On the Relation between Growth of Employment and Output Across States in India

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Abstract

Employment and Output are important elements featured in the economy as their progress is the major driving force behind the development of an economy. The paper observes the state of employment conditions prevailing across the various states in India. States are categorically divided into two parts using the criteria of their contribution in the Net Domestic Product. The relationship between employment and growth in terms of State Domestic Product has also been observed in terms of elasticity and regression analysis separately in order to find out whether the go hand in hand to bring about progress in the economy. Results show a positive relationship between growth of employment and growth of output.

Keywords
Output Elasticity of Employment, Job-loss growth, Employment rate, Growth rate of output.

1. Introduction

a. Introduction

Employment is a major macroeconomic indicator which determines the level of aggregate demand in an economy. In developing countries, lack of employment opportunities force the people to maintain a low standard of living. Thus, the vicious circle of poverty remains in the economy. Countries which start with a low level of capital tend to have low investment owing to which there is low demand followed by low output and thus low employment. Even with high quality of education which is compatible to that of the prosperous western world, job opportunities are marginal. This leads to migration of the highly skilled labour force to the countries inviting them and luring them with the lucrative opportunities and incentive which their home country is unable to afford for all. Employment is the most important engine of growth. Employment creates demand which proved an incentive for producers to increase output. In this paper we shall observe the state of employment conditions prevailing

across the various states in India. It is considered by most observers of the Indian economy that the employment conditions of the country is poor. This context needs proper clarification as presise answers to questions such as the direction of trends of change of the employment scenario, its nature and its relationship with growth is of worth mentioning. This makes research on such a topic a challenge. Among numerous such challenges, the one which need special mentioning is that, the structure of India's economy, as indeed of most developing economies, is fundamentally different from those of the more prosperous and admistratively dominative developed countries. The conceptual tools and statistical indicators used to analyse the employment conditions in those economies are mostly inappropriate for the analysis of employment conditions in developing countries.(Ghosh.A,2016)

Employment and Growth must go hand in hand in order to obtain progress in terms of development.Both are parallel dependent on each other.

In this paper we divide the states into two categories using State domestic Product (the contribution of each state in the Net Domestic Product of the economy).

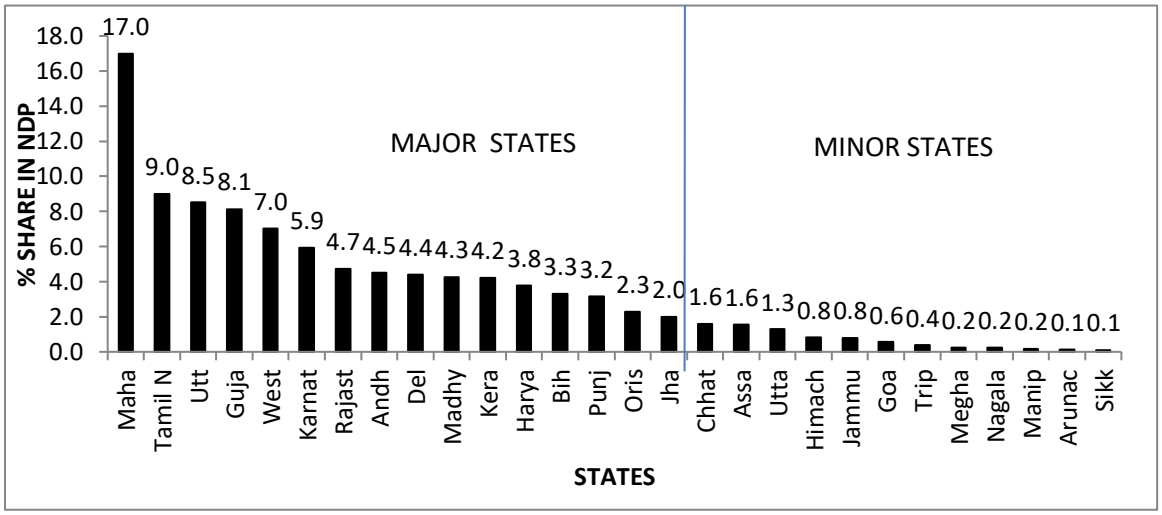
Since the states constitute the country, therefore there must be some relation between the SDP earned by the states and the country's Net Domestic Product. The results obtained on observation of the contribution through to the observed periods are as follows:

