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IMPACT OF SERVICE SECTOR ON ECONOMIC GROWTH: EVIDENCE FROM NORTH EAST INDIA

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Abstract: *The importance of service sector has been increasing in current economies of the world. In India, the service sector has been contributing more than 60 percent of total GDP. However, this growth is not uniform across all the regions of the country. This study is an attempt to examine the impact of service sector on the economic growth of North East India. Further, we have tried to analyze the linkage between service and non-service sector for the North-Eastern states of India using Granger causality test under Vector Error Correction Mechanism (VECM). The study uses secondary data compiled from the Handbook of Statistics on Indian Economy published by Reserve Bank of India from 1991 to 2017. A significant and positive influence of the growth of service sector on the overall economic growth for the states of North East India is visible from the study. However, it has been observed that the linkage involving service and non-service sector is relatively poor for the states of North East India.*

Keywords: *Economic Growth, North East India, Service Sector, Fixed effects, Panel data, VECM.*

JEL Classification: *L80, L89, O14, O47.*

INTRODUCTION

In any economy, structural changes have been conventionally coupled with the progression of economic development. As the insights from development economics suggests, economic activities move from agriculture towards industry and finally towards service sector when the economy becomes highly developed. As observed in the Indian context, the pattern doesn't seem to exactly replicate in the same way. Compared to the growth of industrial sector, India showed a rapid growth of service sector in the process of economic development (Singh, 2012; Bansal, 2013). In case of Indian economy service sector has become the largest sector and it has been growing faster than the other sectors after liberalisation. Along with rapid growth, the contribution of service sector towards GDP is also very high (Hansda, 2001). The influence of service sector on growth of the economy is a matter of

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immense significance to a nation. Because of the high potential in services which drive economic growth, a number of studies have been conducted focusing on services in the recent past. But most of the studies have been conducted on national economy. Though services have been growing significantly, the growth pattern has not been consistent across all regions. Therefore, it is very difficult to explore the growth effects of service sector if there is no regional level study. What is true for a nation as a whole may not be true for a particular region. According to Sabri *et al* (2012), Indian service economy is growing through the knowledge industries, like IT services, entertainment and media, biotechnology, pharmaceutical, and health services, but their impact is minimal in the North-East region of India.

This paper is an attempt to address the gap by investigating empirically the impact of service sector on the economic growth of North East India - a region consisting of eight states of India and home of 45.8 million populations as per 2011 census, which is isolated from mainland India. In addition, we have also tried to analyze the linkage between service and non-service sector for North East economy. Since this region is yet to receive any similar consideration in most of the regional level or state level studies, understanding the impact of service sector on economic growth would provide important insights and assist policy makers to identify optimal policies for accelerating economic growth in this region. The rest of the paper is organized as follows, Section 2 gives a brief description of services; Section 3 depicts the picture of North Eastern service sector in India; Section 4 introduces a theoretical model which explains the growth effects of the service sector; Section 5 is devoted to the empirical investigation of the growth impact of service sector and finally, in Section 6, we put down our concluding remarks.

SERVICES: AN OVERVIEW

During classical period, services did not receive much attention because apart from primary and secondary sector, classical economists considered other activities as 'unproductive'. According to them, the productive employment must fulfill two conditions, firstly, they should lead to the production of tangible objects which is a pre requisite condition for accumulation and secondly, they should give rise to a surplus that could be made available for future re-investment. On the other hand, if any employment did not generate tangible assets as well as some surplus for re-investment, then the employment is considered to be unproductive and workers engaged in such occupations were taken to be unproductive (Melvin, 1995). The role of services in the process of economic development gained importance during the stage theories of development. Fisher (1935) divided the economy into three sectors: primary, secondary and tertiary sector. Among these three sectors, the service sector has been considered as more diverse than the other two sectors, agriculture and industry even at the aggregate level. Thus, if the primary sector involves producing commodities directly from natural resources and secondary

sector involves transforming material goods into other more valuable products and commodities, then, the service sector includes all activities that do not produce or modify material goods. The outputs of agriculture, mining or manufacturing are material and tangible. But the output of service sector such as teaching, selling, entertaining etc. have no physical form and therefore are immaterial and intangible. Thus, services are used to represent a diverse group of economic activities which are non-storable, non-transferable and intangible.

