Analysis of gdp determinants statistics economics essay

The aim of our report is to identify the factors which affects GDP for any country. In our report we are analyzing such factors in relation to India's GDP. The report will be dealing with regression analysis, hypothesis testing, mean, median, mode etc of such factors which are independent variables and their affect on GDP which is a dependent variable.

2. Introduction:

The report revolves around an exploratory study. It includes analyzing the statistical data of India's GDP and other factors like Employment to population ratio, FDI, population for the past 20 years. Our aim is to identify the dependence of above mentioned factors on GDP of India and results of the regression analysis. Here we take GDP as the dependent variable and other three factors as the independent variables. Before getting into analysis we look into the substitute measures of each variable used in the report for analyzing regression, hypothesis testing and calculating the mean and median values.

GDP

Lending Interest Rates

FDI

Population

Employment to population ratio

2. 1) GDP:

GDP forms the dependent variable of our research study. GDP is an indicator of overall economic welfare of a country. It is the sum total of the final goods and services produced within the borders of the nation. In other words, summing up the consumption, government expenditure, investments and net exports results in the GDP growth rate of a country. It is considered to be a very important element as it helps in estimating the health of country's economy. Calculating the GDP is not an easy task because of which they are left to be calculated by the economists. GDP growth rate of an economy is dependent on various factors like FDI, population to employment ratio, lending interest rate, population etc. Governments closely watch out the GDP as it measures the economic performance of the country. If GDP rises it means the economy has grown and vice versa.

GDP is criticized on various grounds like it does not talks about the spending power, distribution of income or well being of country's inhabitant.

Formula of calculating GDP:

GDP= C+I+G+(X-M)

Where,

C= consumption

I= investment

G= government expenditure

& (X-M) = Net Exports

The independent variables (Population, Lending Interest rates, FDI, Employment to population ratio etc) that we are using in the research analysis affect each of these above mentioned components.

The data related to GDP has been shown in the appendix 9. 1

2. 2) Employment to population ratio:

It is taken as an independent variable in our study. We attempt to measure the impact of this ratio on GDP growth in India. Employment to population ratio basically means the ratio of the total working age of the labor force employed over total population. Following formula is used in calculating the ratio:

Employment to population ratio=

Employed Persons/ Total non-institutionalized civilian population *100

This ratio does not bear underrating problems relating to unemployed persons and other discouraged workers that enter or exit the labor force.

The data of employment ratio is shown in appendix 9. 1

2. 3) FDI:

Foreign direct investment is an independent variable in our research report. We try finding out the impact of FDI on GDP growth rate.

In simple words it is an investment made by one company in a given country in another company based or set up in another country.

FDI has been a major source of managerial skills, technology, capital and access to market desired for sustained economic development and growth in the recent past. All the Countries are involved in inviting more and more of foreign direct investment to come and invest in their country resulting in rapid economic growth. FDI is considered to be an important factor in facilitating growth, however, it will result in growth only if the inflows are carefully managed and invested.

The related data is included in the appendix 9. 1 for the past 20 years . All the inferences related to FDI has been drawn on the basis of such data.

2. 4) Population:

The growth of population has always been a debating issue. There is no conclusion as to it is negative or positive for growth of an economy. Population and economic growth are interrelated to each other in a way that, population increases due to high economic growth leading to early marriages and hiking birth rates and checking on the mortality rates by providing healthy environment to the citizens. Higher population also depresses economic growth through diminishing returns. (Becker, Glaeser, and Murphy 1999, p. 145) In our study we attempt to study the impact of population on economic growth which is expressed as the real GDP per capita.

The data regarding population for past 20 years has been included in the appendix 9. 1. All the analysis related to it has been done on the basis of such data and various results has been drawn on such basis.

2. 5) Lending Interest Rate:

Lending Interest rate is the amount of interest charged by a lender from a borrower in case of loan being offered. A country's real GDP and interest rates are interlinked in a variety of means. They have a direct relationship, i. e., high lending rate results in high growth for the economy. The dependence of GDP on Lending Interest Rate can be studied in the analysis of the study.

The related data regarding interest rate is included in appendix 9. 1

3. Tools used for research study:

The statistical tools used in our research study with the objective of finding the dependence of GDP on various independent variables like, Population, Lending interest rates, FDI, Employment to population ratio are Regression Analysis, Mean, Median, Mode, Hypothesis Testing

Steps involved in analysis:

Our first step was to scrutinize and identify the factors responsible for GDP growth of a nation.

Next, we tried locating data of the identified factors for the past 20 years.

Than we tried finding relationship of various factors with the GDP of a nation.

The data was than constructed and summarised in a proper manner to conduct regression analysis.

SPSS software was used to conduct the regression analysis and hypothesis testing.

All the data and factors collected are using the secondary sources, i. e., Internet and Journals.

4. Data Description:

N i. e. the number of observations for our research is 20.