- The states contributing a marginal amount near to zero to the GDP throughout and consistently are Arunachal Pradesh,Goa, Manipur, Meghalaya, Mizoram, Nagaland, Tripura.
- Himachal Pradesh, Jammu and Kashmir, Uttar Pradesh and Uttaranchal have been contributing consistently 1% to the NDP.
- Kerala has been contributing consistently 4% to the NDP.
- Tamil Nadu has an increase in contribution to NDP from 8% to 9%.
- Assam contributed 3% in the initial period of observation 1993-94 but from then on its contribution fell to a consistent level of 2%.
- Similar observations were seen for Bihar with a consistent contribution of 3%; Madhya Pradesh (5% to 4%); and Punjab (4% to 3%).
- Odisha had been contributing a regular amount of 3% till 2009-10 but fell in the final observed year in 2011-12 (2%).
- The increase in contribution has been observed in the states of Delhi (3% to 5%); Gujrat (6% to 8%); Maharashtra (16% to 18%), Rajasthan (4% to 5%) , Haryana (3% to 4 %).
- West Bengal and Rajasthan has been contributing somewhat constantly at 7.5% and 4 to 5% respectively.
- Other consistent contributors are Andhra Pradesh at 5%, Chattisgarh at 2% and Jharkhand at around 2% and Karnataka at around 6%.
- Some states had a fall in their contribution in NDP such as Madhya Pradesh (5% to 4%), a significant fall for Sikkim (7% to 4%)

Thus we see that the highest contributor is Maharashtra towards the county's NDP.

There is one thing to be noted here is that a major factor affecting contribution of SDP is the size or the population of the state. Those states with a low population shall be able to contribute only a small amount to the GDP. Other factors affecting are the geographical location, the nature of work available and the climatic conditions interfering with daily life of the people.

Fig 1: Relative Share of Net State Domestic Product to All India NDP in 2013-14.



Source: Calculated from data for the period 1993-94 to 2013-14 related to SDP at factor cost from Central Statistics Office (CSO).

Considering the year 2013-14 and the logic that the major contributors have always been at almost the same level throughout our observed periods, we have divided the states into two major categories i.e. *major states* which include Maharashtra, Tamil Nadu, Andhra Pradesh , Gujarat, Uttar Pradesh, West Bengal, Karnataka, Madhya Pradesh, Bihar, Delhi, Rajasthan, Kerala, Haryana, Punjab, Orissa, and Jharkhand and the *minor states* include Assam , Himachal Pradesh, Goa , Tripura, Meghalaya, Nagaland , Manipur , Arunachal Pradesh, Mizoram ,Chhattisgarh, Uttaranchal, Jammu and Kashmir and Sikkim. The demarcation line that has been set is that the countries contributing below 2% to the Indian NDP is considered to be minor states. A noticeable point is that among the minor states there may be some with high per capita income the reason for which is that those states also have a low population.

b. Objectives of the study

- To observe the trend in Employment rate and its growth across states in India
- To analyse the nature of employment growth across states using output elasticity of employment.

c. Data sources and Methodology

Our study is based entirely on secondary data. The major sources of data are Central Statistical Organisation (CSO) and National Sample Survey Organisation (NSSO). State Domestic Product at constant prices, base being 2004-05 prices is taken from CSO. Worker Participation rate and population is taken from NSSO.

Employment rate:

It is measured by the ratio of the total number of workers to the total population in each state.

Output elasticity of employment and nature of growth:

Output elasticity of employment (OEE) = Growth of Employment/ Growth of output.

The nature of growth is specified by the value of EEO.

Employment Elasticity of Output(EEO) is the reciprocal of OOE.

If, OEE <0, the growth is job loss in nature

0≤ OEE <1, the growth is job-less

OEE ≥1, the growth is job-creating.

