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Project report on

"Statistical Analysis of Foreign Direct Investment (FDI) in India"

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CERTIFICATE

This is to certify that the project entitled, **"Statistical Analysis of Foreign Direct Investment (FDI) in India"** has been submitted to the Department of Statistics, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad in partial fulfilment of Master degree in Statistics in the Academic year 2016-2017.

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"Statistical Analysis of Foreign Direct Investment (FDI) in India"

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CHAPTER 1

INTRODUCTION

INTRODUCTION

One of the most striking developments during the last two decades is in the spectacular growth of FDI (Foreign Direct Investment) in the global economic landscape. This unprecedented growth of global FDI in 1990 around the world, make FDI an important and vital component of development strategy in both developed and developing nations and policies are designed in order to stimulate inward flows. In fact, FDI provides a win – win situation to the host and the home countries. Both countries are directly interested in inviting FDI, because they benefit a lot from such type of investment. The 'home' countries want to take the advantage of the vast markets opened by industrial growth. On the other hand the 'host' countries want to acquire technological and managerial skills and supplement domestic savings and foreign exchange. Moreover, the paucity of all types of resources viz. financial, capital, entrepreneurship, technological know-how, skills and practices, access to markets- abroad- in their economic development, developing nations accepted FDI as a sole visible panacea for all their scarcities. Further, the integration of global financial markets paves ways to this explosive growth of FDI around the globe.

Foreign direct investment (FDI) is an integral part of an open and effective international economic system and a major catalyst to development. Yet, the benefits of FDI do not accrue automatically and evenly across countries, sectors and local communities. National policies and the international investment architecture matter for attracting FDI to a larger number of developing countries and for reaping the full benefits of FDI for development. The challenges primarily address host countries, which need to establish a transparent, broad and effective enabling policy environment for investment and to build the human and institutional capacities to implement them. With most FDI flows originating from OECD (Organisation for Economic Co-operation & Development) countries,

developed countries can contribute to advancing this agenda. They can facilitate developing countries access to international markets and technology and ensure policy coherence for development. More generally Overseas Development Assistance (ODA) to leverage public/private investment projects, encourage non-OECD countries to integrate further into rules-based international frameworks for investment, actively promote the OECD Guidelines for Multinational Enterprises, together with other elements of the OECD Declaration on International Investment and share with non-members the OECD peer review-based approach to building investment capacity.

In India role of FDI was first introduced by finance minister Dr. Manmohan Singh in 1991 in the form of Foreign Exchange Management Act which lead to increase in the domestic capital cash inflows in the country and this will help in economic growth of the country. The importance of FDI has grown considerably in Indian economy day by day. After liberalization its role has changed significantly. Earlier the amount of FDI was low conforming to some selected sectors but now the inflow of FDI has grown tremendously and almost in all the sectors of the economy.

1.1 What is FDI?

Foreign direct investment is the inflows in cash as a part of investment for acquiring the management control in an enterprise which is operating in the country than that of such investor. In simple term, investment directly made by a foreign company business in another company situated in the other country.

FDI means foreign direct investment. Now a day's government initiate lot of steps to increase foreign investment in India & that's why the Union cabinet has opened the gates of multi brand retail segment of India to well known foreign chains like **Wal-Mart**, Carrefour etc.

Foreign direct investment (FDI) is made through a business or a sector by an individual or a company from another country. It is different from portfolio investment which is made more indirectly into another country's economy by using financial instruments such as bonds and stocks. There are various levels and forms of foreign direct investment depending on the type of companies involved and the reasons for investment. A foreign direct investor might purchase a company in the target country by means of a merger or acquisition, setting up a new venture or expanding the operations of an existing one. Other forms of FDI include the acquisition of shares in an associated enterprise, the incorporation of a wholly owned company or subsidiary and participation in an equity joint venture across international boundaries. If you are planning to engage in this kind of venture, you should determine first if it provides you and the society with maximum benefits. One good way to do this is evaluating its advantages and disadvantages.

1.2 History of FDI in India

The historical background of FDI in India can be traced back with the establishment of east India Company of Britain. British capital came to India during the colonial era of Britain in India. Before independence major amount of FDI came from the British Companies. After Second World War, Japanese companies entered into the Indian market and enhanced their trade with India, yet U.K. remains the most dominant investor in India. However, researcher could not portray the complete history of FDI pouring in India due to lack of abundant and authentic data. Over the past half a century, perceptions of the role played by Foreign Direct Investment (FDI) in the development process has undergone several changes. Policy regime is the main factor driving foreign investment inflows to a country. Perceptions of foreign investors towards India changed quite distinctly as a result of the change in the policy regime. Inflows of FDI have increased substantially

compared to the earlier regime in which the scope for FDI was quite restricted.

There has been a sea change in India's approach to FDI from the early 1990s when it began structural economic reforms encompassing almost all the sectors of the country. Foreign investment was introduced in 1991 under Foreign Exchange Management Act (FEMA), driven by then finance minister Dr. Manmohan Singh. As Singh subsequently became the prime minister, this has been one of his top political problems, even in the current times. India disallowed overseas corporate bodies (OCB) to invest in India. India imposes cap on equity holding by foreign investors in various sectors, current FDI in aviation and insurance sectors is limited to a maximum of 49%. Starting from a baseline of less than $1 billion in 1990, a 2012 UNCTAD (United Nations Conference on Trade & Development) survey projected India as the second most important FDI destination (after China) for transnational corporations during 2010–2012. As per the data, the sectors that attracted higher inflows were services, telecommunication, construction activities and computer software and hardware. Mauritius, Singapore, U.S. and U.K. were among the leading sources of FDI.

1.3 What is GDP?

The economy of India is the seventh-largest in the world measured by nominal GDP and the third-largest by purchasing power parity (PPP). The country is classified as a newly industrialized country, and one of the G-20 major economies, with an average growth rate of approximately 7% over the last two decades.

The OECD defines GDP as "an aggregate measure of production equal to the sum of the gross values added of all resident and institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)." An IMF publication states that "GDP measures the monetary value of final goods and services - that is, those that are bought by the final user - produced in a country in a given period of time (say a quarter or a year)".

Total GDP can also be broken down into the contribution of each industry or sector of the economy. The ratio of GDP to the total population of the region is the per capita GDP and the same is called Mean Standard of Living.

The concept of purchasing power parity allows one to estimate what the exchange rate between two currencies would have to be in order for the exchange to be at par with the purchasing power of the two countries' currencies. Using that PPP rate for hypothetical currency conversions, a given amount of one currency thus has the same purchasing power whether used directly to purchase a market basket of goods or used to convert at the PPP rate to the other currency and then purchase the market basket using that currency. Observed deviations of the exchange rate from purchasing power parity are measured by deviations of the real exchange rate from its PPP value of 1.

PPP exchange rates help to minimize misleading international comparisons that can arise with the use of market exchange rates. For example, suppose that two countries produce the same physical amounts of goods as each other in each

of two different years. Since market exchange rates fluctuate substantially, when the GDP of one country measured in its own currency is converted to the other country's currency using market exchange rates, one country might be inferred to have higher real GDP than the other country in one year but lower in the other; both of these inferences would fail to reflect the reality of their relative levels of production. But if one country's GDP is converted into the other country's currency using PPP exchange rates instead of observed market exchange rates, the false inference will not occur. Essentially GDP PPP controls for the different costs of living and price levels, usually relative to the United States Dollar, thus enabling a more accurate depiction of a given nation's level of production.

1.4Advantages of Foreign Direct Investment:

1. Economic Development Stimulation.

Foreign direct investment can stimulate the target country's economic development, creating a more conducive environment for you as the investor and benefits for the local industry.

2. Easy International Trade:

Commonly, a country has its own import tariff, and this is one of the reasons why trading with it is quite difficult. Also, there are industries that usually require their presence in the international markets to ensure their sales and goals will be completely met. With FDI, all these will be made easier.

3. Employment and Economic Boost:

Foreign direct investment creates new jobs, as investors build new companies in the target country, create new opportunities. This leads to an increase in income and more buying power to the people, which in turn leads to an economic boost.

4. Tax Incentives:

Parent enterprises would also provide foreign direct investment to get additional expertise, technology and products. As the foreign investor, you can receive tax incentives that will be highly useful in your selected field of business.

5. Resource transfer:

Foreign direct investment will allow resource transfer and other exchanges of knowledge, where various countries are given access to new technologies and skills.

6. Reduced Disparity between Revenues and Costs:

Foreign direct investment can reduce the disparity between revenues and costs. With such, countries will be able to make sure that production costs will be the same and can be sold easily.

7. Increased Productivity:

The facilities and equipment provided by foreign investors can increase a workforce's productivity in the target country.

