Original Research Article

An analysis on the employment intensity of economic growth in Assam over the post reform period

Abstract:

The economy of Assam is growing significantly over the post reform period without generating sufficient employment opportunities for its increased labour force. The share of agriculture in domestic product of the state is in a downward trend and employment tends to shift away from this sector to non-farming sectors. However, owing to inadequate training and skills, many rural youths of the state are not able cope themselves with the emerging employment opportunities generated in the growing service and industrial sectors of the state. So, the estimation of the employment intensity of the growth in the state at aggregate and sectoral level seems to be highly essential for understanding employment absorptive capacity of this thriving economy.

Key Words: Employment intensity, Agriculture Sector, Industrial Sector, Service Sector, Domestic Product, Productivity.

Introduction:

Employment is the principal link that establishes the relationship between the economic growth and poverty reduction in a region. To be a pro-poor growth, the economic growth needs to generate sufficient employment opportunities so as to utilize effectively the abundant labour of the poor section in a society. Since the only asset in which the poor section is relatively in abundant is labour. During the post reform period, the economy of Assam is growing modestly without generating sufficient number of jobs for its rapidly growing labour force. So, the present economic growth of the state is often described as jobless growth to an extent. However, for lessening the incidence of poverty in the state, a pro-poor growth strategy is highly desirable. Since output growth alone is not sufficient for a country for poverty reduction (T. Ajilore & O. Yinusa). For measuring the employment absorptive capacity or potentiality of employment generation in the thriving economy of Assam, among various indicators/ techniques, the employment intensity has been taken as an appropriate technique in this paper. Despite the adoption of suitable policy measures in the post reform economy, the employment intensity of growth in India at aggregate level remains at a low level and is in a declining trend. The same misfortune happens in the economy of Assam too. In the post reform economy of Assam, the service sector and industrial sectors have witnessed a sizeable growth contributing with the increased shares to the GSDP of the state, while the share of agriculture sector is in a declining

trend. In 2019, the shares of the service and industrial sectors in GSDP of the state (at current price) were more than 44% and 33.62% respectively. In contrast, the agriculture sector has contributed only 15.64% to the GSDP of the state in this year[1].The agriculture sector of the state is not able to absorb the growing labouforce in the state. For the higher percentage of rural poor depend on agriculture sector and being a labour intensive sector, the agriculture sector should grow significantly for generating employment opportunities, especially for rural mass having little skill and education. Importantly, the demand for manual works in the agriculture sector of the state is in a diminishing trend, due to labour substitution effect produced by the modern technologies used in many agriculture activities such as in ploughing and treading out of grains for the last few decades. Moreover, the increased students to population ratio among the rural youths and more so among the females leads to the inter-sectoral transfer of labour away from agriculture to the higher productive non-farming sectors of the economy.

Statement of the problem:

Hence, it is partially understood to what extent the moderately growing economy of Assam over the post reform period is able to absorb the growing labour force of the state in its different sectors. What role the growing industrial and service sectors of the state have played for generating employment opportunities for increased educated youths in the state is not properly known. However, the service and industrial sectors need to grow at a higher rate than the present one so as to take care of jobs itself. Given the concentration of a large number of rural poor in agriculture, the development of this sector with appropriate measures is a must for reducing rural poverty. Hence, a common and often raised clue termed as a jobless growth amidst of the growing process of economic prosperity in Assam has been tried to examine in this academic work. This has been done mainly through estimating the employment intensity of the economic growth of Assam over the post reform period. For it, the employment elasticity of growth at aggregate level and sectoral levels has been determined. Along with it, an interconnected concept, productivity intensity of growth has been estimated. Then, the factors crucial for the change in employment and productivity intensity of growth of the state have been tried to identify for policy prescription.

Review of Literature:

In estimating the employment elasticity of economic growth for India at aggregate and sector specific level, Sangita Misra & Anoop K Suresh have found aggregate employment elasticity for India to decline and vary from 0.18 to 0.20 during the post reform period. At the sector specific analysis, the agriculture sector has shown a negative elasticity, while the service sector has witnessed an employment intensive growth. For manufacturing sector, though the employment elasticity is hovered around 0.3 at sectoral aggregate, it is in the range of 0.4-0.5 for the organized manufacturing sector (Sangita Misra & Anoop K Suresh).

