

Effect of Population, GDP and Levels of Literacy on Unemployment

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Abstract:- This study investigates the impact of population, literacy level and GDP on unemployment in case of India over the period 1991-2018. The prime objective of the study is to identify and establish a link between GDP, literacy level, population level and unemployment. The data is collected from world bank website. The Augmented Dickey Fuller (ADF) test is used to test the stationarity of the data. Further, correlation is applied to determine the relation between the variables and regression to find the variables having maximum impact of unemployment. The results show that the independent variables do not have a significant impact on the dependent variable in the long run. The research also provides recommendations for the policy purpose to reduce the unemployment in the country.

Keywords:- Unemployment, Population, Literacy level, GDP.

I. INTRODUCTION

India faced the slowest economic growth in over six years at a low of 5% in the first quarter ended June 2019. This supposedly happened due to slow consumer demand and private investment among deteriorating global environment.

This has impelled many global agencies to cut India's GDP growth by various grades for 2019-20.

In October's monetary policy review, RBI, had cut its economic growth projections for the country to 6.1% from 6.9% earlier the same year.

There are several reasons for this slump in economy such as rising unemployment, declining GDP and increasing levels of illiteracy and growing population.

➤ Unemployment Levels

According to the Centre for Monitoring Indian Economy (CIME), India's unemployment rate rose to a two-year high in February. The metric that measures labour force that is unemployed was at 7.2% which is much higher than 5.9% unemployment rate in February 2018 and 5% in February 2017.

The labour participation rate i.e. the percentage of working age population that are either unemployed but looking for a job or employed fell to 42.7% in February from 43.2% in January. It originally stood at 43.8% in February 2018.

➤ Gross Domestic Product (GDP)

The gross Domestic product fell to 4.5% in the quarter of July-September of the year 2019-20, for the seventh successive quarter. There was a fall of 0.5 per cent points compared to the last quarter. Compared to the second quarter of the year 2018-19, it is a fall of 2.6%. In the second quarter of the previous year, the GDP growth stood at 7.1%.

It reduced from 7.4% in 2018 to 5.6% in 2019. (Economic times,2019) It has currently come to a six-year low of 4.5% in the July-September quarter of 2019.

GDP affects the income of every individual. Lower GDP means a proportionate decline in per capita income. India is one of the most unequal societies which makes poor suffer more than the rich. Lesser income would make people unsatisfied, quitting their current jobs and unemployment rates to go up. This could also imply that more people fall below the poverty line with a decrease in GDP.

➤ Population Levels

The population of India is at around 1,366,417,754 which is roughly equivalent to 17.71% of the total population of the world. India is currently placed at number 2 in the list of countries by population, China being at the top, according to reports from the United Nations.

Population of India, which at the end of the twentieth century, was only around 238.4 million amplified by more than five times in a period of 110 years to reach 1210 million in 2011. Population of India rose by 3.35 times since independence.

➤ Literacy Levels

Any person of the age of 7 years and above who can read and write is considered literate, according to the 2011 Census. The average Indian literacy rate is about 74% with Kerala having the highest literacy of 93.91%

India's literacy increased from 64.08% in 2001 to 74.04% in 2011 according to a Census Survey. This shift includes an increase in female literacy rate from 53.7% in 2001 to 65.5% in 2011. Efforts have been made to improve literacy especially in the rural areas for both men and women.

In this paper, we analyse the effect, relationship and the extent of impact of each of these variables (population Growth, Low levels of literacy, declining GDP) on unemployment.

The research paper also talks about the certain measures that the government have already taken to reduce unemployment and gives a conclusion of their effectivity based on our analysis.

➤ *Objectives*

- To analyze the relationship of Unemployment with Population, GDP, Literacy levels Individually
- To determine the degree to which independent variables (Population, GDP, Literacy levels) are influencing the dependent variable (Unemployment)
- To test and determine the factor that has the maximum impact on changes in levels of unemployment
- To compare the results of the study and analyze the effectivity of government measures to reduce unemployment.