8. Increment in Income:

Another big advantage of foreign direct investment is the increase of the target country's income. With more jobs and higher wages, the national income normally increases. As a result, economic growth is spurred. Take note that larger corporations would usually offer higher salary levels than what you would normally find in the target country, which can lead to increment in income.

9. More consumer savings:

One of the biggest advantages of FDI is that it will increase the savings of Indian consumer as he will get good quality products at much cheaper rates. Consumer savings are likely to increase 5 to 10% from FDI.

10. Increase in government revenue:

Government revenues are certainly going to increase a lot because of FDI. Government revenues will increase by 25 to 30 billion dollars which is a really big amount. This government revenue can help a lot in the development of Indian economy.

1.5 Disadvantages of Foreign Direct Investment

1. Hindrance to Domestic Investment:

As it focuses its resources elsewhere other than the investor's home country, foreign direct investment can sometimes hinder domestic investment.

2. Risk from Political Changes:

Because political issues in other countries can instantly change, foreign direct investment is very risky. Plus, most of the risk factors that you are going to experience are extremely high.

3. Negative Influence on Exchange Rates:

Foreign direct investments can occasionally affect exchange rates to the advantage of one country and the detriment of another.

4. Higher Costs:

If you invest in some foreign countries, you might notice that it is more expensive than when you export goods. So, it is very imperative to prepare sufficient money to set up your operations.

5. Economic Non-Viability:

Considering that foreign direct investments may be capital-intensive from the

point of view of the investor, it can sometimes be very risky or economically non-viable.

6. Expropriation:

Remember that political changes can also lead to expropriation, which is a scenario where the government will have control over your property and assets.

7. Destruction of small entrepreneurs:

The biggest fear from FDI is that it is likely to destroy the small entrepreneurs or small grocery shops as they will not be able to withstand the tough competition of big entrepreneurs as these entrepreneurs are going to provide all the goods to the consumers at much lesser prices.

8. Shrinking of jobs:

Many critics of FDI are of the view that entry of big foreign chains like Wal-Mart; Carrefour etc. are not going to generate any jobs in reality in India. At best the jobs will move from unorganized sector to organized sector while their number will remain the same or lesser but not more.

9. No real benefit to farmers:

Critics of FDI are also of the view that it is a fallacy that the farmers are going to benefit in any way because of the entry of foreign chains in India rather it will make the Indian farmers a slave of these big chains & the farmers will entirely be on their mercy. Thus, FDI is only going to deteriorate the already miserable conditions of Indian farmers.

1.6 Data collection:

This study is based on the secondary data. Secondary data is one of the part of research methodology through which information about the project can be collected. The required data have been collected from various sources which are mentioned as follows:

- Publication from Ministry and Commerce, Govt. Of India
- Various Bulletins of Reserve Bank Of India
- World Investment Report
- Country Report on Economic Policy
- Centre for Monitoring Indian Economy
- Indian express: Business
- The Economic Times

It is a time series data and data have been collected for the period 2000-01 to 2014-15.

CHAPTER 2

OBJECTIVES

Objectives of the Study

- ✓ To know the total inflow of FDI in India.
- ✓ To identify the inflow of FDI from various countries.
- ✓ To analyze distribution of investments of FDI in various sectors.
- ✓ To check the consistency of investments of various countries through FDI in India.
- ✓ To study the Impact of FDI on Indian Economy.
- ✓ To study the trend and pattern of inflow of FDI.
- ✓ To study the trend and pattern of GDP of India.
- ✓ To forecast inflow of FDI in India.
- ✓ To check significant difference between total investments in India by various Countries.
- ✓ To check significant difference between total investments of inflow of FDI in various sectors.
- ✓ To check significant difference between total investments of inflow of FDI under the RBI's regional offices in India.
- ✓ To study the challenges faced in improvement of investments of FDI in various sectors.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Concept & Definitions

- **Population**:-

The group of individuals under study is called population.

- **Parameters:-**

The statistical measure namely mean, standard deviation, variance, correlation coefficient etc. if they are calculated based on population are called parameters. If the population information is neither available completely nor finite. Parameters cannot be evaluated. In such cases, the parameters termed as unknown.

- **Statistic**:-

The statistical measures, if they are obtained. Based on the sample alone, they are called statistic. Any function of sample observations is also known as statistic.

- **Hypothesis Testing**:-

There are two types of hypothesis:

I. Null hypothesis:-

It is tentative statement about the unknown population parameter. It is to be tested based on the sample data. It is usually denoted as H_0.

II. Alternative hypothesis:-

Any hypothesis, which is complementary to the null hypothesis, is called alternative hypothesis. It is usually denoted by H_1.

- **Significance Level**:-

A type I error occurs when the researcher rejects a null hypothesis when it is true. The probability of committing a type I error is called the significance level. & is denoted by "α ".

- **Degrees of Freedom**:-

The number of degrees of freedom generally refers to number of independent observations in a sample minus the number of population parameters that must be estimated from a sample data.

- **P-value**:-

The p-value is a function of the observed sample result (a statistic) that is used for testing a statistical hypothesis. Before performing the test a threshold value is chosen, called the significance level of the test, traditionally 5% or 1% and denoted as α. If the p-value is equal to or smaller than the significance level (α), it suggests that the observed data are inconsistent with the assumption that the null hypothesis is true, and thus that hypothesis must be rejected and the alternative hypothesis is accepted as true. When the p-value is calculated correctly, such a test is guaranteed to control the Type I error rate to be no greater than α.

3.2 Coefficient of Variation:

The consistency of players can be found using coefficient of variation. According to prof. Karl Pearson who suggested C.V. is the percentage variation in the mean and standard deviation being considered as the total variation in the mean.

For comparing the variability of two or more series coefficient of variation is calculated. The series having greater C.V. is said to be more variable than the other and the series having lesser C.V. is said to be more consistent.

Coefficient of variation is calculated as follows:

$$\text{Coefficient of Variation (C.V.)} = 100\times\frac{\sigma}{\bar{x}}.$$

Coefficient of Variation (C.V.): 100 times the coefficient of dispersion based upon the standard deviation is called Coefficient of Variation (C.V.).

3.3 Time Series

Definition:

"An ordered sequence of values of a variable at equally spaced time intervals".

Time series analysis comprises methods for analyzing time series data in order to extract meaningful statistics and other characteristics of the data. **Time series forecasting** is the use of a model to predict future values based on previously observed values.

Applications:

The usage of time series models is twofold:

- Obtain an understanding of the underlying forces and structure that produced the observed data
- Fit a model and proceed to forecasting, monitoring or even feedback and feed forward control.

Least Square Method

In which we can fit a trend. Since it is desirable that the trend line is near the observed data and time series is minimum, we can apply least square method. Through this method both linear non-linear trend lines can be fitted.

Linear Trend

Whenever it is apparent that the time series is moving up or down every year by a steady value,

$$Y_t = a + bx$$

Where, Y_t= trend value

a = trend value in the year of the origin

b= annual increment

X = time in years

The linear trend equation is similar to the linear regression equation. The procedure of computing and interpretation of a and b are similar to the regression analysis.

Non-linear trend

The underlying assumption for applying linear is that the trend is rising by approximately a constant amount every year. This may not be valid in many circumstances. If the amount of annual rise grows by a dissimilar rate, a non-linear trend is more appropriate.

One of the popular techniques of calculating non-linear trend is second-degree parabola. In the linear trend the trend line is straight but in case of second degree parabolic trend there is one bend in the trend curve. The relevant trend equations is given below,

$Y_t = a + bx + cx^2$

Where, a= Y intercept

b= slope of the curve

c=rate of change in the slope

Prediction and forecasting

In statistics, prediction is a part of statistical inference. One particular approach to such inference is known as predictive inference, but the prediction can be undertaken within any of the several approaches to statistical inference. Indeed, one description of statistics is that it provides a means of transferring knowledge about a sample of a population to the whole population, and to other related populations, which is not necessarily the same as prediction over time. When information is transferred across time, often to specific points in time, the process is known as forecasting.

- Fully formed statistical models for stochastic simulation purposes, so as to generate alternative versions of the time series, representing what might happen over non-specific time-periods in the future
- Simple or fully formed statistical models to describe the likely outcome of the time series in the immediate future, given knowledge of the most recent outcomes (forecasting).
- Forecasting on time series is usually done using automated statistical software packages and programming languages, such as R, S, SAS, SPSS, Minitab, Pandas (Python) and many others.

Coefficient of Determination (R Squared):

The coefficient of determination, R^2, is used to analyze how differences in one variable can be explained by a difference in a second variable. The coefficient of determination is similar to the correlation coefficient, R. The correlation coefficient formula will tell you how strong of a linear relationship there is between two variables. R Squared is the square of the correlation coefficient, *r* (hence the term r squared).