Panel Data Regression Model

Panel data regression model is used to analyse the incidence of food insecurity and nutrition insecurity across states of India. The panel data regression model is specified as

$Y_{it} = \beta_1 + \beta_2 X_{it} + \varepsilon_{it}$---------- (1)

i=1,2....29 and t=1, 2,……22 (1993-94 to 2014-15)

Where X_{it} is the matrix of independent variables and(ε_{it}) is the composite error term. ε_{it}consists of two components, where one is the cross section or individual specific error component $(\alpha_i)$and another component varies both time series and cross section observations (η_{it}), i.e.,

$\varepsilon_{it} = \alpha_i + \eta_{it}$

Where $E(X_{it,}\eta_{it}) = 0$, thatimplies that$\eta_{it}$is not correlated withX_{it}.

But $\alpha_i$may be and may not be correlated withX_{it}.

- If α_i is correlated with X_{it} i.e. $E(X_{it,}\alpha_i) \neq 0$, the model is treated as Fixed Effect Model (FEM)
- If α_i is not correlated with X_{it}i.e. $E(X_{it,}\alpha_i) = 0$the model is treated as Random Effect Model (REM)

Advantages of dynamic panel over static panel data are-

Static panel does not take into account the proper dynamics of the model.Static panel cannot take care of the endogenity between the independent variables.Being unobserved, Panel level effects are uncorrelated with the lagged dependent variable making the standard estimators inconsistent.This is where Dynamic Panel data has the capability to rule out these defects..

$\mathbf{y_{it} = \delta y_{i,t-1} + x_{it}\beta + u_{it}}$ i= 1, . . . , N; t = 1, . . . ,T

whereδ is a scalar, $x_{it}$is the independent variable matrix of dimensions $1 \times K$ and β is the co-efficient matrix with dimension $K \times 1$.
We will assume that the uitfollow a one-way error component model ui t = μi+ νi t
μi is time indifferent variable .
whereμi~ iid(0, σ^2_μ) and νi t ~iid (0, σ^2_υ) independent of each other and among themselves. iid implies identically and independently distributed.
Autocorrelation due to the presence of a lagged dependent variable among the regressors and individual effects characterizing the heterogeneity among the individuals is generally observed.
Arellano (1989) finds that for simple dynamic error components models, the estimator that uses differences rather than levels for instruments has a singularity point and very large variances over a significant range of parameter values. In contrast, the estimator that uses instruments in levels, has no singularities and much smaller variances and is therefore recommended. Arellano and Bond (1991) proposed a generalized method of moments(GMM) procedure that is more efficient than the Anderson and Hsiao (1982) estimator,
whileAhn and Schmidt (1995) derived additional nonlinear moment restrictions not exploited by the Arellano and Bond (1991) GMM estimator.

Unit Root Test

The time series variables or the panel variables that are included in a regression model needs to be stationary. It means that an important stability requirement that a data should satisfy is that the means and variances of the variables that are used to obtain the established relationship should remain well-defined constants and also independent of time. In other words, the variables have to be stationary. The need for stationarity is that if the means and variances are changing, the computed t-statistic under the OLS regression fails to converge to their true value as their sample size increases. In this situation, the conventional confidence intervals become invalid and the hypothesis tests cannot be conducted as usual. Consequently, we might end up with the wrong hypothesis that the variables have strong association between them although in reality there might be no such association between the variables. This is known as the problem of Spurious Regression. It is mostly observed that most of the time series data are non-stationary which renders the conclusion of stability of long-run trend growth.
Tests for stationarity: Stationarity of a series can be understood simply by plotting the series over time. If the series shows no tendency to drift upwards overtime, it is stationary in mean. Again it the series starts to gyrate such that overtime the amplitudes of the peak and trough increase, then the series is stationary in variance. For time series data the stationarity has tested with Augmented Dickey Fuller (ADF) Test and Philips-Perron (PP) Test. For Panel Data the stationarity is tested by Levun-Lin-Chu Test, Im. Pesaran-Shin Test, Fisher ADF Test, Fisher PP Test.