II. REVIEW OF RELATED LITERATURE

Ishola (2016) examined the impact of growing population on the level of unemployment in Nigeria. The paper has three main objectives –

- To test the determinants of unemployment in Nigeria
- To target the macroeconomic policy on unemployment
- To determine the spread between the actual and natural rate of unemployment

To test this theory, the paper made use of the Keynesian theory and the neo classical theory of unemployment.

The time period (data set) taken into consideration was between 1970 and 2015.

The Vector Error Correction Model (VECM) and Vector Auto-Regressive (VAR) and the ordinary Least Square Method (OLS) were used to help conclude the objectives.

The paper also tested the impact of GDP, Inflation on unemployment in Nigeria using models of unit root test, normality test, regression and co-integration.

In all the above models, the macro economic factors were considered the independent factor whereas unemployment was considered to be the dependent factor.

The study concluded that with a one standard deviation shock in economic factors (GDP, Inflation, Population), the unemployment rate varied between positive and negative between the 1st and 6th period but constantly became negative from 7th period to 10th period.

The findings of the study were that generally there is no long run relationship between population and unemployment and keeping this study in mind it is assumed that unemployment can reduce drastically with the current Nigerian population rate if the government policies are introduced which target increase their government expenditure, exchange rate and foreign investments.

The paper recommends that population should be kept under check as it directly effects the other variables that then cause an impact on the levels of unemployment in Nigeria.

Singh & Kumar (2014) tests the impact of population growth, unemployment and poverty in India.

The paper states that increasing population has effects on several other factors – poverty and unemployment being one of them.

The paper states that rising population leads to a rising labour force which is countered by low levels of employment thus causing high unemployment in the country.

In the period of 2001 to 2011 it has been found that the urban Indian population has increased almost twice that of the rural Indian population.

The paper is based on analytical secondary data research whereby the data has been obtained from Primary Census Abstract 2001 and 2011, Census of India.

The data has been calculated on the basis of the states/union territories which have been further segregated into rural and urban categories.

The population growth has been analysed using decadal growth rate and poverty and unemployment has been analysed using simple percentage method.

It can be inferred that despite performing well with respect to poverty and unemployment reduction, still there may be excessive number of poor and unemployed across India. So, endeavour is entailed on the part of authorities to arrest the concern of population growth, poverty and unemployment.

GIDEON (2017) studies the relationship between population growth and unemployment in Nigeria and finds the causes for the same.

Secondary research is used in the paper whereby data is derived from secondary sources for the years 2007 and 2015 namely - trading economics, world bank, National Bureau of Statistics and Trading Economics.

In the paper, a multiple regression is carried out to test relationships between population and unemployment.

The dependent variable (y) is the unemployment rate and the independent variables considered are corruption (x1), population (x2) and education (x3). The unemployment is expressed in percentage, corruption in terms of index, population in millions and education in index.

The findings from the above model was that there is an 87.4% variation on unemployment which is explained by population corruption and education. Thus, this is used to

support the hypothesis that states a positive relation between unemployment and population growth.

It is also observed that population is the factor that contributes maximum to increasing unemployment in Nigeria.

The paper recommends that to reduce unemployment the first step is for the government to increase their contributions towards a socio-economic and political atmosphere.

Ahmad & Khan (2016) focuses on exploring the effect and consequences of unemployment in district Peshawar, Pakistan.

The method used for finding out the same was primary survey whereby a set of questions were asked to a sample size of 120 respondents and the answers were collected and interpreted accordingly.

All 120 of them agreed to the fact that overpopulation is the main cause of rising unemployment, out of which 32.5% were unemployed due to low education, 15.8% due to having no skills and 55% were unemployed due to no approach to the concerned authorities.

High population growth, lack of education, lack of proper skill, poverty and lack of capital were found to be the main causes of high rate of unemployment in Pakistan this study.

Most of the respondents disagreed to the statement of increasing job opportunities whereby they felt that their population is on a rise but the job opportunities were not increasing thus causing unemployment.

Thus the paper recommends a need for creation of job opportunities and eradication of unemployment in that area.

Loku & Deda (2013) talks about Kosovo, where creation of jobs in public and private sector has been at low levels. Presentation of a real situation in Kosovo regarding to labour issues, employment, and unemployment and handling policies that are related to the labour market developments are elucidated.

The paper also talks about unemployment and its effects on the population growth and development.