Meaning of the Coefficient of Determination:

The coefficient of determination can be thought of as a percent. It gives you an idea of how many data points fall within the results of the line formed by the regression equation. The higher the coefficient, the higher percentage of points the line passes through when the data points and line are plotted. If the coefficient is 0.80, then 80% of the points should fall within the regression line. Values of 1 or 0 would indicate the regression line represents all or none of the data, respectively. A higher coefficient is an indicator of a better goodness of fit for the observations.

Usefulness of R^2:

The usefulness of R^2 is its ability to find the likelihood of future events falling within the predicted outcomes. The idea is that if more samples are added, the coefficient would show the probability of a new point falling on the line..Even if there is a strong connection between the two variables, determination does not prove causality.

Model	Equation of model
Linear	$Y = b_0+b_1X+e$
Exponential	$\ln(Y)= b_0+b_1X+e$
Logarithmic	$Y = b_0+b_1\ln(X)+e$
Polynomial of order 2	$Y = b_0+b_1X+b_2X^2+e$
Polynomial of order 3	$Y=b_0+b_1X+b_2X^2+b^3X^3+e$
Polynomial of order 4	$Y = b_0+b_1X+b_2X^2+b_3X^3+b_4X^4+e$
Polynomial of order 5	$Y = b_0+b_1X+b_2X^2 +b_3X^3+b_4X^4+b_5x^5+e$
Polynomial of order 6	$Y = b_0+b_1X+b_2X^2 +b_3X^3+b_4X^4+ b_5x^5+b_6X^6+e$
Power	$Y = X^n$

3.4 Autocorrelation

Autocorrelation is a characteristic of data in which the correlation between the values of the same variables is based on related objects. It involves the assumption of instance independence, which underlies most of the convential models. It generally exists in those types of data-sets in which the data, instead of being randomly selected, is form the same source.

Autocorrelation depicts various types which shows certain kinds of pattern, for example, a curve that shows a discernible pattern among the residual errors, a curve that shows a cyclical pattern of upward or downward movement, and so on.

In time series, it generally occurs due to sluggishness or inertia within the data. If a non-export researcher is working on time series data, then he might use an incorrect function form, and this again can cause autocorrelation.

The handling of the data by the researcher, when it involves extrapolation and interpolation, can also give rise to autocorrelation. Thus, one should make the data stationary in order to remove autocorrelation in the handling of some series data.

Autocorrelation is matter of degree, so it can be positive as well as Negative. IF the series (like an economic series) depicts an upward or downward pattern, then the series is considered to exhibit negative autocorrelation.

When a researcher has applied ordinary least square over an estimator in the presence of autocorrelation, then the estimator is incompetent.

Autocorrelation using Durbin-Watson test:

- Autocorrelation can be checked using the Durbin-Watson test.

A test that the residuals from a linear regression or multiple regression is independent.

Method:

Because most regression problems involving time series data exhibit positive autocorrelation, the hypotheses usually considered in the Durbin-Watson test are

H_0: $\rho = 0$

H_1: $\rho > 0$

The test statistic is

$$\boldsymbol{d = \frac{\sum_{i=2}^{n}(e_i - e_{i-1})^2}{\sum_{i=1}^{n} e_i^2}}$$

Where $e_i = y_i - \hat{y}_i$ and y_i and $\hat{y}_i$ are, respectively, the observed and predicted values of the response variable for individual i. d becomes smaller as the serial correlations increase. Upper and lower critical values, dU and dL have been tabulated for different values of k (the number of explanatory variables) and n.

The decision rules for $\mathbf{H_0}$: p = 0 V/s $\mathbf{H_1}$: p < 0

If d < dL	reject H_0: p = 0
If d > dU	do not reject H_0: p= 0
If dL< d < dU	test is inconclusive.

3.5 Simple linear regression

Simple linear regression is the least squares estimator of a linear regression model with a single explanatory variable. In other words, simple linear regression fits a straight line through the set of *n* points in such a way that makes the sum of squared residuals of the model (that is, vertical distances between the points of the data set and the fitted line) as small as possible.

The adjective simple refers to the fact that the outcome variable is related to a single predictor. The slope of the fitted line is equal to the correlation between *y* and *x* corrected by the ratio of standard deviations of these variables. The intercept of the fitted line is such that it passes through the center of mass (*x*, *y*) of the data points.

Other regression methods besides the simple ordinary least squares (OLS) also exist. In particular, when one wants to do regression by eye, one usually tends to draw a slightly steeper line; closer to the one produced by the total least squares method. This occurs because it is more natural for one's mind to consider the orthogonal distances from the observations to the regression line, rather than the vertical ones as OLS method does.

Fitting the regression line

Suppose there are *n* data points $\{(x_i, y_i), i = 1, \ldots, n\}$. The function that describes x and y is:

$$y_i = \alpha + \beta x_i + e_i$$

The goal is to find the equation of the straight line

$$y = \alpha + \beta x$$

Which would provide a “best” fit for the data points? Here the "best" will be understood as in the least-squares approach: a line that minimizes the sum of squared residuals of the linear regression model.

It is sometimes useful to calculate r_{xy} from the data independently using this equation:

$$\mathbf{r_{xy}} = \frac{\overline{\mathbf{xy}} - \bar{\mathbf{x}}\bar{\mathbf{y}}}{\sqrt{\left(\overline{\mathbf{x^2}} - \bar{\mathbf{x}}^{\mathbf{2}}\right)\left(\overline{\mathbf{y^2}} - \bar{\mathbf{y}}^{\mathbf{2}}\right)}}$$

The coefficient of determination (R squared) is equal to $\mathbf{r_{xy}^2}$when the model is linear with a single independent variable.

3.6 ANALYSIS OF VARIANCE (ANOVA)

The analysis of variance is a powerful statistical tool for testing of significance of equality of several population means. The test of significance based on t-distribution is an adequate procedure only for testing the significance of the difference between two sample means. When we have three or more samples to consider at a time an alternative procedure for testing the hypothesis that all the samples are drawn from the same population i.e. they have the same mean is analysis of variance technique is used. The basic purpose of the analysis of variance is to test the homogeneity of several means.

❖ Assumptions of one way ANOVA:

- The samples are randomly selected and independent of one another.
- All populations involved follow a normal distribution.
- All populations have the same variance (or standard deviation).

One Way classification:

Let us suppose that N observations $x_{ij}, (i = 1,2, \dots, k; j = 1,2, \dots, n)$ of random variable X are grouped, on some basis, into k classes of equal sizes n respectively,(N = nk).Then the total variation in the observation x_{ij} can be split into two components as between classes variation and within classes variation.

The linear mathematical model is:

$$x_{ij} = \mu + \alpha_i + \varepsilon_{ij} \; ; \qquad (i = 1,2, \dots, k; j = 1,2, \dots, n)$$

Where,

μ = General mean effect

$= \frac{1}{k} \sum_{i=1}^{k} \mu_i$

α_i= Effect due to i^{th} treatment

ε_{ij}= Random error component

To test the equality of k population means the hypothesis is constructed as:

Null hypothesis:

H_0: There is no significant difference among different population means i.e.

H_0: $\mu_1 = \mu_2 = \cdots = \mu_k$

Alternative hypothesis:

H_1:There is significant difference among different population means i.e.

H_1: $\mu_i \neq \mu_k$ at least one population mean is not statistically equal.

The above information of variance components are summarized in ANOVA table as:

ANOVA Table:

Source of variation	S.S.	d.f.	M.S.S.	F ratio
Treatment	SSTR	$k-1$	$MSTR = \frac{SSTR}{k-1}$	$F_{obs.} = \frac{MSTR}{MSE}$
Residual/Error	SSE	$N-k$	$MSE = \frac{SSE}{n-k}$	-
Total	SST	$N-1$	-	-

Notations and definitions:

Where,

SSTR = Treatment sum of square

$= n\sum_{i=1}^{k}(\bar{x}_i - \bar{x})^2$

SSE = Error sum of square

$= \sum_{i=1}^{k}\sum_{j=1}^{n}(x_{ij} - \bar{x}_i)^2$

SST = Total sum of square

$= \sum_{i=1}^{k} \sum_{j=1}^{n} (x_{ij} - \bar{x})^2$

4. Decision

Reject the null hypothesis if: $F_{(observed\ value)} > F_{(k-1),(n-k),\alpha}$

Tukey's test

Tukey's test, Tukey method, Tukey's honest significance test, Tukey's HSD (honest significant difference) test or the Tukey–Kramer method, is a single-step multiple comparison procedure and statistical test. It can be used on raw data or in conjunction with an ANOVA (Post-hoc analysis) to find means that are significantly different from each other. Named after John Tukey, it compares all possible pairs of means, and is based on a studentized range distribution (q) (this distribution is similar to the distribution of t from the t-test. See below).The Tukey HSD tests should not be confused with the Tukey Mean Difference tests (also known as the Bland–Altman test).