SERVICE SECTOR IN NORTH EAST INDIA

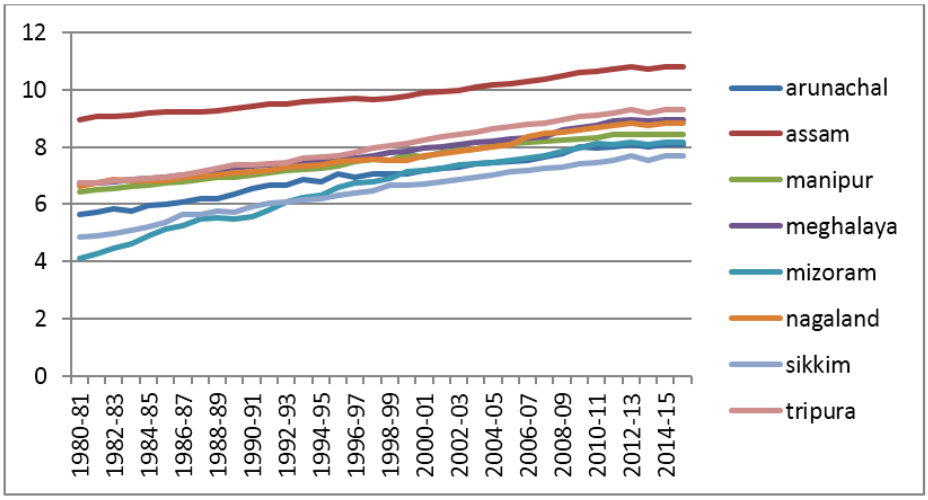

Figure 1: Trend of service sector SDP(NER)[1]

Figure 1 depicts the service sector SDP trends in North East Region (NER) of India from 1980-81 to 2014-15. It is evident from the figure that the trend of North Eastern service sector SDP has been increasing over the years and the trend cuts across all the states of North East Region without any exception.

Digging deeper, we look into the share of service sector in SDP of the states of North East India. The share of service sector at aggregate and disaggregate levels has been looked at. From the data presented in Table1 it is observed that during 1991-2001, the average share of service sector SDP was 39.33 percent for Arunachal Pradesh which had increased to 56.08 percent during 2001-2011. For Assam the average share was 44.53 percent in 1991-2001 which had increased to 57.34 percent in the next decade. Similarly, the share of service sector SDP can be witnessed to be increasing significantly for almost all the states of North East India with an exception of Meghalaya which had experienced a slight fall in the share of service sector SDP from 66.06 percent during 1991-2001 to 65.18 percent in the next decade. Among all the states the share of service sector SDP was highest for Sikkim during 1991-2001 whereas it waslowest for Arunachal Pradesh during the same period. Although the share of service sector SDP for Arunachal Pradesh increased significantly in the next decade and rose to 56.08 percent during 2001-2011 from 39.33 percent in 1991-2001, but it was still lower compared to other

1 *Source: Generated by authors*

seven states. Mizoram's service sector SDP share also took a giant leap during 2001-2011; it jumped from 52.12 percent in the previous decade to 72.64 percent in 2001-2011 moving ahead of Sikkim in terms of service sector share in SDP.

Table1: Share of service sector SDP in total SDP- Average (in percentage)[2]

States	1991-2001	2001-2011	1991-2011
Arunachal Pradesh	39.33	56.08	47.49
Assam	44.53	57.34	50.89
Manipur	63.17	67.21	65.08
Meghalaya	59.02	63.51	61.3
Nagaland	66.06	65.18	65.74
Sikkim	67.07	68.02	67.33
Tripura	58.99	67.68	63.26
Mizoram	52.19	72.64	62.07
NER	56.30	64.71	60.40

We have also analyzed the share of services sub sectors to the service sector SDP for each state. From the data in Table 2 it is observed that in Arunachal Pradesh the share of construction is highest among all the services sub sectors which is followed by other services and public administration whereas the share is lowest for banking and insurance. In case of Assam the share is highest for trade, hotels & restaurants followed by other services and construction and the share is lowest for real estate, ownership of dwelling and business services. In Manipur, the situation is exactly same as that of Arunachal Pradesh. However, for Meghalaya, we have found that the share is highest for public administration followed by real estate, ownership of dwelling and business services, and construction service whereas the share is lowest for banking and insurance. In Nagaland, it is observed that real estate, ownership of dwelling & and business services takes the highest share whereas the share is lowest for banking and insurance. For Sikkim, construction service takes the highest share and the share is lowest for banking and insurance. Finally we have observed that for both the cases of Tripura and Mizoram, the share is highest for trade, hotels and restaurants whereas for Tripura, banking and insurance takes the lowest share and in case of Mizoram, the lowest share has been experienced by transport, storage and communication service.