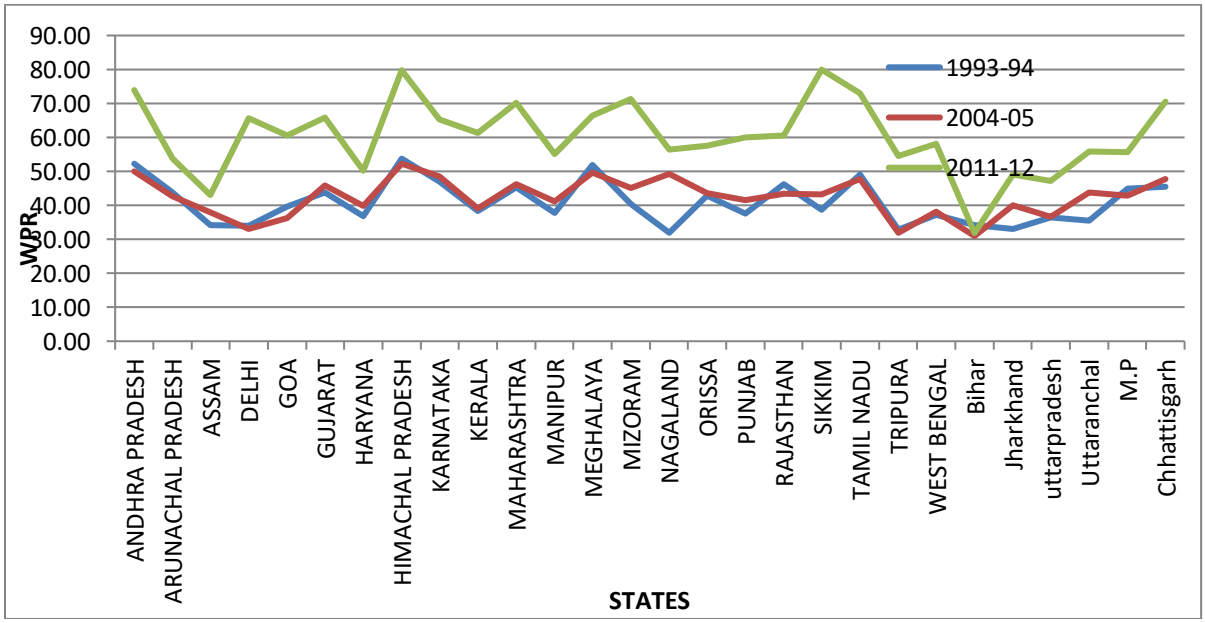
Plan of Study

The rest of the work is divided into five sections. Section 2 deals with Variation in the of employment of states. Section 3 deals with Growth in employment across states. Section 4 deals with Nature of Growth measured by output elasticity of employment. Section 5 deals with explanation the relationship between Growth of Employment and Growth of Output. We end with Summary and Conclusions in Section 6.

2. Variation in the of employment of states

We have provided the values from the NSSO on the number of employed workers in each of the 29 states. Using this we would be able to infer about the Employment Rate or Worker Participation Ratio in the states. The Employment Rate provides us with the information as to the approximate amount of the population who have been able to get employed during the period of observation or the time-period respectively. In the figure of Employment Rate we would be able to plot a trend of three years in order to avoid crowding and identify clearly on observation , the nature of the trend.

Figure 2a. Employment rate (WPR) across states in India, 1993-94 ,2004-05 and 2011-12



Source: Based on calculation of WPR in excel sheet. Data obtained from NSSO rounds.

From the above figure 2a some notable points come into observation.
There has been fluctuations in WPR in the observed periods , but most of them have shown a trend of increase.
In most of the states, WPR has shown quite a substantial rise during 2011-12. Thus may be due to some policy taken by the government to increase employment or due to a substantial increase in growth leading to the increase in employment. Unlike other states, Assam, Bihar and Haryana did not have a substantial amount of increase in employment during the period of 2011-12, but still there trend had evidence of increase.
The rise in employment in Bihar was somewhat consistent leaving aside 2009-10.Steady increase in employment rate was observed in Kerala, Mizoram and Bihar.

3. Growth of employment across states.

Table. 3.1 The Average Annual Growth rate of employment across states of India.