Tukey's test compares the means of every treatment to the means of every other treatment; that is, it applies simultaneously to the set of all pair wise comparisons

$\mu_i - \mu_j$

And identifies any difference between two means that is greater than the expected standard error. The confidence coefficient for the set, when all sample sizes are equal, is exactly $1 - \alpha$. For unequal sample sizes, the confidence coefficient is greater than $1 - \alpha$. In other words, the Tukey's method is conservative when there are unequal sample sizes.

Assumptions of Tukey's test

1. The observations being tested are independent within and among the groups.
2. The groups associated with each mean in the test are normally distributed.

3. There is equal within-group variance across the groups associated with each mean in the test (homogeneity of variance).

Advantages and disadvantages

When doing all pair wise comparisons, this method is considered the best available when confidence intervals are needed or sample sizes are not equal. When samples sizes are equal and confidence intervals are not needed Tukey's test is slightly less powerful than the step-down procedures, but if they are not available Tukey's is the next-best choice, and unless the number of groups is large, the loss in power will be slight. In the general case when many or all contrasts might be of interest, Scheffé's method tends to give narrower confidence limits and is therefore the preferred method.

CHAPTER 4

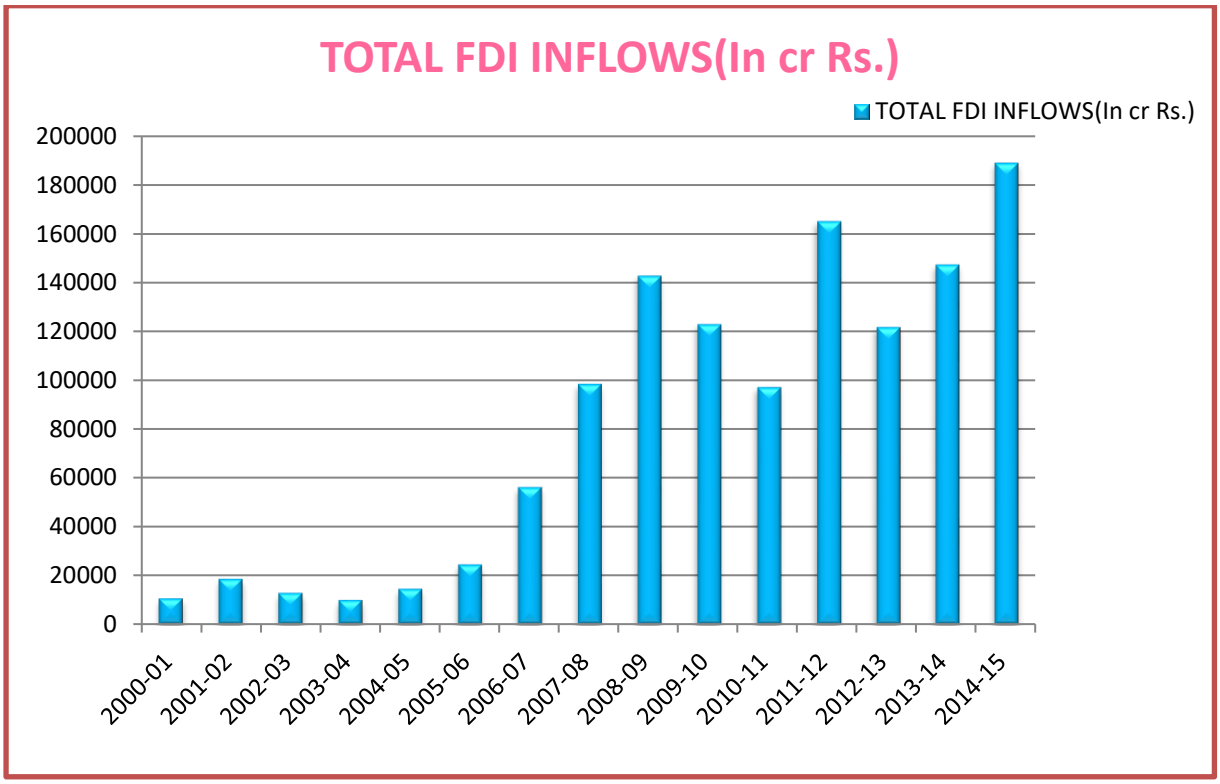
ANALYSIS AND DISCUSSION

4.1 Graphical Representation:

4.1.1 Bar diagram:

To study the total inflow of FDI in India during 2000-01 to 2014-15:

Fig1: Total FDI Inflow in India (In Crore Rs.)

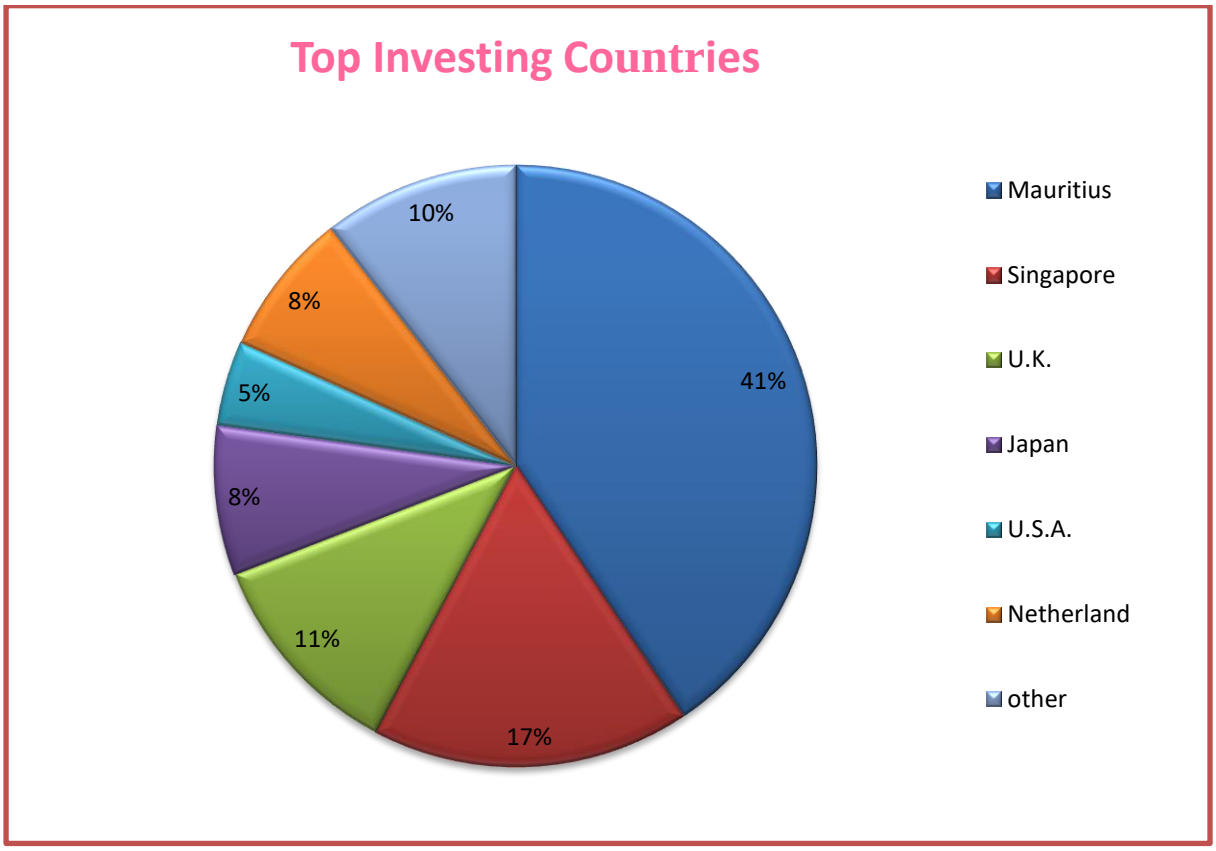


The graph shows that, there exist increasing trend during the period 2006-07 to 2014-15 with slight fluctuations. The highest rate of FDI inflow was during the year 2011-12 and 2014-15.