2 *Source: Calculated by authors*

Table 2: Share of services sub sectors to service sector SDP (in percentage)[3]

	Construction	Transport, storage & communication	Trade, hotels & restaurants	Banking & insurance	Real Estate, ownership of dwelling & business services	Public Administration	Other services
Arunachal Pradesh	38.03	4.48	9.97	4.22	4.62	18.92	19.77
Assam	13.18	7.57	29.84	6.14	4.15	11.53	27.58
Manipur	36.01	4.17	15.26	2.78	5.74	17.87	18.16
Meghalaya	17	8.55	16.97	4.36	18.7	20.7	13.71
Nagaland	15.7	18.1	6.54	2.65	22.21	20.76	14.04
Sikkim	24.86	4.34	9.55	3.71	17.38	17.42	22.73
Tripura	18.73	4.76	24.63	3.65	6.73	18.11	23.38
Mizoram	16.32	3.26	22.49	3.42	14.06	20.31	20.13

SERVICE SECTOR AND GROWTH OF AN ECONOMY: THEORETICAL FRAMEWORK

Let us try to put the theoretical framework in place using Solow growth model (1956) to analyze the growth impacts of service sector SDP. We begin by defining the production function

$$Y_t = AK_t^{\alpha} L_t^{1-\alpha} \tag{1}$$

Equation (1) represents a Cobb-Douglas production function, the proportion of capital (K) is represented by and that of labor (L) is represented by . The technological parameter is represented by . On dividing (1) by on both sides, the transformed Cobb-Douglas production function becomes

$$y_t = Ak_t^{\alpha} \tag{2}$$

where $y_t = \frac{Y_t}{L_t}$ and $k_t = \frac{K_t}{L_t}$.

Equation (2) can be interpreted as production function per unit of labor.

Taking log on both sides of (2) we get

$$\log y_t = \log A + \alpha \log k_t \tag{3}$$

Consider δ as the depreciation of capital stock in a unit time period. So the change in capital stock can be written as

3 *Source: Calculated by authors*

$$K_{t+1} - K_t = S_t - \delta K_t \tag{4}$$

Since at equilibrium, I_t=S_t, we can replace I_t with S_t and rewrite (3) in the following form

$$\Delta K_t = I_t - \delta K_t \tag{5}$$

where, $\Delta K_t = K_{t+1} - K_t$.

If fraction of investments in service sector SDP (SSDP) is represented using β_1 then,

$$I_t = \beta_0 + \beta_1 SSDP_t \tag{6}$$

where, is the intercept term.

Substituting (5) in (4) we get the following expression

$$\Delta K_t = \beta_0 + \beta_1 SSDP_t - \delta K_t \tag{7}$$

On dividing both sides of (6) by L_t we get

$$\Delta k_t = \frac{\beta_0}{L_t} + \beta_1 \left(\frac{SSDP_t}{L_t}\right) - \delta k_t \tag{8}$$

On differentiating (3) with respect to time we get

$$\frac{dy_t}{y_t} = \frac{dA}{A} + \frac{\alpha}{k_t}\left\{\frac{\beta_0}{L_t} + \beta_1 \left(\frac{SSDP_t}{L_t}\right) - \delta k_t\right\} \tag{9}$$

On further simplification, (9) can be written as

$$\frac{dy_t}{y_t} = \frac{\alpha\beta_1}{k_t}\left(\frac{SSDP_t}{L_t}\right) + \Sigma \tag{10}$$

where, $\Sigma = \frac{\mathrm{dA}}{\mathrm{A}} + \frac{\alpha\beta_0}{k_t L_t} - \alpha\delta$.