	1993-94 to 1999-00	1999-00 to 2004-05	2004-05 to 2009-10	2009-10 to 2011-12
Maharashtra	3.61	3.12	10.07	6.47
Tamil Nadu	5.13	3.65	11.53	10.23
Uttar Pradesh	1.74	1.38	5.31	4.94
Gujarat	5.12	4.75	10.71	7.59
Haryana	2.89	6.43	8.99	6.06
Karnataka	5.62	2.67	7.75	5.63
Rajasthan	5.49	1.89	6.18	10.92
Andhra Pradesh	3.92	5.88	7.49	4.03
Delhi	4.6	3.21	10.54	4.65
Madhya Pradesh	3.62	-0.57	7.15	5.51
Kerala	4.39	5.82	9.28	5.74
Haryana	2.89	6.43	8.99	6.06
Bihar	1.19	3.41	6.88	11.78
Punjab	2.36	1.77	5.88	4.07
Odisha	2.49	5.06	5.89	3.71
Jharkhand	3.27	2.29	3.27	8.65
Arunachal Pradesh	0.26	7.65	5.37	2.4
Assam	0.19	2.71	4.32	3.27
Chhattisgarh	0.35	4.2	6.07	6.14
Goa	7.61	1.46	4.77	17.82
Himachal Pradesh	5.77	5.23	6.08	6.56
Jammu & Kashmir	1.84	2.31	4.4	4.28
Manipur	3.07	1.62	3.52	0.8

Meghalaya	4.37	4.51	5.4	8.4
Mizoram	6.03	4.1	8.14	4.64
Nagaland	-0.62	4.48	6.67	7.08
Sikkim	2.51	5.97	25.54	10.63
Tripura	6.3	8.08	8.32	7.32
Uttarakhand	0.76	8.89	16.04	9.03

Source: Based on calculation of employment in excel sheet. Data obtained from NSSO rounds

From table 3.1 we can see a rising trend in growth rate which are random fluctuations in nature. The change in growth in each state is unique in it's in own way and has its own reasons for doing so.

Andhra Pradesh has faced a huge rise in 1999-2000 to 2004-05 and had a huge fall from 2004-05 to 2009-10 after which it returned back to its steady state at around 2 %.

In states like Arunachal Pradesh, Bihar , Jharkhand, Goa there has been an initial fall in employment followed by a subsequent rise in employment by double digit followed again by a fall and a rise.

Assam, Delhi, Gujarat has followed a regime of falling employment pattern from double digit to single digit.

Haryana has had a rise followed by a fall.

The only state with a steady rise in employment has been Himachal Pradesh.

Karnataka, Uttar Pradesh, Uttaranchal, Maharashtra have experienced a huge rise followed by a subsequent fall.

Kerala, Mizoram and Punjab are the states has a falling rate of employment but the rates are quite close to one another.

North Eastern states other than Mizoram face a huge rise and then a fall.

States that are subject to fluctuations are Orissa, Rajasthan, Sikkim, Tamil Nadu and Madhya Pradesh.

Few unique features that has been seen by Chattisgarh is a fall and then an increase by more than half in the next year.

Similarly, between the period of 1993-94 and 1999-2000, the number of people employed had almost doubled.

4. Nature of Growth measured by output elasticity of employment

Table 4.1 Nature of employment growth across states in India in the periods 1993-94 to 2011-12

1993-1994 to 2011-12	Rising from Job Loss Growth	At and around Job Less Growth	Tending to More Job growth	Tot. States
Major States	Tamil Nadu,	Maharashtra, Uttar Pradesh,	Jharkhand	16

	Kerala	Gujarat, West Bengal, Karnataka, Rajasthan, Andhra Pradesh, Delhi, Madhya Pradesh, Haryana, Bihar, Punjab, Orissa.		
Minor states	Goa, Jammu and Kashmir	Arunachal Pradesh, Himachal Pradesh, Meghalaya, Mizoram, Sikkim, Tripura, Uttaranchal	Assam, Chhattisgarh, Manipur, Nagaland	13
Total States	4	20	5	29

