	4.12	-1.76	-1.65	0.70
Nagaland	2.80	1.55	-3.55	0.80
Sikkim	-0.89	2.85	-0.98	0.98
Tripura	-7.79	4.32	-11.09	-14.55

Source: NSS rounds, CSO and authors calculations

Table 5.14 shows the sectoral contribution to total employment rate for the period 2004-05 to 2011-12. Arunachal Pradesh and Tripura had negative growth of employment while the rest had positive but insignificant growth. India's GDP was highest during these periods and so far the contribution to employment had been minimal and insignificant to the eight states that is shown here. Service sector as like previous year were negative in all the states except for Arunachal Pradesh whereas industry gained momentum in generating employment growth except for Arunachal Pradesh and Mizoram which had negative growth. Agriculture is still a very important sector for many households livelihood as shown in states like Assam, Mizoram, Nagaland. Overall there were not much of employment growth during these period.

Table 5.14: Sectoral contribution to total employment rate (2004-05 to 2011-12)

STATES	Agriculture	Industry	Services	Total employment rate change
Arunachal	-3.40	0.50	1.71	-1.20
Assam	-10.83	5.30	3.84	-1.69
Manipur	-20.97	15.80	3.66	-1.51
Meghalaya	-13.13	3.46	9.86	0.19
Mizoram	-9.56	5.10	5.45	0.99
Nagaland	-17.09	1.07	0.95	-15.07
Sikkim	9.47	-0.64	-7.58	1.26
Tripura	-6.19	28.64	-18.64	3.81

Source: NSS rounds, CSO and authors calculations

In Table 5.15 it is the overall conclusion of total employment rate contributed by the sectors for the last two decades or so. Arunachal Pradesh had done pretty well generating mostly from service sectors, Assam had growth in industry and service sector but it was not enough to offset the major fallout from agriculture. Manipur had a substantial increase of employment in industry however large fallout was also experienced in agriculture and service sector leading to negative growth rate overall. Meghalaya had significant positive growth in industry as well as service sector however again the agriculture sector had a major fallout which led to negative growth. The scenario had been almost similar for states like Nagaland, Tripura and Sikkim. The problem here is that the workers shifting from agriculture to industry or service sectors were not been

able to absorb all and also it was tough competition for the people who were looking for jobs in the industry and service sector newly. That is why there had been in most of the states similar scenario of negative employment growth.

It shows the percent contribution of the various sectors to growth of employment rate during 1993-94 to 2011-12. There was high positive growth of total employment in Arunachal Pradesh at 12.04%. However employment rate declined in 5 states namely Manipur, Meghalaya, Nagaland, Sikkim and Tripura. In two states it was marginal increase i.e. Assam and Mizoram.

Out of the total employment contribution, services contributes the highest in Arunachal Pradesh. The employment growth in service sector was 11.54%. Assam, Meghalaya, Mizoram also had significant contribution of service sector in employment. Industry plays a leading role in Assam, Manipur, Nagaland and Tripura . The highest contribution from industry was for Tripura then Manipur in terms of employment. It is only in Sikkim that agriculture takes the leading role and it is the only state where agriculture makes a positive contribution.

Table 5.15: Sectoral contribution to total employment rate (1993-4 to 2011-12)

STATES	Agriculture	Industry	Services	Total employment rate change
Arunachal	-0.51	1.01	11.54	12.04
Assam	-13.03	7.63	6.39	0.99
Manipur	-16.38	16.61	-2.12	-1.88
Meghalaya	-18.72	7.39	11.17	-0.16
Mizoram*	-5.44	3.34	3.80	1.69
Nagaland	-10.07	1.80	-7.00	-15.26
Sikkim	9.60	0.85	-10.65	-0.20
Tripura	-16.24	29.39	-22.64	-9.49

Note: * 1999-2000 to 2011-12, the data for Mizoram prior to 1999 not available.
Source: Author's computation from census and NSSO *Mizoram data is from 2000 to 2012

One thing to be remembered in these analysis was that even though the results turned out to be similar with elasticity approach and Shapley decomposition method, the later had an edged on explaining more in depth as it showed that the rise in the GDP growth went into productivity and sectoral shifts more than generating employment.

5.4 Summary and Conclusion

The secondary data of economic growth and employment data are used to analyze the Growth decomposition of output of NER. It has been proven and shown in this chapter that output growth is a composite output and it can be decomposed into various components. There have been various studies studying the relationship of economic growth and employment generation however it did not cover the NER of India in depth. The main objective of this chapter is to introduce and analyze the pattern of economic growth and its relation to employment post 1990s reform. Two techniques of decomposition has been used viz. i) Employment Elasticity Approach and ii) Shapley's Decomposition analysis

The hypothesis of this chapter is as follows: i) the economic growth in NER has been jobless growth and (ii) the growth of output is mostly contributed by the rise in productivity of the workers and inter sectoral shifts of the workers.

The first technique of decomposition which is employment elasticity approach finds that during the span of almost twenty years i.e. from 1993-94 to 2011-12 the employment elasticity for all the sectors of each states are very low as it can be seen that that in many states and sectors most of it was below the 1%, except for cases like in Assam, Manipur and Tripura in industry sector. It can be concluded that since the elasticity of employment in every sector was low the robust GDP growth during some of the years of the two decades time could not generate employment. The time period of 2005-06 to 2011-12 saw a significant fall in the growth rate of employment. However the NSDP growth rate was higher than any other period during these period. This gives a clear picture that economic growth is not the sufficient condition for employment growth. Had there not been modest growth of employment rate during the period 1999-2000 to 2004-05, there would have been lower rate of employment during the time period of almost two decade, 1993-94 to 2011-12 as shown in table 5.2 and 5.4 in chapter 5. The highest employment growth rate is found in Sikkim with just 3.4 percent while the NSDP growth rate is the highest amongst the states with 10.75 percent. Arunachal Pradesh has the least growth in employment and NSDP growth rate of just 4.14 percent.

The findings using Shapely decompositions reaffirm the finding that growth in India and the states in NER has been largely jobless growth. It is increase in output per worker across the NER states that has led to the growth in per capita income, this result complies with the all India average. In terms of contribution of employment states like Arunachal Pradesh, Assam and Mizoram showed positive contribution whereas all other states have negative contribution. The negative contributions of demographic factors imply burden of dependency on the workers. The contribution of growth in employment rate has been negligible. The ranking of sectors –agriculture, industry and services in terms of their contribution to employment differs widely across the states. However the labour force participation seems to be contributing positively in most of the states except for Arunachal Pradesh, Assam and Meghalaya. The data shows that the productivity has increased however there is heterogeneity in terms of employment and labour force participation amongst the states.