4.1.2 Pie chart:

To study the contribution in total inflow of FDI in India by various countries during the period 2000-01 to 2014-15 :

Fig2: contribution in FDI in India by various countries

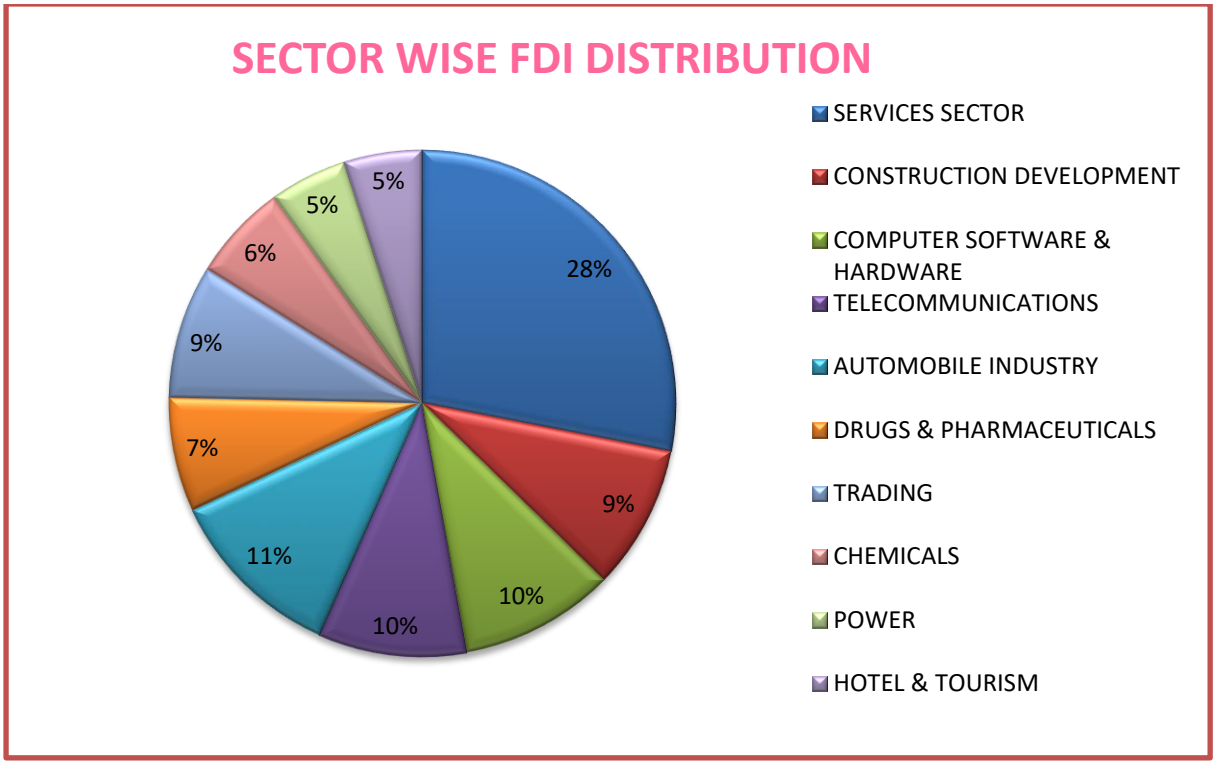


The above graph shows that, more than 50% of the total FDI inflows received in India from Mauritius and Singapore. Investments are more from Mauritius in India as compared to other countries and Investments from U.S.A. is low as compared to other countries in India.

4.1.3 Pie chart:

To study the distribution of FDI in India in Various sectors:

Fig3: Inflow of FDI in various sectors in India

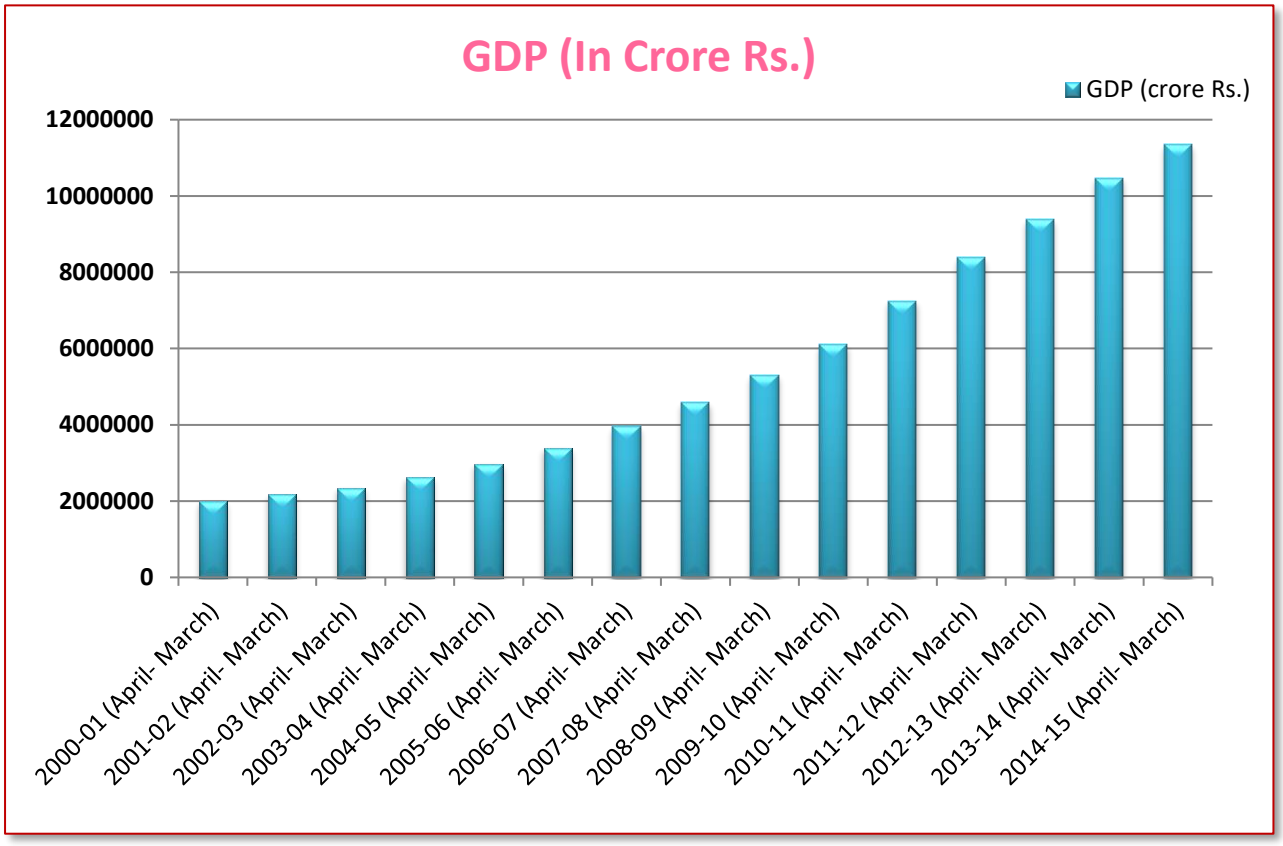


The above graph shows that, among all the top sectors in India, investments in service sector are more from FDI inflow which is 28% as compared to other sectors and very poor i.e. only 5% of investments are done in power sector from FDI inflow.

4.1.4 Bar Diagram:

To study the GDP of Indian Economy during the period 2000-01 to 2014-15:

Fig4: GDP of Indian Economy (In Crore Rs.)



The above graph shows that, there is positive upward trend in GDP of India over the period of study.

4.2.1 Coefficient of Variation of FDI inflow from the various countries:

Consistency of the top investing countries in India can be finding by using Coefficient of Variation. The country with less coefficient of variation is more consistent country and the country with large coefficient of variation is less consistent .The results are listed in table and the coefficient of variation for has been calculated as shown in table:

Table 1: Coefficient of variation of FDI inflow from the various countries

Year	Mauritius	Singapore	U.K.	Japan	U.S.A.	Netherlands	Germany	Cyprus	France
2006-07	28759	2662	3861	8389	2905	266	382	540	1174
2007-08	44483	12319	4377	4690	2780	3385	3336	2075	1039
2008-09	50794	15727	8002	3840	3922	5983	1889	2750	1133
2009-10	49633	11295	9230	3094	4283	7728	5670	2980	3017
2010-11	31855	7730	12235	7063	5353	5501	908	4171	3349
2011-12	46710	24715	36428	14089	5347	6698	7452	7722	3110
2012-13	51654	12594	5797	12243	3033	10054	4684	2658	3487
2013-14	29360	35625	20426	10550	4807	13920	6093	3401	1842
2014-15	55172	41350	8769	12752	11150	20960	6904	3634	3881
Mean	43157.78	18224.11	12125	8523.333	4842.222	8277.222	4146.444	3325.667	2448
S.D.	10347.7	13004.09	10395.71	4108.8	2567.669	6120.975	2630.15	1948.199	1140.813
c.v.	23.97643	71.35653	85.73781	48.20649	53.02667	73.94963	63.43146	58.58071	46.60184

Above table shows that, among the top investing countries in India, U.K. has highest coefficient of variation which is 86% and we conclude that there is very high variation in investments from U.K. in India as compared to other countries. Mauritius has less coefficient of variation near to 24% which shows that Mauritius is most consistent country investing in India as compared to other countries.