There are two types of data:

Qualitative

Quantitative

Qualitative data deals with categorical measurement and is not measured in terms of numeric values. For our study the qualitative factors can be like Market Risk, Business Confidence etc, which affects the GDP but due to their qualitative nature we overlooked them of the study.

Quantitative data deals with the numerical measurement of the database. Relating to our study, the quantitative data factors are Population, GDP, Lending interest rates, FDI etc.

We have limited our research taking in account only the quantitative data.

Data can also be time series or cross sectional:

Cross sectional data is the data for a given point of time analyzing the differences among the subjects.

Whereas time series data is concerned with the data over a spread time course

In our report we are using time-series data, for 20 years i. e. from 1991 to 2010.

Regression Analysis:

Regression Analysis means scrutinizing the relationship between a dependent and independent variable. After conducting an analysis, regression statistics is helpful in identifying the dependent variable when the independent variables are unknown.

Dependent Variable- GDP growth of India

Independent variable- FDI, Employment to Population ratio and Real Interest Rate

The regression equation is:

Y= b1X1+b2X2+....+E

In the above equation-

Y= dependent variable

X1, X2 ...= independent variables

b1, b2 ...= coefficients describing effect of independent variables on the dependent variables

E= error term

In our study, the equation looks like,

GDP= b1F1+b2F2+b3F3+...+bnfn

Where,

F1 to Fn= independent variable factors

Hypothesis testing:

Hypothesis testing is the test of significance wherein we identify the likelihood that an assumption is true, and at what likelihood we would hold the assumption as true. The assumption made is referred as the Null hypothesis and is denoted by H0 and an alternate hypothesis is defined known as an Alternative Hypothesis and is denoted by Ha. The rationale behind this test is to hold null hypothesis to be true and then performing the study on the argument in question. Once the hypothesis is defined and data is collected and constructed, following steps of hypothesis are followed:

A critical region of size alpha is determined using the sample distribution of the test statistics

Using the sample data, identify the values of test statistics

The last step is confirming that the value of test statistics falls under the critical region defined; if no, we accept the null in favour of the alternative hypothesis and if yes, we reject the null hypothesis.

5). Variables considered as independent in hypothesis and doing regression analysis

In doing the analysis of various factors affecting GDP growth some of the factors which is been considered as the variables are FDI, Employment ratio,

Population and Lending interest rate as they impact directly in the growth of GDP for any country. The factors are denoted by " r" and following relation between the factors as stated above and the regression can be explained under

5. 1) Population (H1)

Although increase in population has a negative impact on the economy of any country. However, such increase allows availability of labor at cheap rates which attracts the companies or firms to make more investment in the form of Foreign direct investment or FII's that helps to give upward thrust in GDP.

5. 2) Foreign Direct Investment(H2)

It can be argued on the grounds of proven facts that Foreign Direct Investment has a positive relation for boosting the economic growth of any country which results in increasing the GDP of the country. FDI allows the money to come in the economy which creates opportunities to increase growth of the economy.

5. 3) Employment Ratio(H3)

It also affects the economy which indeed affects GDP growth as with the increase in the employment more expenditure will have to be incurred which in turn affect country's GDP

5. 4) Lending Interest Rate(H4)

If the interest rate increases it will lead to less money circulation in the economy. The banks and financial institutions of the country will not able to

lend money as the people will not be willing to accept because the increase in interest rate will attract more interest expense and hence will resist to it. This will result in decrease in the consumption which will bend the GDP down and secondly money circulation will also reduce which result in the fall in GDP growth.

Hence the whole discussion can be summarized in the following manner-:

H1- Increase in population lead to increased GDP. Hence it has a positive relation

H2- Increase in FDI Increases GDP. It also has a positive relation

H3- Increase in employment leads to increase in GDP. It shows positive relation

H4- Increase in Interest rate leads to fall in GDP. It has a negative relation

6). Regression results

6. 1) Employment Regression (Appendix 9. 3. 1)

In this regression model,

Employment ratio is an independent variable and on X-axis.

GDP is a dependent variable and on y-axis.

After doing data analysis of this model, we conclude that the regression equation for this is:

Here,

is an intercept which is 1. 736

is a slope of this equation which is -2. 958

– Estimated value

If employment ratio is increase by 1, there is decrease in GDP by 2. 958.

There is negative linear relationship between GDP and employment ratio.

Now if we talk about correlation between these two variable which is R.

= +âˆš(. 720)

= +. 849

In this + sign shows that correlation is positive and is . 849

Now is . 72 which shows that 72 % variance in GDP is explained by employment ratio.

Now if we talk about this model whether it is good or bad, we have to check two condition.

should be high

In this is high.

Hypothesis test:

: Î² = 0 (no linear relationship between X and Y)

: Î² â‰ 0 (linear relationship between X and Y)

This is conclude by t statistics

Now, = -6. 80

– Standard error

âˆ’value is . 000 and we assume Î± is . 05 which is greater than p-value.

Hence we reject .