Source: Based on calculation of output elasticity of employment in excel sheet

By Job loss growth(OEE<0) we mean that there is negative relationship between growth rate of employment and growth rate of output. As there is increase in growth of employment, there is a corresponding fall in growth rate of output. Such a phenomenon is observed in the case where there is diminishing marginal productivity of labour or the workers have the tendency of 'shirking', where they tend to free-ride the benefits while exerting less of the effort. India has a huge amount of disguised employment, which is the most suitable reason applying to the case of Job-loss growth. Another explanation towards this form of growth is the increase in full use of capital intensive technology. In such a case , the increase in growth of output is not at all capable of absorbing the growing employment, thus as growth rate of output increases, the growth rate of employment falls. As per the observations of the data we find that in the observed period of 1993-94 to 2011-12, there are about twenty states who have faced the problem of job loss growth, among which thirteen are major states and seven are minor states. Other than the reasons mentioned above there are also many external factors that cause in the occurrence of such a phenomena.

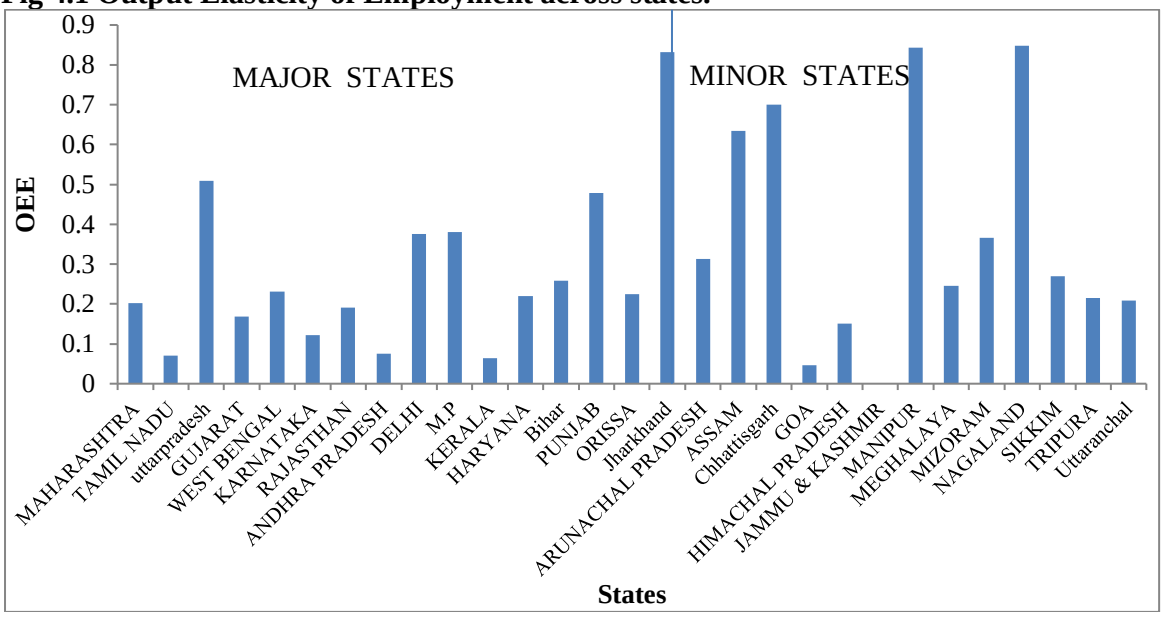
By Job-less growth($0 \leq OEE < 1$), we mean that there is a simultaneous or parallel growth of both per capita income as well as employment, but the growth in employment is much lesser than growth in output. In other words, the nature of output growth is such that it is unable to absorb the generating employment by only a part. There are many factors contributing to this form of growth of which, the earlier mentioned capital intensive technology usage is one of them. This poses a lot of problem especially in developing countries like India, which are mainly labour intensive in nature. As per the observations of the data we find that in the observed study period: 1993-94 to 2011-12, there are about four stateswho have faced the problem of job loss growth, among which two are major states and two are minor states.

More Job growth (OEE>1) is the most favourable of the three. It implies that the creation or the generation of employment is higher than the increase in output growth. This occurs due to increase in labour intensive technology and or the increase in marginal productivity of labour

due to increase in benefits such as insurance, health expenses, better standards of working envioronment and other forms that are provided by the government or the private entrepreneur, who ever be the worker. As per the observations of the data we find that in the observed period of 1993-94 to 2011-12, there are about five states who have received the benefit of job loss growth, among which one was a major states and the other was a minor states.