4.2.2 Coefficient of Variation of FDI inflow among the RBI's Regional offices:

Consistency of the investment under the RBI's regional offices in India can be finding by using Coefficient of Variation. The region with less coefficient of variation is more consistent region and the region with large coefficient of variation is less consistent .The results are listed in table and the coefficient of variation for has been calculated as shown in table2:

Table 2: Coefficient of variation of FDI inflow among the RBI's Regional offices

RBI's - Regional Offices	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	total	mean	S.D.	C.V.
MUMBAI	39409	27669	44664	47359	20595	38933	218629	36438.17	10294.5	28.25196
NEW DELHI	46197	12184	37403	17490	38190	42252	193716	32286	13977.77	43.29359
CHENNAI	4852	6133	7235	15252	12595	23361	69428	11571.33	7030.222	60.75551
BANGALORE	3653	6115	6711	5553	11422	21255	54709	9118.167	6480.776	71.07543
AHMEDABAD	3876	3294	4730	2676	5282	9416	29274	4879	2414.143	49.48027
HYDERABAD	5710	5753	4039	6290	4024	8326	34142	5690.333	1600.889	28.13348
KOLKATA	531	426	1817	2319	2659	1464	9216	1536	916.5684	59.67242
KOCHI	1038	1892	624	255	562	234	4605	767.5	624.1429	81.32154
JAIPUR	606	167	2274	1208	708	3237	8200	1366.667	1166.039	85.31991
CHANDIGARH	255	2093	569	390	411	601	4319	719.8333	684.4994	95.09137
BHOPAL	808	1376	181	47	103	1418	3933	655.5	636.3115	97.07269
PANAJI	149	230	161	714	233	211	1698	283	214.0533	75.6372
KANPUR	227	514	635	167	288	679	2510	418.3333	219.4572	52.45989
BHUBANESHWAR	702	68	125	285	150	56	1386	231	244.8461	105.994
GUWAHATI	51	37	5	27	4	29	153	25.5	18.32757	71.87284

The above table shows that, among the RBI regional offices Bhubaneshwar has got the highest coefficient of variation i.e.105% which shows that the region is less reliable in terms of investment. HYDERABAD has less variation near to 28% to this results that, Foreign investors clarifies view that HYDERABAD is one among those RBI regional offices to be trusted for expanding their business in India.

4.3.1 Autocorrelation using Durbin-Watson test:

Autocorrelation can be checked using the Durbin-Watson test.

A test that to detect the autocorrelation in the time series data.

Hypothesis:

H_0: There is no autocorrelation.

V/s

H_1: There is autocorrelation.

- The test criterion is –

Condition	Decision
if d < dL ;	autocorrelation
if d > dU ;	no autocorrelation
if dL< d < dU ;	inconclusive

Model Summary					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	**.925[a]**	**.856**	**.845**	**25289.13387**	**1.517**
a. Predictors: (Constant), YEAR					
b. Dependent Variable: FDI					

The values of dL and dU From Durbin Watson tables, dL=0.776, dU=1.054 at α=0.01

Here we observe that, d=1.517>dU=1.054

Therefore, we conclude that there is no autocorrelation.

4.3.2 Trend Analysis for FDI

The following table included the year and the inflow of FDI in India.

Table 3: Total FDI in cr. Rs.

Year	Total FDI in cr. Rs.
2000-01 (April- March)	10733
2001-02 (April- March)	18654
2002-03 (April- March)	12871
2003-04 (April- March)	10064
2004-05 (April- March)	14653
2005-06 (April- March)	24584
2006-07 (April- March)	56390
2007-08 (April- March)	98642
2008-09 (April- March)	142829
2009-10 (April- March)	123120
2010-11 (April- March)	97320
2011-12 (April- March)	165146
2012-13 (April- March)	121907
2013-14 (April- March)	147518
2014-15 (April-March)	189107

Trend Analysis for Total FDI INFLOWS in Rs. Crore

Accuracy Measures

MAPE	65
MAD	21240
MSD	554268253

Fitted trend equation

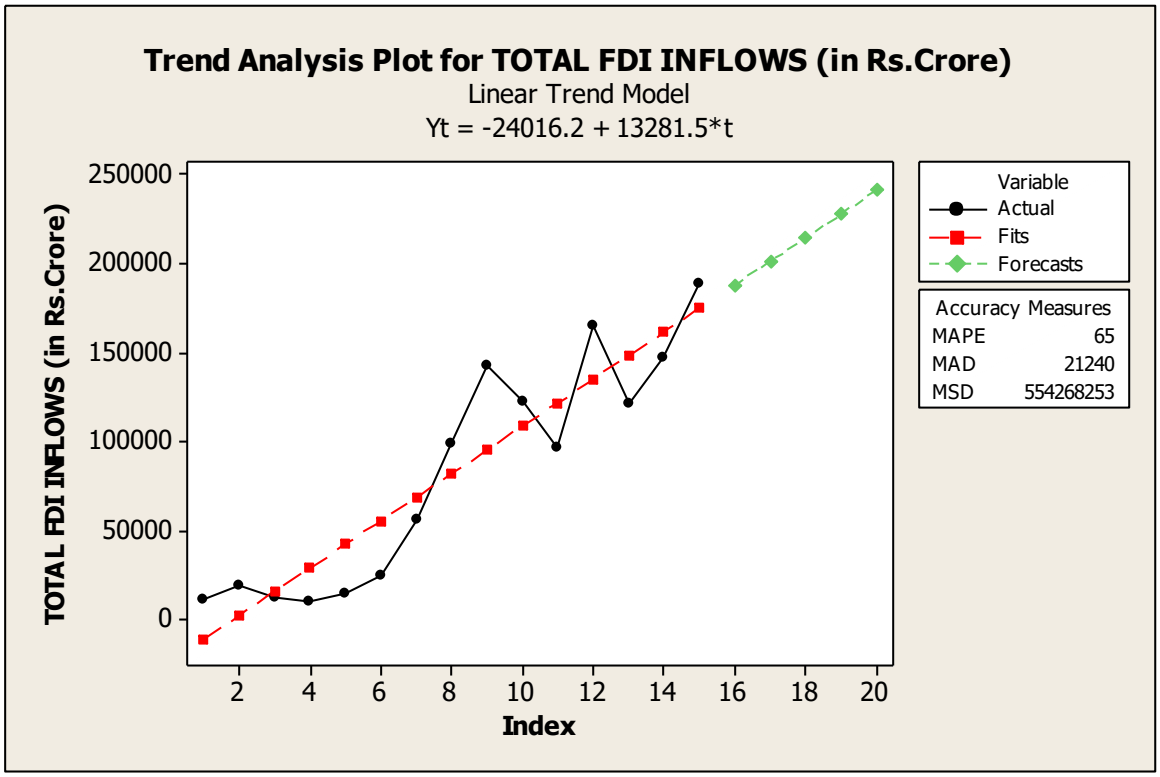
$$Y_t = a + b*x$$

$$Y_t = -24016.2 + 13281.5*t$$

Forecasts:

Period	Forecast
2016	188488
2017	201769
2018	215051
2019	228332
2020	241614

Fig 5: Trend Analysis Plot for TOTAL FDI INFLOWS (in Rs. Crore)



The above graph shows that, the actual inflow of FDI, trend values and forecasted values for next five years.

4.3.3 Autocorrelation using Durbin-Watson test:

Autocorrelation can be checked using the Durbin-Watson test.

A test that to detect the autocorrelation in the time series data.

Hypothesis:

H_0: There is no autocorrelation.

V/s

H_1: There is autocorrelation.

- The test criterion is –

Condition	Decision
if d < dL ;	autocorrelation
if d > dU ;	no autocorrelation
if dL< d < dU ;	inconclusive

Model Summary					
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
1	**.656[a]**	**.430**	**.387**	**964231.34637**	**1.287**
a. Predictors: (Constant), YEAR					
b. Dependent Variable: GDP					

The values of dL and dU From Durbin Watson tables, dL=0.776, dU=1.054 at α=0.01

Here we observe that, d=1.287 > dU=1.054

Therefore, we conclude that there is no autocorrelation.

4.3.4 Trend Analysis for GDP:

The following table included the year and the GDP of Indian Economy:

Table 4: GDP in cr. Rs.