[1] Directorate of Economics& Statistics, Government of Assam, Economic Survey of Assam,2020-21,pp.37

In an inquiry into the employment intensity of the sectoral growth of Botswana economy, T. Ajilore & O. Yinusa have found the employment elasticity of the mineral-led growth of the economy at a low point. The growth in the capital intensive mining sector has been mainly productivity driven; not employment driven that indicates a jobless growth of Botswana economy. In the study, the authors has suggested an effective mineral-led growth strategy for Botswana economy so as to diversify into sectors and activities that are relatively more labour-intensive (T. Ajilore & O. Yinusa).

In examining employment generating potentiality of growth in the Nepalese economy for the period of 1998-2018, M P Dahal& Hemant Rai have found that except a few sub-sectors such as mining and quarrying, and transport and communication, the economic growth in Nepal at aggregate and sectoral level was both employment and productivity driven. So, they have asserted that the economy of Nepal has witnessed a job enabling growth over the period of 1998-2018 (Dahal, Madhav Prasad & Hemant Rai).

In his empirical study, Rizwanul Islam has found that for poverty reduction, mere a high growth rate is not sufficient. Parallel to it, the pattern, sources and distributive aspects of the growth are equally important. Employment is an important linkage between the economic growth and poverty reduction. For poverty reduction, the economic growth must contribute to employment and productivity both. For achieving this goal, he has opined that the employment structure in the economy must be shifted away from low productive to those sectors or occupations with higher productivity such as from agriculture to higher productive manufacturing and other non-farm sectors (Islam).

In their modest attempt to identify the major macroeconomic determinants of the employment elasticity of growth in India for the period of 1993-94 to 2009-10, F Pattanaik & N C Nayak have found that the labour supply, economic structure, price instability and human capital are the major determinants of the employment elasticity of growth in India. They have suggested for the diversification of economic activities towards labour-intensive sectors, price stability and skill-based education for attaining a pro-employment growth in India (Falguni Pattanaik & Narayan Chandra Nayak).

Hence, emphasizing on employment aspect amidst of the economic growth for poverty reduction, some authors have examined the employment absorptive capacity of the growth through estimating employment elasticity of growth at aggregate and sectoral levels, while some others have tried to outline the major determinants influencing it for policy prescription. However, such kind of study has not so far been done for the economy of Assam. Despite the shift of employment away from agriculture to non-farming sectors, and spectacular growth in the service and industrial sectors of the state, the incidence of massive unemployment and poverty remain relentless and a stubborn challenge for the economy. So, it is highly essential to examine the employment absorptive capacity of the economic growth in the state both at aggregate and

sector specific level; and to suggest measures for gainful and sustainable employment opportunities to such vast labourforce of the state.

Objectives of the study:

i. To examine the employment elasticity of the economic growth in Assam both at aggregate and sector specific level over the post reform period.
ii. To examine the productivity intensity of economic growth in the state.
iii. To suggest measures for gainful employment potentiality in the different sectors of the state.

Research Questions:

i. Is the employment intensity of the economic growth in Assam in a declining trend in the post reform period?
ii. Whether is the productivity intensity of the growth in the state rising over the post reform period?

Research Methodology:

The methodology of the study contains mainly the conceptual, analytical and data framework.

The employment intensity is usually measured as employment elasticity with respect to economic output (Kapsos). Employment elasticity is a ratio between the percentage change in the number of employed persons in an economy or a region or a sector and a percentage change in economic output as measured through GDP.

For estimating employment elasticity of output, two vital approaches have been used-
(i) Compound annual growth rate (CAGR) approach that gives 'arc elasticity' and
(ii) Regression approach that gives 'point elasticity'.
The formula for estimating arc elasticity is as follows-

$$\varepsilon = \frac{\Delta L/L}{\Delta Y/Y} \quad \textbf{(Equation-1)}$$

Where, L stands for employment and Y for output, more especially GSDP. The numerator gives the % change in employment, while the denominator gives the % change in output. Due to the availability of employment data once in five years, the CAGR approach is widely used in India.

The second approach for estimating employment elasticity of output is Regression approach that gives point elasticity. Here, a functional relationship between employment and output (GSDP) is postulated and estimated. When the lengthy and reliable time series data on employment and output are available, this approach is applicable (Lim). So, this approach is of little use in India for the non-availability of time series data on employment on annual basis. The regression equation for estimating employment elasticity of output is as follows-

$$\ln L = \alpha + \beta \ln Y + u \quad \textbf{(Equation-2)}$$

Where α stands for intercept term, β for regression coefficient and u for the error term.