If we differentiate (10) with respect to $\frac{SSDP_t}{L_t}$ we get

$$\frac{\partial\left(dy_t/y_t\right)}{\partial\left(SSDP_t/L_t\right)} = \frac{\alpha\beta_1}{k_t} > 0 \tag{11}$$

Equation (11) makes it evident that service sector SDP per unit of labor effects the per capita economic growth positively. Hence, a positive relationship between per capita income and per capita service sector SDP can be theoretically established.

EMPIRICAL RESULTS

For further understanding the relationship between the economic growth and the growth of service sector of North-East India, an empirical analysis is conducted. Given the theoretical linkage between service sector and economic growth, our model takes the following functional form:

$$\log\left(\frac{y_{it}}{y_{i(t-1)}}\right) = \alpha + \beta \log\left(\frac{SSDP_{it}}{L_{it}}\right) + \beta' Z' + u_{it} \tag{12}$$

Therefore,

$$G_{it} = \alpha + \delta S_{it} + \beta' Z' + u_{it} \tag{13}$$

where, $G_{it} = \log\left(\frac{y_{it}}{y_{i(t-1)}}\right)$, y_{it}, stands for annual growth rate of per capita income of i^{th} state in period t, S_{it} is the logarithm of per capita service sector SDP of i^{th} state in period t and indicates vector of control variables which are supposed to affect per capita income growth of i^{th} state. A positive and significant value of δ (coefficient of S_{it}) would provide evidence in favor of service led growth.

To identify some variables which may have impact on economic growth, the first control variable is taken as the difference in the initial per capita income. The states with lesser per capita income usually show a higher rate of growth as can be derived from the convergence hypothesis (Solow, 1956). Thus, the share of agricultural sector in total SDP has been introduced as a proxy for differences in the production structure of the economies which might have different impact on economic growth. It is because of the fact that agricultural sector shows relatively lesser productivity growth and also lesser payback of technological advancements (Nagaraj *et al*, 1998). Thus, if the proportion of agriculture in total SDP is higher, the expected growth rate of per capita income will be lower. We have also introduced another control variable namely, 'rest of regional growth', because economic activities of neighboring regions may affect economic activity of a particular region (Baumont *et al*, 2001). Rest of the regional growth has been defined as per capita NSDP growth at 2004-05 prices of North-Eastern region after discounting NSDP and population values of i^{th} state. Now-a-days, trade liberalization has been considered as the most important component of globalization. It is the trade liberalization through which globalization influences growth dynamics of developing economies. (Debnath *et al*, 2013). Thus trade liberalization has also been included in our model as a control variable as it can possibly impact economic growth in either ways. It is defined as the ratio of the sum of export and import to GDP. We have introduced per capita real social sector expenditure in our model which is the ratio of the per capita expenditure on social sector to the price level. It is expected that this might have a positive impact on economic growth. Finally,

population growth has been included in the model assuming that this might have a negative impact in economic growth.

Now incorporating the above mentioned variables, the final equation can be depicted as:

$$G_{it} = \alpha + \delta_i S_{it} + \beta_1 \log\left(y_{i(t-1)}\right) + \beta_2 \log(SA_{it}) + \beta_3 \log(PCRSSE_{it}) + \beta_4 RRG_{it} \quad (14)$$

$$+ \beta_5 TL_t + \beta_6 PG_{it} + u_{it}$$

Here, δ_i represents the state-specific effects of service sector growth, in a particular state it remains invariable over time but across states it varies. The variable TL is not state-specific but varies over time. The description of the abbreviations, definitions and variable sources are provided in the Appendix.

In order to estimate the above equation, panel dataset has been used which includes all the states belonging to North Eastern part of India for the time period 1991 to 2017. Here the most important issue of concern is to choose one out of the two methods: one being the pooled OLS method and other which allows for state specific effects. To put things simplistically, pooled OLS method signifies that no disparity exists in the estimated cross section and the data set under consideration is a priori homogeneous. But since this assumption is highly restricted in nature, it does not depict the actual scenario of the relationship among variables (Asteriou, 2006). Therefore, the Redundant Fixed Effect (RFE) test is required to make choice out of the pooled OLS and the fixed-effect methods. Literature suggests the use of the standard F-test for this purpose (Asteriou, 2006). The RFE test shows that we cannot reject the null hypothesis of a uniform intercept. However, uniform coefficient for per capita service sector SDP growth can be rejected at 1 percent level of significance. Rejection of the pooled OLS method indicates that the incremental effect of service sector growth variable is not consistent across cross section.