The above conclusion can also be drawn through the representation of a Bar Diagram as in Figure 4.1

Fig 4.1 Output Elasticity of Employment across states.



Source: Based on calculation of output elasticity of employment in excel sheet

From the above figure 4.1 we can see that the states with the maximum output elasticity of employment are those mentioned in Table 4.1 to have a tendency towards More Job growth, while those with the lowest values as mentioned in the above projected table are the ones rising from Job loss Growth.

5. Explaining the relationship between Growth of Employment and Growth of Output

The inter-relationship among growth rate of employment and Growth of SDP is analysed on the basis of panel data regression model. Regression estimation is done for 29 states and the time period of the entire observed period of our study.

The function of estimation is considered as

OEE= f (GSDP, GRE) or, OEE= $\alpha + \beta$ GRE+γGSDP

Where,

OEE is output elasticity of employment,

GRE is growth rate of employment,

GSDP is growth rate of state domestic product.

Table 5.1The summary of regression analysis used in estimation process

R Square	0.90	Multiple R	0.95
Adjusted R Square	0.89	*F*	113.52
Observations	29.00	*Significance F*	0.00
	Coefficients	*t Stat*	*P-value*
Intercept	0.35	8.27	0.00
GSDP	-0.05	-10.86	0.00
GRE	0.17	12.31	0.00

Source: Based on the regression analysis in Excel.

From the result we observe that the variables have a high significant value.

We now try to find a relationship between growth rate of employment and growth rate of output.

The function of estimation is considered as :

$GRE = a + bGSDP$

Table 5.2 The summary of regression analysis used in estimation process

R Square	0.04	Multiple R	0.19
Adjusted R Square	0	*F*	1.01
Observations	29	*Significance F*	0.32
	Coefficients	*t Stat*	*P-value*
Intercept	1.52	2.95	0
GSDP	0.06	1	0.32

Source: Based on the regression analysis in Excel.

We observe a positive but insignificant relationship between the two variables.

Summary

In order to sum up the work, we have learnt a few valuable concepts about the growth patterns of our Indian economy where the main focus has been on the state level. We have divided the 29 states (leaving the newly arrived Telengana from our analysis), into major and

minor states.

We analyzed the employment rate across the states of India. Analysis of growth rate using output elasticity of employment is done and along with it, we also find a positive relationship between growth rate of employment and growth rate of output. As for output elasticity of employment, it is positively and significantly related to growth rate of employment and negatively related to growth rate of per capita SDP.

Our economy is facing the problem of jobless growth as a whole. In other words, there is increase in growth of per capita SDP but this does not generate an additional amount of employment. Growth of percapita State Domestic Product (PCSDP) and employment can be related with convergence in a way that, convergence would be possible in the sense where there is inclusive form of growth. In order to attain inclusive form of growth, there should be an increase in participation, which can be possible with the increase in employment. Thus increasing growth along with increasing employment would lead to convergence across states as predicted from our analysis.

Income of labour enables flow of resources across income classes of people and across the social and ethnic groups. Flows of income across locations are influenced both by assets available and by other modes of creating employment opportunities. However, income generated by employment of migrant labour, facilitates flow of resources across regions for a given regional distribution of capital assets. Employment and equity of income across classes of people and across regions are, therefore, closely related to each other in the long term (Vision 2020, Planning Commission of India).

Bibliography

Alluwalia .M(2000), "Economic Performance of States in Post Reform Period" *EPW*Vol XXXV
No.19, may 06, 2000

Bagchi, KanakKanti (2011), Regional Disparities in India's Socio-economic Development, New Century Publications, http://www.researchandmarkets.com/reports/1719102/ regional_disparities in indias_socioeconomic (Accessed on December 4, 2013).

Baltagi B.H.(2005), *Econometric Analysis of Panel Data*, Third Edition,JohnWiley& Sons, Ltd, March 30, 2005.

Ghosh A.K(2016), *India Employment Report 2016,* Institute for Human Development, Oxford University Press.

Vision 2020, Planning Commission of India.