The estimated value of the regression coefficient (β) provides the employment elasticity of growth. However, output growth hinges on both the quantity of labour employed and labour productivity (Islam, 2004,pp.1-33). So, the relationship between employment elasicity, employment growth and productivity need to be identified. Kapsos(2005) gives an arithmetic identity between employment intensity and productivity intensity of growth as given below:

$$Y = L \times P \quad \textbf{(Equation-3)}$$

Where, Y stands for output, L for labour employed and P for productivity.

For a small change in output, the eqution-3 gives following result:

$$\Delta Y = \Delta L + \Delta P \quad \textbf{(equation-4)}$$

Dividing the equation-4 by output growth (ΔY), the relationship between employment intensity and productivity intensity of growth can be drawn as follows:

$$\varepsilon = 1 - \Delta P / \Delta Y \quad \textbf{(Equation-5)}, \quad \text{where } E = \Delta L / \Delta Y$$

The equation-5 has clarified the relationship between the employment intensity and productivity of growth (Kapsos) Based on this equation, the association between the employment intensity and changes in employment and productivity intensity in different scenarios of economic growth can be interpreted. A summary of this relationship is shown in chart-1:

Chart -1: Interpretation of the employment elasticities:

Employment elasticity	GDP Growth	
	Positive GDP Growth	Negative GDP Growth
$\varepsilon<0$	(-)employment growth (+)productivity growth	(+)employment growth (-)productivity growth
$0 \leq \varepsilon \leq 1$	(+)employment growth (+)productivity growth	(-)employment growth (-)productivity growth
$\varepsilon>1$	(+)employment growth	(-)employment growth

	(-)productivity growth	(+)productivity growth

Source: Steven Kapsos(2005): Employment intensity of growth- Trends and macroeconomic determinants, ILO,pp.4.

From the different cells of the table-1, the following inferences can be drawn-

In a country experiencing positive GDP growth with negative employment elasticity, the employment in the country will be declining and productivity be increasing. In a country with positive GDP growth and the employment elasticity lies between 0 and 1, both the employment and productivity in the country grow positively and the lower value of the elasticity (close to 0) correspond to less employment-intensive (more productivity).In country experiencing positive GDP growth with elasticity greater than 1, it would gain a positive employment growth at the cost of negative productivity growth. For the countries with negative GDP growth, the interpretation of employment elasticities in relation to employment growth and productivity growth is exactly the opposite.

Data: The study is based on the secondary data from various official sources. The GSDP of the state and the sectoral share in it for the study period have been collected from various issues of the economic survey of Assam. The time series data on the GSDP of the state and sectoral share in it are attainable as the data on these economic variables are published annually by the government of the state.

However, the time series data on the employment size for the state both at aggregate and sectoral level are not available. NSSO through the employment-unemployment surveys has provided the data on the work force participation rate (WFPR) for the country (India) and the states both at aggregate and sectoral level. But these are available on quinquennial basis (once in five years) for a couple of years such as for years 1993-94, 1999-2000, 2004-05, 2009-10, 2011-12. Moreover, the data on labour force participation rate (LFPR) and unemployment rate (UR) for 2015-16 and 2019-2020 has collected from the annual Report of Period Labour Force Survey. Taking the difference between LFPR and UR, the WFPR in the economy of Assam for 2015-16 and 2019-2020 has been calculated. Through the interpolation technique, the WFPF in the state for other years under the study period has been estimated.

However, WFPR gives employment data on rate basis; not the absolute figure on it. At first, the absolute figure on the employment in the state has been tried to estimate. This has been done through multiplying the WFPR[2] by the population size in working age of the state for the years in consideration. Then, the absolute sizes of the employment in the three broad sectors of the state- agriculture and allied sector, industry and service have been determined. For it, the percentage of the workforce engaged in different sectors.i.e. the employment rates over time has been taken from the NSSO reports, Office of the registrar general of India and RBI publications. Finally, multiplying the aggregate employment size of the state by the sectoral employment rates

[2]WFPR is measured as a percentage of the employed persons in the total population in working age of a state or a country for a year.

(sectoral shares in the aggregate employment), the absolute figures on the employment in different sectors of the state have been determined. This has been shown in the table-1,2 &3..