After rejecting the pooled OLS method, Hauseman Test has been conducted to make a choice between the Fixed Effect and the Random Effect models. Through this test, the consistency of an estimator is assessed by weighing it against a less efficient estimator. Further details on Hauseman Test can be found in Asteriou (2006). The test helps in evaluating whether a statistical model pertains to the data. Our result indicates that Fixed Effect model is suitable. In literature, this model has been identified as the fixed effects model because even if the coefficient of per capita service sector SDP may differ across individual states, there is no change in each individual state's coefficient over time. The model has been estimated by keeping the intercept constant but allowing for different coefficients of the variable per capita service sector SDP. Table3 reports the estimated fixed effects results.

Table 3: Impact of Service Sector on Economic Growth: Fixed Effect Results[4]

	Dependent Variable	
Variables	**Coefficient**	**t-statistic**
Constant	0.44	3.62***
S_{it}	0.004	9.59***
$Y_i(t\text{-}1)$	-0.04	-3.55***
RRG_{it}	-0004	-0.59
$\log (SA)_{it}$	-0.03	-2.17***
$\log (PCRSSE)_{it}$	0.01	1.85**
TL_t	0.01	1.41
PG_{it}	-0.007	-5.11***
$\bar{R}^2$ =0.51		

We have seen from the table that the sign of the coefficient of S_{it} is positive and statistically highly significant; indicating that growth of service sector has a positive impact on economic growth. The presence of fixed effects indicates that though the growth of service sector has a significant positive impact on economic growth in all the states of North East India, such impacts are state specific; that is; service sector growth does not give equal benefit to all the North Eastern states. Now among the control variables, we have seen that except for trade liberalization, all other estimated coefficients of the variables are statistically significant. The estimated coefficient of initial per capita income is negative and it is statistically significant at one per cent level showing that the conditional beta convergence is present among the states of North East India. It has been found that the economic growth has a positive spillover effects within this region since the coefficient of 'rest of regional growth' variable is positive and significant. As expected, the coefficient of the variable 'agricultural share to SDP' has been found to be negative and statistically significant at one per cent level. It has been further observed that the economic growth is higher for the states where the per capita real social sector expenditure is comparatively higher. This is because the coefficient of per capita real social sector expenditure is positive and significant at five per cent level. Interestingly, the coefficient of trade liberalization has been found to be insignificant which indicates that trade liberalization does not have any significant impact on the North Eastern states of India after 1991. Finally, as expected, the impact of population growth on the growth of an economy has been found to be negative.

From the above discussion, it has been observed that the growth of service sector has a positive impact on the overall economic growth of north east region.

4 *Source: Estimated by authors.*

*Note: 1. ***and ** indicate significant at one percent and five percent level. 2. The heteroscedasticity bias of standard errors has been corrected by using the White's estimator.*

Now let us see whether there exists any inter linkage between service sector and non-service sector. As a first step towards analyzing the inter linkage between service sector and non-service sector, the stationary property of per capita income of non-service sector as well as per capita income of service sector (both in logarithmic form), has been tested by Phillips-Perron unit root test. Results of this test are shown in Table 4

Table 4: Phillips-Perron panel unit root test[5]

Series	Level[@]	First difference[#]
$PCI(NS)_{it}$	34.34	204.49***
$PCI(SS)_{it}$	14.44	151.97***

From the table it is observed that the series are non-stationary at level but stationary at first difference. Since all the series are integrated of the same order – integration of order 1, co-integration technique can be used in order to check whether there exist any long run relationship or not.

Johansen panel co-integration test as developed by Maddala and Wu (1999) has been conducted to test for the existence of long run relationship among variables. Table - 5shows the results of panel co-integration tests under the null hypothesis of no co-integration.