Year	GDP in cr. Rs.
2000-01 (April- March)	2348481
2001-02 (April- March)	2474962
2002-03 (April- March)	2570935
2003-04 (April- March)	2775749
2004-05 (April- March)	2971464
2005-06 (April- March)	3253073
2006-07 (April- March)	3564364
2007-08 (April- March)	3896636
2008-09 (April- March)	4158676
2009-10 (April- March)	4516071
2010-11 (April- March)	4918533
2011-12 (April- March)	5247530
2012-13 (April- March)	5482111
2013-14 (April- March)	5741791
2014-15 (April-March)	2000743

Trend Analysis for GDP (in Rs. Crore)

Accuracy Measure

MAPE	1.70716E+01
MAD	6.60229E+05
MSD	6.60229E+05

Fitted Trend Equation

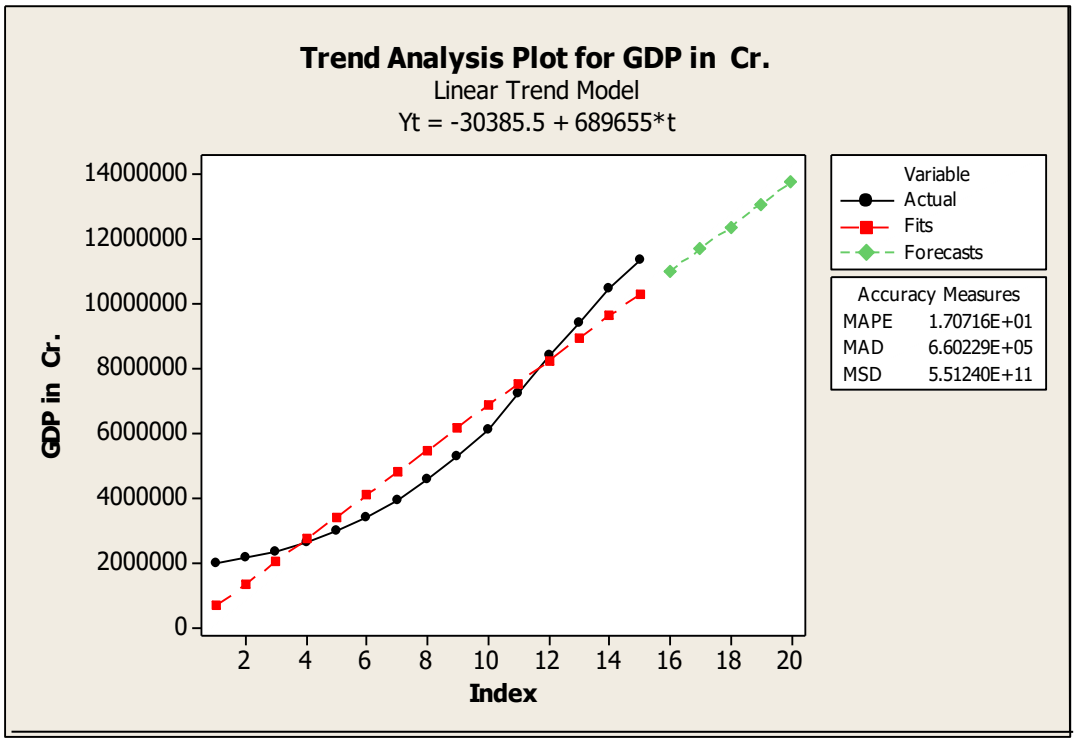
Yt=a+b*x

Yt = -30385.5 + 689655*t

Forecasts

Period	Forecast
2016	11004089
2017	11693743
2018	12383398
2019	13073053
2020	13762707

Fig 6: Trend Analysis Plot for GDP (in Rs. Crore)



The above graph shows that, the actual GDP of Indian Economy, trend values and forecasted values for next five years.

4.4.1 Regression Analysis:

Hypothesis:

Ho: There is no significant impact on GDP due to FDI inflow in India.

V/s

H_1: There is significant impact on GDP due to FDI inflow in India.

Coefficient of determination:

R^2 is a measure of the proportion of the total response variation that is explained by model.

Linear Model (using SPSS)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.571[a]	.326	.274	1.04915E6

Quadratic model (using SPSS)

R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
.822	**.676**	**.622**	**756745.997**

The independent variable is FDI.

The dependent variable is GDP.

From the above two table, Quadratic model is best fit because R^2=68%. This suggests that 68% of the total response variation is explained in this quadratic model.

Estimation of coefficients:

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.312E6	296238.811		7.806	.000
	FDI	27.686	10.864	1.391	2.548	.027
	FDISQR	-5.973E-5	.000	-.486	-.890	.392

a. Dependent Variable: GDP

We have get the Quadratic regression model is

GDP=2312452.43 +27.686*FDI - 5.973E-5*FDISQR

ANOVA Table						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.532E13	2	7.660E12	31.173	.000[a]
	Residual	2.703E12	11	2.457E11	_	_
	Total	1.802E13	13	_	_	_

Predictors: (constant), FDISQR, FDI

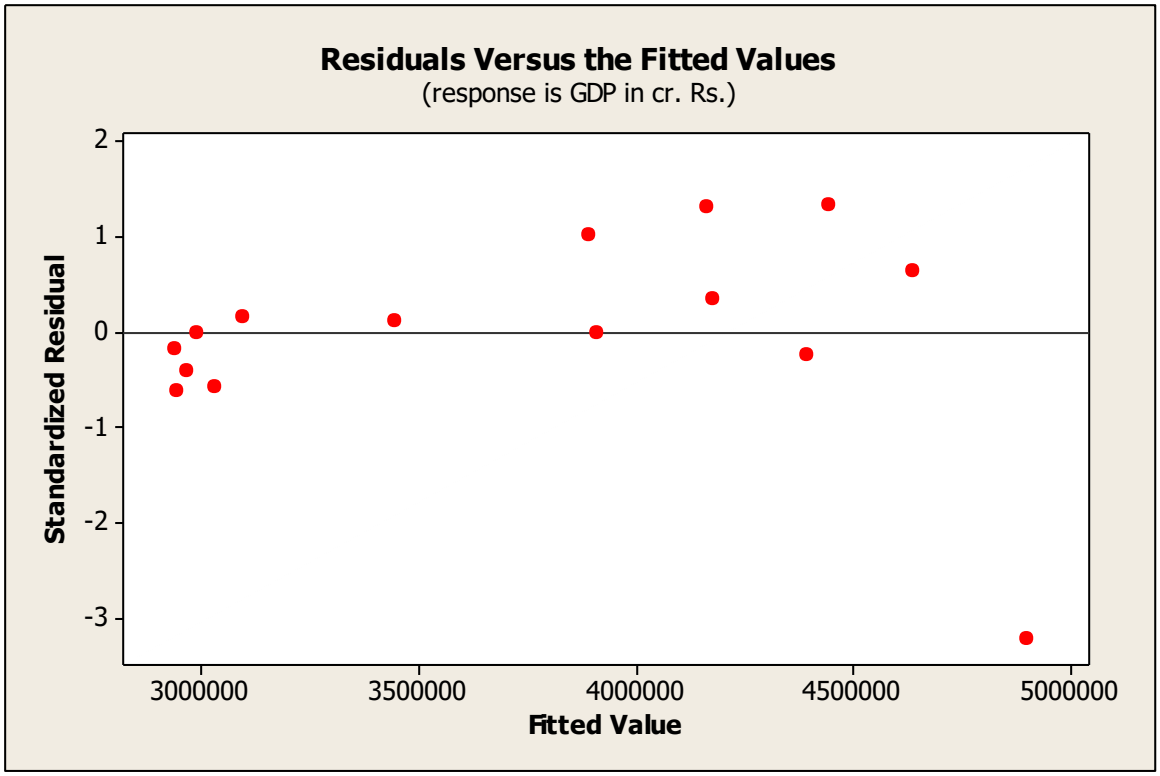
Dependent variable: GDP

Here p value (0.000) < α (0.05).

So we reject H_0 at 5% L.O.S.

That is, there is significant impact on GDP due to FDI inflow in India.

i.e. GDP of Indian economy depend on FDI.



- In the above plot the standardized predicted values are plotted against standardized residuals.
- This plot does not show any pattern. In other words the plot is random.
- This suggests that the current model is adequate.
- Most of the residuals are between -3 to +2.

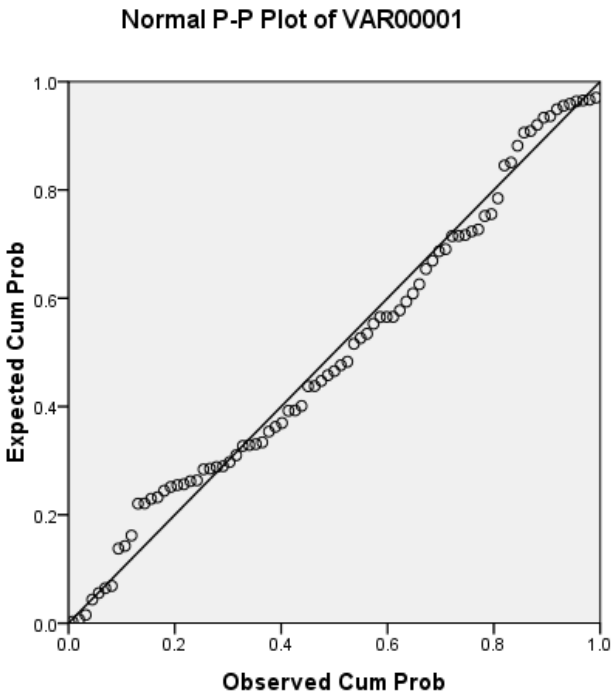
4.6.1 ANOVA for Country wise flow of FDI in India (in crore Rs.):

To test Equality of Total inflow of FDI in India by various countries.