Table-1: Estimation of the aggregate employment of the state (Assam):

Years	WFPR (%) on usual status(ps+ss)	PSWA(,000)	Size of employment(,000)
(1)	(2)	(3)	(4)=(2) x (3)
1993-94	33.75	12800	4320.00
1999-00	34.05	14600	4971.30
2004-05	39.10	16630	6502.33
2009-10	36.30	18330	6653.79
2011-12	34.10	18459	6294.52
2013-14	37.87	18725	7091.16
2015-16	34.5	20250	6986.25
2019-20	31.90	23840	7604.96

PSWA stands for Population Size in Working Age

Sources: (i) NSSO reports,1993-94,1999-2000,2004-05,2009-10&2011-12 ; (ii) Economic Survey, Assam(various issues), Directorate of Economics& Statistics, Government of Assam; (iii) 5th annual employment-unemployment survey, Labour Bureau, Ministry of Labour & employment, 2015-16;(iv)Population projection by technical group, office of Registrar general of India, and (v) Annual Report, Period Labour Force Survey,2019-20.

Table-2: Sectoral share (%) in total employment in Assam's economy according to usual status (ps+ss):

Years / Sectors	1993-94	1999-00	2004-05	2009-10	2011-12	2013-14	2015-16	2019-20
i.Agriculture & Allied	65.1	59.85	56.55	53.1	51.05	47.5	44.5	42.1
ii.Industry	10.79	12.1	13.65	16.7	14.95	16.9	19.29	20.19
iii.Service	24.11	28.05	29.8	30.2	34.00	35.6	36.21	37.71

Sources: Same as in table-1

Table-3: Distribution of employment among the three broad sectors of Assam's economy over the post reform period:

Years / Sectors	1993-94	1999-00	2004-05	2009-10	2011-12	2013-14	2015-16	2019-20
i.Agriculture & Allied	2812320	2975323	3677068	3533162	3213352	3368301	3108881	3201688
ii.Industry	466128	601527	887568	1111183	941031	1198406	1347648	1535441
iii.Service	1041552	1394450	1937694	2009445	2140137	2524453	2529721	2867830

Source: Calculated by the author from table-1 &table-2

Discussion and Results:

Estimation of Aggregate Employment Elasticity of Growth in Assam using CAGR approach:

In Assam, the GSDP grows significantly high at 8.53% on an annual average, while the employment in the state increases at a small percentage(1.98%) on an annual average) over

the post reform period (1993-2020). As a result, the employment elasticity of growth in Assam's economy remains at a low point (0.31) over this period (table-4). Similarly, the employment elasticity of growth in the country (India) is also at low point (0.20) for 1999-00 to 2011-12[3]. Hence, the economy of Assam as Indian economy is growing without generating sufficient number of employment opportunities for its growing labour force, indicating a jobless growth to an extent. However, in the initial period of economic reform (1993-94 to1999-00), the employment elasticity of growth in Assam was moderate at 0.59, which has increased to 0.65 for1999-00 to 2004-05 period. Then, it has declined to a much lower point (0.06) for 2004-05 to 2009-10. Unfortunately, Assam's economy has experienced negative employment elasticity for a couple of years (during 2009-10 to2011-12 and 2013-14 to 2015-16). But, during the period of 2015-20, it has been recovered at 0.35 point. This indicates that 1% point growth in the GSDP of the state leads to only 0.35% point growth in employment during 2015-20(table-4). Hence, Assam has not experienced an employment enhancing growth even after successful implementation of various reform measures. The unemployment and poverty remain a relentless and adamant challenge in front of the macroeconomic management of the economy till now.

In contrast, over the post reform period, the productivity intensity of growth in Assam is found to be at a satisfactory point (at 0.69 on an annual average). This may be due to the use of modern technologies in various modes of production and improvement of knowledge and skills among the existing workforces. Hence, whatsoever the economy of Assam has achieved over the post reform period may be described as productivity driven growth; not employment driven growth.

However, in the early phase of the economic reform (up to 2004-05), the GSDP and the employment in Assam's economy had increased resulting in positive employment elasticity of growth . In this phase, both employment intensity and productivity intensity of growth were positive and satisfactory. Hence, the positive economic growth was associated with positive growth both in employment and productivity. Unfortunately, this ideal situation did not remain for a long. During 2009-10 to11-12 and2013-14 to 2015-16, though GSDP of the state has increased significantly, the employment growth has got negative point that result in negative employment elasticity. Given the positive GSDP growth (for these two periods), the negative employment elasticity associates with the negative employment growth and positive productivity growth (table-4). This finding is line with the inference of Kapsos as shown in table-1.