Table-5: Johansen Panel Cointegration Test[6]

Hypothesized number of cointegrating equation(s):H_0	Trace Statistic	Maximum Eigen value	*p* value
None (r = 0)	15.55	13.50	0.03
At most 1 ($r \leq 1$)	2.05	2.05	0.15

The results of the above table indicate that the null hypothesis of the zero co-integrating vector is rejected using the 99% critical value. This implies that the variables are co-integrated with at least one co-integrating vector. Given the evidence of co-integration, the long-run relationship among the variables can be expressed as:

$$PCI(NS) = 3.16 + 1.06\, PCI(SS) \tag{15}$$

The above co-integration Equation shows the sign of the coefficient of *PCI (SS)* is positive which indicates that if per capita income of service sector were to increase by one unit, per capita income of non-service sector would increase by 1.06 units.

5 *Source: Conducted by authors.*

*Note: *** indicates significance at 1 percent level. @ indicates with drift and trend, and # indicates with drift only. The residual spectrum has been estimated by the Bartlet kernel method with Newey-West bandwidth selection.*

6 *Source: Conducted by authors.*

Note: r indicates number of cointegrating vectors.

GRANGER CAUSALITY UNDER VECTOR ERROR CORRECTION MECHANISM

If the variables are having relationship in the long run, this only indicates the degree of association i.e, from the co-integration equation it can be said whether output of i^{th} sector will increase or not if output of j^{th}sector increases, but it cannot be said whether it is output of i^{th} sector that causes the output of j^{th} sector to change, or the other way around. In order to examine the direction of linkage, Granger causality tests should be conducted among the variables (Raju and Kurien, 2005; Sinha and Mehta, 2014). But if the variables are co-integrated in a VAR first-differences system, a vector error correction model (VECM) setting must be proposed to perform Granger causality test (Greene 2008). Thus, to analyze in details the long-run adjustments, following panel vector error correction models have been proposed:

$$\Delta PCI(NS)_{i,t} = \alpha_1 + \sum_{i=1}^{n} \beta_{1,l}\, \Delta PCI(NS)_{i,t-1} + \sum_{i=1}^{n} \gamma_{1,l}\, \Delta PCI(SS)_{i,t-1} + \lambda_1 ECT_{t-1} + \varepsilon_{1,i,t} \quad (16)$$

$$\Delta PCI(SS)_{i,t} = \alpha_2 + \sum_{i=1}^{n} \beta_{2,l}\, \Delta PCI(NS)_{i,t-1} + \sum_{i=1}^{n} \gamma_{2,l}\, \Delta PCI(SS)_{i,t-1} + ECT_{t-1} + \varepsilon_{2,i,t} \quad (17)$$

Where index i refers to the state $(i = 1,\ldots,8)$, t refers to the time period $(t = 1,\ldots, T)$ and l refers to the lag. $\varepsilon_{1,i,t}$,$\varepsilon_{2,i,t}$ and $\varepsilon_{3,i,t}$ are supposed to be white-noise errors. λ_1,λ_2 and $\lambda_3$are coefficients for the error-correction terms. These coefficients are expected to capture the adjustments of$PCI(NS)_{it}$ and $PCI(SS)_{it}$ towards long-run equilibrium. In our case, Equation (16) is used to test causation from per capita income of services sector to per capita income of non-service sector. If all the $\gamma_{1,l} = 0$, change in *PCI(SS)*does not Granger cause change in *PCI(NS)*. Equation (17) is used to test causality from the non-service sector to services sector. Change in *PCI(NS)* does not Granger cause change in *PCI(SS)*, if all the $\beta_{2,l} = 0$.

The VECM approach not only shows the direction of Granger causality among the variables, it also makes distinction between "short-run" and "long-run" Granger causality. The former is generally referred to as the Channel 1 source of causation and can be evaluated by testing whether the estimated coefficients on lagged values are jointly statistically significant. This can be done using the F test. On the other hand, long-run Granger causality is generally referred to as the Channel 2 source of causation and can be evaluated by testing whether the coefficient of the error correction term in each equation [that is, $\lambda_1 = 0$; $\lambda_2 = 0$] is statistically different from zero by a t-test. The empirical results of causality through these channels are shown in Table 6.