A tabular representation of unemployment in Kosovo is given to compare the change in population over the years, also the subsequent unemployment rates.

The author recommends that unemployment can be contained by countable number of ways, some are :

- Conducting social support group meeting, which will reduce the stress and financial insecurity.
- Creating job openings by working on illiteracy, and promoting skilled force.

- This will create a circle which will cause a skilled management and hence, urge them to employ skilled workforce.

Chandio, Biag, Memon & Shaikh (2015) studied the impact of literacy level on unemployment in Pakistan during the period 1994-2014. It also studies about how the population growth affects the unemployment in the country. It tested the impact by using linear regression and bivariate, one tailored correlation through SPSS (Statistical Package for Social Sciences). The study concluded that population growth and unemployment are major contributors to unemployment in Pakistan as the value of the adjusted r square is approximately 89%. This model is significant at 100% confidence level. Literacy rate was taken as the dependent variable and unemployment was taken as a constant. It also concluded that the beta of unemployment is positively and significantly related to the literacy rate however the strength of relationship between the both is moderate. The paper recommends the policy makers to utilize the resources effectively and strengthen the education system as the population is increasing.

Samiullah (2014) investigated the impact of human capital factors like education, health, population and life expectancy on unemployment in Pakistan from 1981 to 2010. It applied Johansen co-integration approach and Vector Error Correction Model (VECM) to determine the long run and short run relationship among the variables. Augmented dicky-fuller test is also applied to check the stationarity of data. These tests concluded that the literacy rate is statistically significant and negatively related to the unemployment levels in the country. Normalised co integrated coefficients showed that if literacy rate is increased by 1%, unemployment is reduced by 0.61% in the long run. The study concludes that when the education sector is improved, the rate of unemployment decreases and vice versa. This is because of the inverse relationship between the two. It also analysed the relationship between the population growth rate and expected life with the unemployment rate. The results show that there is a positive relationship of these variables with the unemployment rate. The main finding of the study shows that all human capital indicators have an impact on the unemployment rate in Pakistan and therefore the null hypothesis taken earlier are rejected. It suggests that the government should increase the education and health expenditure as these are the two most important factors to reduce the unemployment level in the country. It is recommended that Government has to extend the ratio of education and health expenditure. Because these two factors are most encouraging for reduction of unemployment level in the country. High investment in these two sectors are directly amplify the number of school and hospitals that increase the literacy rate and enhance the health condition of people that will leads reduces the unemployment condition of Pakistan.

The author Shkumbin Misini has examined the impact of macroeconomic variables regarding economic growth under nominal GDP in relation to the unemployment in Kosovo.

The research includes the analysis of the scatter plot graphs of nominal GDP in relation to unemployment, and also includes the analysis of descriptive statistic. To test this theory, the research has also made use of simple linear regression to analyse the relation of nominal GDP in relation to unemployment.

The study concludes that the two variables, unemployment and nominal GDP have a negative effect as the model suggests that for every 1% increase in the nominal GDP, there will be an average reduction of -0.43% in the unemployment. Over the past years, there has been economic growth but there has only been a small decrease in poverty and unemployment. This decrease has not contributed in the welfare increase of the citizens and therefore the citizens are seeking emigration.

The author suggests that the government should make radical changes in the approach towards economic growth. This would attract foreign investments in the country indirectly stimulating businesses that employ more employees which would help agriculture businesses by changing the approach of public investments. These factors would have an influence on unemployment reduction which further influences general poverty alleviation and decrease of emigration.

The author A. Thayaparan has examined the effect that inflation and economic growth has on unemployment in Sri Lanka. The time period taken into consideration is from 1990 to 2012.

The author has made use of secondary data taken from Central Bank annual reports for the same period.

To help conclude the objectives, the author has made use of Augmented Dickey Fuller Test to test unit root or stationery. In addition to that, Ordinary least square technique and Granger Causality test were used to determine the causality among the above variables.

The study revealed that the coefficient of GDP is positive and has no significant impact on unemployment. GDP has a positive but insignificant influence on unemployment. The research has revealed that there is a bidirectional causality between unemployment and GDP IN Sri Lanka.