Table-4: Estimation of aggregate employment elasticity of economic growth in Assam for the period of 1993 to2020 using CAGR approach:

Periods	% increase on an annual average in		Employment Elasticity	Productivity Intensity of Growth
	Employment	GSDP		
(1)	(2)	(3)	(4)	(5)=1- (4)

[3] Sangita Mishra & Anoop K Suresh(2014): Estimating Employment Elasticity of Growth for the Indian Economy, RBI Working paper Series, Department of Economic and Policy Research, RBI,pp.9

1993-94 to 1999-00	2.11	3.58	0.59	0.41
1999-00 to 2004-05	6.16	9.51	0.65	0.35
2004-05 to 2009-10	0.47	8.1	0.06	0.94
2009-10 to 2011-12	-2.70	10.74	-0.25	1.25
2011-12 to 2013-14	6.32	7.92	0.8	0.2
2013-14 to 2015-16	-0.74	13.57	-0.05	1.05
2015-16 to 2019-20	2.21	**6.**30	0.35	0.65
1993-2020	**1.98**	**8.53**	**0.31**	**0.69**

* Annual % increase in employment has been calculated from the data set given in table-1 & Annual % increase in GSDP has been estimated from data set on GSDP of Assam available at various issues of Economic survey of Assam.

Estimation of Employment Elasticity of Sectoral Growth in Assam:
CAGR Approach:

So far as the employment elasticity of sectoral growth is concerned, for agricultural growth, it is found to be negative (- 0.03) over the post reform period (table-5). However; in the early phase of reform, it remained positive (up to 2004-05). Then, it tends to be negative up to 20111-12. Again, it becomes negative (-0.62) during 2013-14 to 2015-16.Of course, it bears a positive point for 2011-12 to 2013-14(0.58) and 2015-16 to 2019-20(0.22) (table-5). The Indian agricultural sector had experienced a positive employment intensity growth (1.09) for 1999-2000 to 2004-05. But it tends to be negative after 2004-05. During 1999-2000 to 2011-12, it bears a negative point (-0.08)[4].

However, the negative employment elasticity in agriculture sector of the state as that of the country reveals the shift of employment away from the agriculture sector to higher productive non-farming sectors. The vital factors that result in negative employment elasticity for agriculture sector of the state are found as follows. First, the trend of using modern labour saving technologies in agricultural activities of the state such as in ploughing and treading, which had been performed largely through bullocks earlier. This, in practice, producing labour substitution by machines has replaced many agricultural workers out of employment.

Secondly, the gradual decline in the labour force participation rate (LFPR) in the agriculture sector of the state as in the country for the last few decades. The increased students to population ratio in the rural areas and more among the female is found to be the root cause of it (Thomas).

However, the use of modern technologies leads to an increase in the agricultural productivity (per worker and per hectare) of the state. Appraisingly, instead of being affected by a number of adverse factors such as the perennial floods, increased human habitations, urbanization and small size of land holdings, the per hectare productivity indices(for all agriculture commodities) in Assam has increased from 113.36 in 2009-10 to 133.21 in 2014-15

[4] ibid

and further to 145.32 in 2019-20[5]. Hence, the present agricultural growth in Assam may be termed as productivity driven.

For industrial sector of the state, the employment elasticity is found to be 0.44 over the post reform period. For whole period of economic reform, this sector has witnessed a positive employment elasticity of growth, except bearing negative point for a short period during 2009-10 to 2011-12(table-6).Hence, positive industrial growth associates with positive employment growth resulting positive employment elasticity of industrial growth in the state. Note that among various sub- industrial sectors, the construction sector of the state is growing significantly and is generating sufficient employment opportunities, especially for unemployed persons in rural areas of the state having inadequate education and skills.

Growing service sector of the state during the post reform period has played an important role in the employment aspect of the state. The employment elasticity of the service sector over the post reform period is estimated to be at a moderate point (0.52) (table-7). In fact, this sector is able to absorb the surplus labour force of agriculture sector of the state to an extent. The telecommunication, tourism and logistic sector have been observed to grow and generate employment opportunities for a large number of people in the state. Of course, many rural youths owing to their inadequate education and skills are yet not able to take such employment opportunities in such emerging sectors and remain unemployed. Hence, a large number of rural people tend to rush to the construction, telecommunication, tourism and logistic sectors out of the agriculture. This indicates the structural change in the economy of Assam, which is admirable and needs to gear up in future.