So we conclude that it is a good regression model.

6. 2) FDI Regression (Appendix 9. 3. 2)

In this regression model,

FDI is an independent variable and on X-axis.

GDP is a dependent variable and on y-axis.

After doing data analysis of this model, we conclude that the regression equation for this is:

Here,

is an intercept which is 3. 894

is a slope of this equation which is 0. 029

– Estimated value

If FDI is increase by 1, there is increase in GDP by .

There is positive linear relationship between GDP and FDI as the slope is positive.

Now if we talk about correlation between these two variable which is R.

= +âˆš(. 782)

= +. 884

In this + sign shows that correlation is positive and is . 884

Now is . 78 which shows that 78 % variance in GDP is explained by FDI.

Now if we talk about this model whether it is good or bad, we have to check two condition.

should be high

In this is high.

Hypothesis test:

: Î² = 0 (no linear relationship between X and Y)

: Î² â‰ 0 (linear relationship between X and Y)

This is conclude by t statistics

Now, = 8. 025

– Standard error

âˆ’value is . 000 and we assume Î± is . 05 which is greater than p-value.

Hence we reject .

So we conclude that it is a good regression model.

6. 3) Lending interest rate (Appendix 9. 3. 3)

In this regression model,

Lending interest rate is an independent variable and on X-axis.

GDP is a dependent variable and on y-axis.

After doing data analysis of this model, we conclude that the regression equation for this is:

Here,

is an intercept which is 2. 088

is a slope of this equation which is -1. 066

– Estimated value

If lending interest rate increases by 1, there is decrease in GDP by 1. 066.

There is negative linear relationship between GDP and lending interest rate as the slope is negative.

Now if we talk about correlation between these two variable which is R.

= +âˆš(. 466)

= +. 683

In this + sign shows that correlation is positive and is . 849

Now is . 46 which shows that 46 % variance in GDP is explained by employment ratio.

Now if we talk about this model whether it is good or bad, we have check two condition.

should be high

In this is high.

Hypothesis test:

: Î² = 0 (no linear relationship between X and Y)

: Î² â‰ 0 (linear relationship between X and Y)

This is conclude by t statistics

Now, = -3. 964

– Standard error

â^'value is . 001 and we assume Î± is . 05 which is greater than p-value.

Hence we reject .

So we conclude that it is a good regression model.

6. 4) Population Regression (Appendix 9. 3. 4)

In this regression model,

Population is an independent variable and on X-axis.

GDP is a dependent variable and on y-axis.

After doing data analysis of this model, we conclude that the regression equation for this is:

Here,

is an intercept which is 3. 894

is a slope of this equation which is 0. 029

– Estimated value

If population is increase by 1, there is increase in GDP by 3. 60

There is strong positive linear relationship between GDP and POPULATION as the slope is positive.

Now if we talk about correlation between these two variable which is R.

= +âˆš(. 819)

= +. 905

In this + sign shows that correlation is positive and is . 905

Now is . 81 which shows that 81 % variance in GDP is explained by population.

Now if we talk about this model whether it is good or bad, we have to check two condition.

should be high

In this is high.

Hypothesis test:

: Î² = 0 (no linear relationship between X and Y)

: Î² â‰ 0 (linear relationship between X and Y)

This is conclude by t statistics

Now, = 9. 031

– Standard error

âˆ’value is . 000 and we assume Î± is . 05 which is greater than p-value.

Hence we reject .

So we conclude that it is a good regression model.

7) Conclusion

The effect of factors like employment ratio, foreign direct investment, lending interest rate and population on GDP of India are considered as important variables which we have tried to explain with the help of regression analysis and hypothesis testing. By considering the data of past 20 years we have also calculated its mean, median, mode, Variance,

standard deviation (appendix 2). We have one dependent variable that is GDP and four independent variables which are FDI, employment ratio, population, and interest rate.

According to multiple regressions, the equation for the model is:

Where x1, x2, x3, x4 are the independent variable, estimated value E(y) is expected by these variable. In our report, we have taken separate simple regression models

Regression analysis cannot interpret as a procedure for establishing a cause and effect relationship between variables. It can only show that how much these variables are related or associated with each other. Regression equation tells us about mean value of y for given value of x. According to Hypothesis test, all four regression model is good model and it estimates the mean value for these independent variables with less errors. The models also shows the relationship between GDP and these independent variables and their effect on GDP. If value of these independent variables is increase by 1, we conclude how much it affects the estimated value of GDP.

Estimated value of GDP is increases by 3. 60 if there is one unit increase in population

Estimated value of GDP is increased by . 029 if there is one unit increase in FDI

Estimated value of GDP is decreased by 2. 958 if there is one unit increase in employment ratio

Estimated value of GDP is decreased by 1. 066 if there is one unit increase in interest rate

Hence it can be concluded that all factors affects GDP and we can’t estimate GDP if we don’t have particular value of these independent variable.

8) Bibliography

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