The study further made use of Vector Error Correlation model to test stability of equilibrium which suggests that coefficient of error correction term for GDP and unemployment have not statistically significant at 1% level.

Rahman (2013) investigated the relationship among GDP, Per capita GDP (PGDP), literacy rate and unemployment rate. In order to study the relationship among GDP, PGDP, literacy rate and unemployment rate, Spearman's rank correlation and Pearson's Product moment correlation coefficient is calculated. In order to test the significance of the correlation coefficient, null (Ho) and alternative (H1) hypothesis are considered. It is observed that GDP is not significantly related with PGDP, literacy rate

or, unemployment rate. Therefore, PGDP plays a significant role for changing literacy and unemployment rate. There exists significant positive relationship between PGDP and literacy rate but significant negative relationship between PGDP and unemployment rate and between literacy rate and unemployment rate.

Many analysts consider literacy rates as a crucial measure to enhance a country's human capital. This claim is made on the grounds that literate people can be trained less expensively than illiterate people, generally have a higher socio-economic status and enjoy better health and employment prospects. Policy makers also argue that literacy increases job opportunities and access to higher education.

In order to develop a country, the government of that country can easily take some proper initiative, for example, increasing education budget, making primary/secondary education compulsory, etc. to increase literacy rate. Increasing literacy rate will reduce unemployment rate and increase PGDP resulting development of the country.

Salama (2017) examined how illiteracy rate affects unemployment among different ages in Palestine. Most of the studies have mentioned that education is negatively connected with unemployment. Since literacy can be the basis of education, education's connection to unemployment is tested with the literacy rate of individuals in this research paper. Using labour force surveys and annual reports of PCBS (2000-2015), 16 years of data is analysed regarding unemployment percentage and literacy rates among different ages in both genders in Palestine. Linear regression models are used to show how illiteracy rate affects unemployment among various ages. The independent variables are gender and literacy rate among age groups (of 15 to 24, 25 to 34, 35 to 44, 45 to 54) and dependent variables are percentage of unemployment among these age groups. The hypothesis is as following:

H1: Literacy rate is negatively related to percentage of unemployment among age groups.

H2: Literacy rate is positively related to percentage of unemployment among age groups.

The results showed that literacy rate is significantly correlated with unemployment. A positive relationship appears between illiteracy and unemployment i.e. literacy among different ages help in reducing the percentage of unemployed people in the country. Hence, literacy can have an impact on increasing the profitability of the persons employed. Studies have shown that people who have secondary and university education have a higher likelihood of securing a job in public sector, thereby increasing the employment rates.

The study of the research paper shows that how it is important for the government of Palestine to play its vital role to offer more opportunities of education to the youth to decrease the level of unemployment in the country.

Khaliq, Soufan & Shihab (2014) have examined how the GDP and Inflation rate have an impact on the unemployment rate of a country. The study was attempted to examine the relation between economic growth and unemployment in Arab countries, during the period- 1994 to 2010. It used unit root test methodology and Pooled EGLS (Cross-section SUR). Data of 9 Arab countries - Algeria, Egypt, Jordan, Lebanon, Morocco, Palestine, Sudan, Syria and Tunisia was taken. The study tested Okun's law on data from a number of countries like Nigeria and the United States and found a degree of instability in the historical performance of Okun's law. They found that economic growth, during that period, was negative and had a significant effect upon the unemployment rate. They showed that a 1% increase in economic Growth during those years would have decreased the unemployment rate by 0.16%. The coefficient of Growth Rate of Population was significant at 5% and the sign indicated that 1% increase in Growth Rate of Population will lead to a rise in the unemployment rate by 0.37%.

Singh R. (2018) This study examined the impact of inflation on GDP and the unemployment rate in India. It is a comprehensive study for the period- 2011-2018. The data has been acquired from secondary sources. Since 2005, the GDP of India has been growing at higher than average rate of more than 5% a year, and even this was not to keep up with the rapid growing population. Political instability, widespread corruption and lack of law enforcement have hampered private investment and foreign aid, which has been a negative influence on growth. Zafar and Mustafa (1998) proved a statistically positive relationship between the macro factors of economic growth of the Indian economy. They found that budget deficit negatively affected the GDP of the economy and positively influenced the inflation rate of the economy.