The driving force underlying such growth in industrial and service sectors of the state is the successful implementation of the reform policy measures in the state. In fact, the government of the state by dint of various economic reform measures is capable of generating a favourable entrepreneurial and industrial atmosphere in the state, and is able to make fashion the efficiency and competiveness in the economy. Liberalizing the investment in most of the economic affairs, making flexibility in registration procedure, providing various incentives such as subsidy and concessional loans, tax concession for sufficient years, developing physical infrastructures for transport and marketing; and making suitable arrangement for technical services and for acquiring skills and knowledge, the government of the state has done most of the essentials for industrial and service sector growth in the state. Yet, the growth rates of the industrial sector and service sectors of the state are lagging behind the desired ones so as to generate sufficient employment opportunities in the state. Except tea and petroleum industries, no such heavy and

[5] (i) Statistical Hand Book Assam,2016,Directorate of Economics and statistics, Government of Assam, Guwahati,pp.115 &(ii) Statistical Hand Book Assam,2019,Directorate of Economics and statistics, Government of Assam, Guwahati,pp.70

major industries has grown up in the state till now , in spite of endowing with abundant resources(natural , human and capital). It has occupied a much low rank in all India ranking of states in industrial sphere.

Table-5: Estimation of employment intensity of Agricultural growth in Assam for the period of 1993 to2020 using CAGR approach:

Periods	% increase on an annual average		Employment Intensity of Agri-Growth
	in employment of Agriculture sector	in GSDP from Agriculture sector	
(1)	(2)	(3)	(4)
1993-94 to 1999-00	0.97	1.9	0.51
1999-00 to 2004-05	4.72	10.41	0.45
2004-05 to 2009-10	-0.78	4.2	-0.19
2009-10 to 2011-12	-4.53	3.82	-1.19
2011-12 to 2013-14	2.41	4.19	0.58
2013-14 to 2015-16	-3.85	6.26	-0.62
2015-16 to 2019-20	0.75	3.46	0.22
1993 -2020	**-0.04**	**4.89**	**-0.03**

* Annual % increase in employment in agriculture has been calculated from the data set given in table-3 & Annual % increase in GSDP from agriculture has been estimated from data set available at various issues of Economic survey of Assam.

Table-6: Estimation of employment intensity of Industrial growth in Assam for the period of 1993 to2020 using CAGR approach:

Periods	% increase on an annual average		Employment Intensity of Industrial Growth
	in employment of Industrial sector	in GSDP from industrial sector	
(1)	(2)	(3)	(4)
1993-94 to 1999-00	4.84	6.42	0.75
1999-00 to 2004-05	6.51	7.3	0.89
2004-05 to 2009-10	5.04	9.2	0.55
2009-10 to 2011-12	-7.66	7.9	-0.97
2011-12 to 2013-14	9.68	10.2	0.95
2013-14 to 2015-16	6.23	10.18	0.61
2015-16 to 2019-20	3.48	10.65	0.33
1993 -2020	**4.02**	**8.84**	**0.44**

* Annual % increase in employment in industry has been calculated from the data set given in table-3 & Annual % increase in GSDP from industry has been estimated from data set available at various issues of Economic survey of Assam.

Table-7: Estimation of employment intensity of growth in Service sector of Assam for the period of 1993 to2020 using CAGR approach:

Periods	% increase on an annual average		Employment Intensity of service sector Growth
	in employment of service sector	in GSDP from service sector	
(1)	(2)	(3)	(4)

1993-94 to 1999-00	5.65	6.82	0.83
1999-00 to 2004-05	7.79	8	0.97
2004-05 to 2009-10	0.74	12.2	0.06
2009-10 to 2011-12	3.25	8.1	0.40
2011-12 to 2013-14	8.98	12.55	0.72
2013-14 to 2015-16	0.10	4.48	0.02
2015-16 to 2019-20	3.34	5.31	0.63
1993 -2020	**4.26**	**8.21**	**0.52**

* Annual % increase in employment in service sector has been calculated from the data set given in table- 3 & Annual % increase in GSDP from service sector has been estimated from data set available at various issues of Economic survey of Assam.