Table 6: Granger causality test result under VECM[7]

Dependent Variables ↓	Explanatory Variables			$\overline{R}^2$
	$\Delta PCI(NS)_{it-1}$	$\Delta PCI(SS)_{it-1}$	ECT_{t-1}	
		F-statistics	t-statistics	
$\Delta PCI(NS)_{it}$	1.97	0.40	-0.20*** (-3.67)	0.44
$\Delta PCI(SS)_{it}$			0.00 (0.29)	0.02

From the above table, it has been observed that the value of F statistic is insignificant in both the equations which suggest that there is no short run causation between non-service sector and service sector for the states of north-east India. Focusing first on the non-service sector equation, i.e., equation (4), it is found that the t-statistics of the error-correction term is highly significant which suggests the existence of long run causality from service sector to non-service sector. The estimated error correction coefficient (-0.20) of Equation (5) indicates that the annual adjustment of $PCI(NS)_{it}$ will be 20 percent of the deviation of $PCI(NS)_{it-1}$ from its co-integrating value. That is if *PCI(NS)* is above its equilibrium value by one point in any time, *PCI(NS)* falls by 0.20 points on average in the next year and vice versa. However, equation (5) shows that the error correction term is insignificant. This suggests that per capita income of non-service and service sector do not react to the co-integrating errors. Therefore, these variables are exogenous in the long run.

Thus it can be said that there exists a unidirectional causation which runs from service sector to non-service sector only in the long run. It implies that the linkage between service sector and non-service sector is relatively poor for the states of North East India.

CONCLUSION

The North Eastern Region has been experiencing a high growth of service sector in the post reform period. The share of service sector in North Eastern region was 56.30 percent in 1991-2001 which has increased around 64.71 percent in 2001-2011. In this paper, we have tried to analyze the impact of service sector on overall economic growth of North East India and it has been observed that the growth of service sector has a positive and significant impact on the overall economic growth of North Eastern Region. However, we have observed relatively poor linkage

7 *Source: Estimated by authors*

Note: *** represents 1 percent level of significance. Diagnostic tests (not reported) conducted for residual autocorrelation are found to be satisfactory.

between service and non-service sector for the North East economy since there is a unidirectional causation that runs from service sector to non-service sector only in the long run. This may be because of the incompatible growth of non-service sector. Therefore, government should give priority for the development of agricultural and industrial sector to foster rapid and sustained growth in North East India. From the findings of the present study it can be said that for in order to have speedy economic growth of the North Eastern states, market oriented development process is not sufficient. Although the central government takes powerful policy instruments to develop service sector for stimulating economic growth, success in the long run depends on choosing the right policy instrument. Since North East Region is geographically isolated from mainland India, therefore, more emphasis should be given on strengthening the interstate trading within North East Region.

The major limitation of the study is that some of the important variables which may have impact on economic growth have not been included in our model. This is because of non-availability of relevant data of variables in the context of North East Economy. Future study in this area should examine the diversification of service sector growth and its impact on overall economy, though such study would face some difficulties regarding non availability of appropriate data of the region.

Appendix: Abbreviations, variables definition and sources

Abbreviation	Definition	Sources
Y	Real per capita NSDP at constant 2004-05 prices	Hand Book of Statistics on Indian economy, RBI, various issues
RRG	Rest of the regional growth defined as Per capita NSDP growth at 1999-2000 prices of northeastern region after deducting NSDP and population values of i^{th} state.	Authors' estimate from Hand Book of Statistics on Indian economy, RBI, various issues
SA	Share of agriculture in NSDP defined as net agricultural domestic product divided by NSDP.	Hand Book of Statistics on Indian economy, RBI, various issues
PCRSSE	Per capita real social sector expenditure defined as per capita social sector expenditure divided by price level.	State Finances : A Study of Budgets, RBI, various issues
TL	Trade liberalisation defined as ratio of export plus import to GDP.	Hand Book of Statistics on Indian economy, RBI, various issues
PG	Population growth.	Hand Book of Statistics on Indian economy, RBI, various issues

Note: For Mizoram, NSDP data at constant price is not available before 1999. Therefore, we have used the formula: NSDP at constant price = NSDP at current price/ SDP deflator, where, SDP deflator = NSDP at current price/ NSDP at constant price. Average SDP deflator of North East states has been used as a proxy of SDP deflator to find out NSDP data of Mizoram at constant price.

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