It found that unemployment is caused by rapid technological change, business cycle of recessions, seasonal factors, change in tastes, individual perceptions and willingness to work and search for job.

The study concluded that inflation insignificantly influences GDP and unemployment and their correlation was negative. The correlation between unemployment and inflation was positive i.e. 0.477 and was insignificant at 10%. The correlation between GDP and unemployment rate was also found insignificant with a value of 0.196. It was, therefore, concluded that inflation has a role which influential but for GDP and unemployment with insignificant levels in the macroeconomics factors of Indian economy.

III. DATA AND METHODOLOGY

A. Data

The data for Unemployment, GDP, Literacy Levels, Population is obtained from worldbank.org

B. Methodology

➤ Unit Root Test

The initial test used is the ADF test also called the Augmented Dickey-Fuller test. It tests the stationarity of a series of data. It is a part of the unit root test. Unit root is a feature that can cause disputes in statistical interpretations. Since most economical and financial time series have a more complicated and dynamic structure, the ADF test is used. In our paper ADF is implemented by first finding the Durbin-Watson Statistic and then comparing it with the R square value using ADF Model.

➤ Correlation

The next test used after checking for stationarity is correlation.

Correlation is a statistical technique applied on quantified data that can show whether and how strongly pairs of variables are related. This technique helps to obtain the first objective of our paper that states the strength of the relationship between each individual variable.

The correlation ranges between -1 to +1, negative 1 indicating perfect negative correlation and +1 indicating a perfectly positive correlation.

Correlation technique in our study will be tested individually for each of the factors (GDP, Population, literacy) with Unemployment using the Data analysis function on Excel.

➤ Regression

Regression analysis is a statistical tool to identify the variables having the maximum impact on the dependent variable (unemployment) and the trend and direction of flow of data. Regression analysis allows to determine the factor that matters the most in the study.

A regression equation is made up of $y = mx + c$, whereby y is the dependent variable (in our case unemployment), m is the slope of the line, x is the dependent variable (in our case Population Growth, Low levels of literacy and GDP), c is the intercept.

Regression analysis helps us to obtain the second and third objective of our paper whereby we use the results of the regression analysis to determine the degree and extent of effect of the independent variable on the dependent variable and also conclude the factor that forms the reason for maximum level of changes in unemployment.

Regression analysis in our study will be done separately for the three macro-economic variables.

• *Regression Equation 1*

$$y = m_1x_1 + c$$

Y = Levels of unemployment

X1 = Population Growth

m1 = slope of x

c = y intercept

• *Regression Equation 2*

$$y = m_2x_2 + c$$

Y = Levels of unemployment

X2 = GDP

m1 = slope of x

c = y intercept

• *Regression Equation 3*

$$y = m_3x_3 + c$$

Y = Levels of unemployment

X3 = Low levels of literacy

m1 = slope of x

c = y intercept

All the three regression equations are solved individually with the help of descriptive statistics on Excel.

IV. RESULTS, ANALYSIS AND INTERPRETATIONS

➤ *ADF Test for Stationarity*

The ADF Test for stationarity was carried out using the Durbin Watson Statistic Value. If the R Square Values derived by doing regression is lesser than the DW Statistic Value then the data is considered to be Stationary. The DW statistic value has been calculated by dividing the Sum of Squared difference of Residuals by Sum of Squared Residuals.

| Particulars | DW Stat Value | R Square Value |
|---------------------------------------|---------------|----------------|
| Unemployment and Population | 0.3603 | 0.0055 |
| Unemployment and GDP Growth (%) | 0.3876 | 0.0875 |
| Unemployment and Adult Literacy Rates | 0.3629 | 0.0150 |

Table 1

As seen in the above table all three variables (Population, GDP Growth and Adult Literacy Rates) have their R Square value less than the DW statistic value, therefore all three variables are stationary and can be considered for the study

➤ *Correlation*

The correlation was carried out on each of the independent factors with the dependent factor. The findings of the correlation were as follows –

| Unemployment and Population | | |
|-----------------------------|------------------|--------------------------|
| | Unemployment (%) | Population (in Millions) |
| Unemployment (%) | 1 | |
| Population (in Millions) | 0.074739531 | 1 |