Regression Approach:

Long-run employment elasticity (point elasticity) of growth in Assam at aggregate and sectoral level has been calculated through Log-Log Regression technique. For it, the annual time series data on the employment sizes for Assam's economy and its three broad sectors has been estimated through using interpolation technique on employment data set as given in table-3. The time series data on the GSDP of the state at aggregate and sectoral levels have been collected from various issues of the economic survey of Assam and these has been converted into real GSDP figures using wholesale price indices of the concerned years. Running Log-Log Regression on so generated time series of employment and GSDP for the state economy, the regression coefficient (β) has been found to be at 0.2966 over the post reform period. This indicates that for 1% increase in GSDP of the state, the employment in the state is predicted to increase by 0.2966%. The corresponding p-value for the regression coefficient being 0.000 less than 0.05 indicates that the result is significant (table-8). Hence, the result of the regression approach is almost similar to that of the CAGR approach (0.31) for the period of 1993-2020. For agriculture sector, the long-run employment elasticity is found to be negative (-0.0946) and insignificant as p-value (0.1544) is greater than 0.05(table-8). The value of point employment elasticity for industrial growth is estimated at 0.4309 and is significant. Similarly, the regression coefficient representing point employment elasticity for service sector is found to be at above of moderate rate(0.5909) and significant(table-8).

Table-8: Estimation of Employment Elasticity of Growth in Assam at aggregate and sectoral level for 1993-2020 using Log-Log Regression:

Sectors	Constant	Log-Log OLS Regression Coefficients	P-value
i.Agriculture & Allied	16.12201	-0.0946	0.1544
ii.Industry	6.726526	0.4309	0.0000
iii.Service	8.736740	0.5909	0.0000
All sectors(Assam's economy)	3.33977	0.2966	0.0063

However, for policy prescription, it is highly essential to investigate and understand the trend of the employment absorptive capacity of the different sub- sectors under these three broad sectors. It is important to know which ones among various sub- sectors have been more labour intensive and have higher potentiality for generating employment opportunities in future. For data limitation, this urgent task has to be ignored in the present study. Though the continuous annual income data on various sub sectors of Assam's economy are attainable in the government reports, the employment data of these sectors in Assam are barely available on either annual or five years basis. So, it becomes a hard job for a researcher to estimate the employment elasticity for these sub- sectors of Assam.

Conclusion and Policy Prescription:

Though at aggregate level, the employment elasticity of economic growth in Assam is positive, it is much low over the post reform period. The present growth in Assam's economy is largely productivity driven. For agriculture sector; the employment elasticity of growth is negative, indicating the fact of the shift of employment away from agriculture to non-farming activities in the state. Labour substitution by modern technologies and shift of the educated rural youths towards higher productive non-farming sectors are the root causes behind such movement. In contrast, the industrial and service sectors have witnessed a positive growth in both GSDP and employment aspect. The employment elasticity of growth in these two sectors is positive and moderate. Thus, the growing service and industrial sectors of the state have endured an important role in employment aspect of the state in absorbing the surplus labour force of the agriculture sector to an extent. However, in the context of massive unemployment in the state, the service and industrial sectors needs to grow at a higher rate so as to take care of employment itself. Besides, the rural youths should be imparted appropriate training and skills for facilitating the shift of their engagement away from agriculture to those activities in service and industrial sectors. Again, for a pro-poor growth in Assam, the agriculture sector of the state cannot be under emphasized. Given the higher concentration of rural poor on agriculture, this sector needs to be developed properly with appropriate measures.

Under such circumstances, the following has been suggested for policy prescription-

i. For a smooth shift of surplus labourforce from agriculture to non-farming sectors, the rural youths needs to be imparted appropriate education, training and skills through effectively implementing suitable skill and training development schemes in rural areas of the state.
ii. For ensuring the gainful employment of the existing workforce in the agriculture sector of the state, the agriculture sector of the state needs to be developed properly furnishing with all the requisites and reform measures by the government. Moreover, the existing agricultural workers should be made acquaintance of proper knowledge and techniques of scientific cultivation, marketing, product diversification and cropping intensities.

iii. For attaining a higher growth rate in industrial sector and service sectors of the state, in addition to the provision of the necessary infrastructure, resources and other incentives, the government needs to generate sufficient number of enthusiastic and groomed entrepreneurs in the state. For it, the government may compel the industries and commerce department to organize regularly the awareness/ motivation programmes on entrepreneurship development.

iv. For attaining and sustaining the jobs in the era of automation, labourforce of the state needs to be aware of the skill need and learning of technological knowhow/ machine-conversion from non-skilled to skilled.

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