Table 2

The above table shows the correlation between Unemployment and Population indicating a correlation of about 7.5% which is a very negligible relationship between Unemployment and Population. This states that there is almost no chance of a change in Unemployment due to a change in Population.

| Unemployment and Adult Literacy rates | | |
|---------------------------------------|------------------|----------------------|
| | Unemployment (%) | Adult Literacy Rates |
| Unemployment (%) | 1 | |
| Adult Literacy Rates | 0.12252666 | 1 |

Table 3

The above table shows the correlation between Unemployment and Adult Literacy Rates indicating a correlation of about 12.25% which is a weak positive correlation. This states that due to a change in Adult Literacy Rates, there is a 12.25% chance that the Rate of Unemployment will change.

| Unemployment and GDP Growth | | |
|-----------------------------|------------------|----------------|
| | Unemployment (%) | GDP Growth (%) |
| Unemployment (%) | 1 | |
| GDP Growth (%) | 0.295949416 | 1 |

Table 4

The above table shows the correlation between Unemployment and GDP Growth (%) indicating a correlation of about 29.59% which is a moderate positive correlation. This states that due to a change in GDP Growth, there is a 29.59% chance that the Rate of Unemployment will change.

❖ Regression Analysis

➤ Regression Equation 1

Unemployment and Population

| SUMMARY OUTPUT | | | | | | | |
|------------------------------|--------------|-------------|-----------|-------------|-----------------------|--|--|
| <i>Regression Statistics</i> | | | | | | | |
| Multiple R | 0.074739531 | | | | | | |
| R Square | 0.005585997 | | | | | | |
| Adjusted R Square | -0.032660695 | | | | | | |
| Standard Error | 0.234351455 | | | | | | |
| Observations | 28 | | | | | | |
| <i>ANOVA</i> | | | | | | | |
| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>Significance F</i> | | |
| Regression | 1 | 0.008021252 | 0.008021 | 0.146051778 | 0.705443361 | | |
| Residual | 26 | 1.427935712 | 0.054921 | | | | |
| Total | 27 | 1.435956964 | | | | | |

Table 5

| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
|--------------------------|--------------|----------------|-------------|-------------|--------------|-------------|--------------|-------------|
| Intercept | 2.542986706 | 0.360036082 | 7.063144046 | 1.6827E-07 | 1.802921941 | 3.283051471 | 1.802921941 | 3.283051471 |
| Population (in Millions) | 0.000120566 | 0.00031548 | 0.382167213 | 0.705443361 | -0.000527913 | 0.000769045 | -0.000527913 | 0.000769045 |

Table 6

In the above table, multiple R is nothing but the correlation between x and y variables. R Square tells us the variation in variable y (unemployment) that is explained due to variable x (Population). This signifies that about 0.5% variation in unemployment is explained due to a change in Population. Since the P value of the equation is considerable high i.e. 0.7 it signifies a nonlinear relationship between Unemployment and Population. Intercept value tells us the y intercept and the coefficient of population indicates the slope of the regression equation.

The SS regression value tells us the explained variation whereas the Residual SS value tells us the unexplained variation which is also the error factor. In the above table the explained variation is significantly lesser than the unexplained variation which indicates that the change in Unemployment due to a change in Population cannot be explained in a strong positive manner.

➤ *Regression Equation 2*
Unemployment and GDP

| <i>Regression Statistics</i> | |
|------------------------------|-------------|
| Multiple R | 0.295949416 |
| R Square | 0.087586057 |
| Adjusted R Square | 0.052493213 |
| Standard Error | 0.22448121 |
| Observations | 28 |

| ANOVA | | | | | |
|------------|-----------|-------------|-------------|-------------|-----------------------|
| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>Significance F</i> |
| Regression | 1 | 0.125769808 | 0.125769808 | 2.495838096 | 0.126238011 |
| Residual | 26 | 1.310187156 | 0.050391814 | | |
| Total | 27 | 1.435956964 | | | |

Table 7

| | <i>Coefficients</i> | <i>Standard Error</i> | <i>t Stat</i> | <i>P-value</i> | <i>Lower 95%</i> | <i>Upper 95%</i> | <i>Lower 95.0%</i> | <i>Upper 95.0%</i> |
|----------------|---------------------|-----------------------|---------------|----------------|------------------|------------------|--------------------|--------------------|
| Intercept | 2.454452031 | 0.148655865 | 16.5109667 | 2.67209E-15 | 2.148885525 | 2.760018538 | 2.148885525 | 2.760018538 |
| GDP Growth (%) | 0.0353456 | 0.022373151 | 1.579822172 | 0.126238011 | -0.01064307 | 0.08133427 | -0.01064307 | 0.08133427 |

Table 8

In the above table, multiple R is nothing but the correlation between x and y variables. R Square tells us the variation in variable y (unemployment) that is explained due to variable x (GDP Growth). This signifies that about 8.7% variation in unemployment is explained due to a change in GDP. Since the P value of the equation is considerably low i.e. 0.126 it signifies a linear relationship between Unemployment and GDP Growth. Intercept value tells us the y intercept and the coefficient of GDP Growth indicates the slope of the regression equation.

The SS regression value tells us the explained variation whereas the Residual SS value tells us the unexplained variation which is also the error factor. In the above table the explained variation is significantly lesser than the unexplained variation which indicates that the change in Unemployment due to a change in GDP Growth cannot be explained in a strong positive manner.

➤ *Regression Equation 3*
Unemployment and levels of literacy

SUMMARY OUTPUT

| <i>Regression Statistics</i> | |
|------------------------------|--------------|
| Multiple R | 0.12252666 |
| R Square | 0.015012782 |
| Adjusted R Square | -0.022871341 |
| Standard Error | 0.233238014 |
| Observations | 28 |

| ANOVA | | | | | |
|------------|-----------|-------------|-------------|-------------|-----------------------|
| | <i>df</i> | <i>SS</i> | <i>MS</i> | <i>F</i> | <i>Significance F</i> |
| Regression | 1 | 0.021557709 | 0.021557709 | 0.396281633 | 0.534508892 |
| Residual | 26 | 1.414399255 | 0.054399971 | | |
| Total | 27 | 1.435956964 | | | |

Table 9

| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
|----------------------|--------------|----------------|-------------|-------------|--------------|-------------|--------------|-------------|
| Intercept | 2.45098736 | 0.365723991 | 6.701740705 | 4.13105E-07 | 1.699230929 | 3.20274379 | 1.699230929 | 3.20274379 |
| Adult Literacy Rates | 0.363094211 | 0.57678951 | 0.629509041 | 0.534508892 | -0.822513606 | 1.548702028 | -0.822513606 | 1.548702028 |

Table 10

In the above table, multiple R is nothing but the correlation between x and y variables. R Square tells us the variation in variable y (unemployment) that is explained due to variable x (Adult Literacy Rates). This signifies that about 1.5% variation in unemployment is explained due to a change in Adult Literacy Rates. Since the P value of the equation is on the upper side i.e. 0.534 it signifies a nonlinear relationship between Unemployment and Adult Literacy Rates. Intercept value tells us the y intercept and the coefficient of Adult Literacy Rates indicates the slope of the regression equation.

The SS regression value tells us the explained variation whereas the Residual SS value tells us the unexplained variation which is also the error factor. In the above table the explained variation is significantly lesser than the unexplained variation which indicates that the change in Unemployment due to a change in GDP Growth cannot be explained in a strong positive manner.

V. CONCLUSIONS AND POLICY

According to the above findings and interpretations, it can be concluded that

- There is a 7.5% chance that a unit increase in Population will lead to a 0.5% increase Unemployment.
- There is a 12.25% probability that a unit increase in Adult Literacy Rates will lead to a 1.5% increase in Unemployment.
- There is a 29.59% chance that a unit increase in GDP Growth will lead to a 8.7% increase in Unemployment.

Inferring the above conclusion, the reason for such a small increase in Unemployment due to an increase in Population will be because even though population has been increasing in India throughout the years, yet the unemployment level has decreased in the recent years fluctuating between 3% to 2%. Yet it should be kept in mind that the probability of this scenario happening is very bleak due to the low correlation.

The relationship between adult literacy rates and unemployment is so because Increasing adult literacy rate would mean an increase in educated labour force which will in turn increase the number of people in the Employment bracket and due to the poor employment opportunities in India, it will lead to an increase in Unemployment.

The relationship between GDP and Unemployment is so because, the GDP growth has been fluctuating in the past 30 years whereas the Unemployment level has remained somewhat constant between 3% to 2%. The reason for this can be explained by the Okun's Law. Moreover, GDP depends on a number of factors that even include political

and economic factors which have not been taken into consideration for the study. Therefore, it cannot be said that an increase in GDP will lead to an increase in unemployment. GDP does not necessarily drive unemployment; Unemployment is essential for calculation of GDP.

RECOMMENDATIONS

According to the results from the above paper, it is clear that Population, GDP Growth and Levels of Literacy are not the main factors in the increasing unemployment in our country. The government should take up strict measures to increase employment opportunities by employment schemes. By doing so, this will not only help increase employment for the long run but will also help in improving the GDP of India. The government can also carry out an expansionary fiscal policy by cutting down tax rates. However, this will only be beneficial in case of a recessive economy where tax cut will leave the consumers with more income to spend thus increasing demand and increasing job opportunities. The government can also reduce interest rates by an expansionary monetary policy, which increases money supply thus increasing liquidity and bank lending capacity. This in turn will cause a decline in the interest rates which allow consumers to borrow and spend more, helping businesses to expand due to increase demand. To meet this increased demand business would have to hire more workers, increasing employment opportunities.

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APPENDIX

➤ Data Sets

| Years | Unemployment (%) | Population (in Millions) | Adult Literacy Rates | GDP Growth (%) |
|-------|------------------|--------------------------|----------------------|----------------|
| 1991 | 2.361 | 891.27 | 48.50% | 1.06 |
| 1992 | 2.408 | 909.31 | 49.75% | 5.48 |
| 1993 | 2.573 | 927.40 | 51.00% | 4.75 |
| 1994 | 2.591 | 945.60 | 52.25% | 6.66 |
| 1995 | 2.611 | 963.92 | 53.50% | 7.57 |
| 1996 | 2.665 | 982.37 | 54.75% | 7.55 |
| 1997 | 2.63 | 1,000.90 | 56.00% | 4.05 |
| 1998 | 2.671 | 1,019.48 | 57.25% | 6.18 |
| 1999 | 2.744 | 1,038.06 | 58.50% | 8.85 |
| 2000 | 2.731 | 1,056.58 | 59.75% | 3.84 |
| 2001 | 2.868 | 1,075.00 | 61.00% | 4.82 |
| 2002 | 3.052 | 1,093.32 | 61.83% | 3.80 |
| 2003 | 3.182 | 1,111.52 | 62.66% | 7.86 |
| 2004 | 3.098 | 1,129.62 | 63.49% | 7.92 |
| 2005 | 3.102 | 1,147.61 | 64.32% | 7.92 |
| 2006 | 2.737 | 1,165.49 | 65.15% | 8.06 |
| 2007 | 2.399 | 1,183.21 | 65.98% | 7.66 |
| 2008 | 2.268 | 1,200.67 | 66.81% | 3.09 |

| | | | | |
|-------------|-------|----------|--------|------|
| <i>2009</i> | 2.475 | 1,217.73 | 67.64% | 7.86 |
| <i>2010</i> | 2.444 | 1,234.28 | 68.47% | 8.50 |
| <i>2011</i> | 2.519 | 1,250.29 | 69.30% | 5.24 |
| <i>2012</i> | 2.69 | 1,265.78 | 69.97% | 5.46 |
| <i>2013</i> | 2.823 | 1,280.85 | 70.63% | 6.39 |
| <i>2014</i> | 2.765 | 1,295.60 | 71.30% | 7.41 |
| <i>2015</i> | 2.782 | 1,310.15 | 71.96% | 8.00 |
| <i>2016</i> | 2.73 | 1,324.51 | 72.76% | 8.17 |
| <i>2017</i> | 2.557 | 1,338.66 | 73.57% | 7.17 |
| <i>2018</i> | 2.551 | 1,352.62 | 74.37% | 6.98 |

Table 11