Table5: Country wise flow of FDI in India

Year	Mauritius	Singapore	U.K.	Japan	U.S.A.	Netherlands	Germany	Cyprus	France
2006-07	28759	2662	3861	8389	2905	266	382	540	1174
2007-08	44483	12319	4377	4690	2780	3385	3336	2075	1039
2008-09	50794	15727	8002	3840	3922	5983	1889	2750	1133
2009-10	49633	11295	9230	3094	4283	7728	5670	2980	3017
2010-11	31855	7730	12235	7063	5353	5501	908	4171	3349
2011-12	46710	24715	36428	14089	5347	6698	7452	7722	3110
2012-13	51654	12594	5797	12243	3033	10054	4684	2658	3487
2013-14	29360	35625	20426	10550	4807	13920	6093	3401	1842
2014-15	55172	41350	8769	12752	11150	20960	6904	3634	3881

The normal Q-Q plot for total investments in India by various countries.



Hypothesis:

H_0 : There is no significant difference between total investments in India by various countries.

V/s

H_1 : There is significant difference between total investments in India by various countries.

Test of Homogeneity of Variances:

SPSS software is used to obtain the table of test of homogeneity of variances. Levene Statistic is:

Levene Statistic	df1	df2	Sig.
1.427	8	72	.200

From the above table, we observe that, the p value (0.2) > 0.05.

Therefore the assumption of homogeneity of variances is valid.

By using SPSS software the test of ANOVA table is:

ANOVA Table for investing countries in India

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	62.427	8	7.803	13.436	.000
Within Groups	41.817	72	.581	_	_
Total	104.245	80	_	_	_

From the above table,

We observe that p value (0.000) < 0.05 value. Therefore we reject H_0, at 5% LOS..Therefore we conclude that, there is significant difference between total investments in India by various countries.

Post Hoc Tests for Multiple Comparisons:

TUCKEY HSD

(I) VAR00001	(J) VAR00001	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00 Mauritius	**2.00 Singapore**	**1.09728**	**.35926**	**.073**	**-.0516**	**2.2462**
	3.00 U.K.	1.49465*	.35926	.003	.3457	2.6436
	4.00 Japan	1.71911*	.35926	.000	.5702	2.8680
	5.00 U.S.A.	2.25232*	.35926	.000	1.1034	3.4012
	6.00 Netherlands	2.03409*	.35926	.000	.8852	3.1830
	7.00 Germany	2.64636*	.35926	.000	1.4974	3.7953
	8.00 Cyprus	2.71609*	.35926	.000	1.5672	3.8650
	9.00 France	2.95991*	.35926	.000	1.8110	4.1088
2.00 Singapore	**1.00 Mauritius**	**-1.09728**	**.35926**	**.073**	**-2.2462**	**.0516**
	3.00 U.K.	**.39737**	**.35926**	**.971**	**-.7515**	**1.5463**
	4.00 Japan	**.62183**	**.35926**	**.726**	**-.5271**	**1.7708**
	5.00 U.S.A.	1.15505*	.35926	.048	.0061	2.3040
	6.00 Netherlands	**.93681**	**.35926**	**.202**	**-.2121**	**2.0857**
	7.00 Germany	1.54909*	.35926	.002	.4002	2.6980
	8.00 Cyprus	1.61881*	.35926	.001	.4699	2.7677
	9.00 France	1.86264*	.35926	.000	.7137	3.0116
3.00 U.K.	1.00 Mauritius	-1.49465*	.35926	.003	-2.6436	-.3457
	2.00 Singapore	**-.39737**	**.35926**	**.971**	**-1.5463**	**.7515**
	4.00 Japan	**.22446**	**.35926**	**.999**	**-.9245**	**1.3734**
	5.00 U.S.A.	**.75767**	**.35926**	**.476**	**-.3912**	**1.9066**
	6.00 Netherlands	**.53944**	**.35926**	**.851**	**-.6095**	**1.6884**
	7.00 Germany	1.15171*	.35926	.049	.0028	2.3006
	8.00 Cyprus	1.22144*	.35926	.029	.0725	2.3704
	9.00 France	1.46526*	.35926	.004	.3163	2.6142
4.00 Japan	1.00 Mauritius	-1.71911*	.35926	.000	-2.8680	-.5702

	2.00 Singapore	**-.62183**	**.35926**	**.726**	**-1.7708**	**.5271**
	3.00 U.K.	**-.22446**	**.35926**	**.999**	**-1.3734**	**.9245**
	5.00 U.S.A.	**.53321**	**.35926**	**.859**	**-.6157**	**1.6821**
	6.00 Netherlands	**.31498**	**.35926**	**.994**	**-.8339**	**1.4639**
	7.00 Germany	**.92725**	**.35926**	**.213**	**-.2217**	**2.0762**
	8.00 Cyprus	**.99698**	**.35926**	**.141**	**-.1519**	**2.1459**
	9.00 France	1.24081*	.35926	.025	.0919	2.3897
5.00 U.S.A.	1.00 Mauritius	-2.25232*	.35926	.000	-3.4012	-1.1034
	2.00 Singapore	-1.15505*	.35926	.048	-2.3040	-.0061
	3.00 U.K.	**-.75767**	**.35926**	**.476**	**-1.9066**	**.3912**
	4.00 Japan	**-.53321**	**.35926**	**.859**	**-1.6821**	**.6157**
	6.00 Netherlands	**-.21824**	**.35926**	**1.000**	**-1.3672**	**.9307**
	7.00 Germany	**.39404**	**.35926**	**.973**	**-.7549**	**1.5430**
	8.00 Cyprus	**.46377**	**.35926**	**.931**	**-.6852**	**1.6127**
	9.00 France	**.70759**	**.35926**	**.569**	**-.4413**	**1.8565**
6.00 Netherlands	1.00 Mauritius	-2.03409*	.35926	.000	-3.1830	-.8852
	2.00 Singapore	**-.93681**	**.35926**	**.202**	**-2.0857**	**.2121**
	3.00 U.K.	**-.53944**	**.35926**	**.851**	**-1.6884**	**.6095**
	4.00 Japan	**-.31498**	**.35926**	**.994**	**-1.4639**	**.8339**
	5.00 U.S.A.	**.21824**	**.35926**	**1.000**	**-.9307**	**1.3672**
	7.00 Germany	**.61228**	**.35926**	**.742**	**-.5366**	**1.7612**
	8.00 Cyprus	**.68200**	**.35926**	**.617**	**-.4669**	**1.8309**
	9.00 France	**.92583**	**.35926**	**.215**	**-.2231**	**2.0747**
7.00 Germany	1.00 Mauritius	-2.64636*	.35926	.000	-3.7953	-1.4974
	2.00 Singapore	-1.54909*	.35926	.002	-2.6980	-.4002
	3.00 U.K.	-1.15171*	.35926	.049	-2.3006	-.0028
	4.00 Japan	**-.92725**	**.35926**	**.213**	**-2.0762**	**.2217**
	5.00 U.S.A.	**-.39404**	**.35926**	**.973**	**-1.5430**	**.7549**
	6.00 Netherlands	**-.61228**	**.35926**	**.742**	**-1.7612**	**.5366**

	8.00 Cyprus	**.06973**	**.35926**	**1.000**	**-1.0792**	**1.2186**
	9.00 France	**.31355**	**.35926**	**.994**	**-.8354**	**1.4625**
8.00 Cyprus	1.00 Mauritius	-2.71609*	.35926	.000	-3.8650	-1.5672
	2.00 Singapore	-1.61881*	.35926	.001	-2.7677	-.4699
	3.00 U.K.	-1.22144*	.35926	.029	-2.3704	-.0725
	4.00 Japan	**-.99698**	**.35926**	**.141**	**-2.1459**	**.1519**
	5.00 U.S.A.	**-.46377**	**.35926**	**.931**	**-1.6127**	**.6852**
	6.00 Netherlands	**-.68200**	**.35926**	**.617**	**-1.8309**	**.4669**
	7.00 Germany	**-.06973**	**.35926**	**1.000**	**-1.2186**	**1.0792**
	9.00 France	**.24383**	**.35926**	**.999**	**-.9051**	**1.3927**
9.00 France	1.00 Mauritius	-2.95991*	.35926	.000	-4.1088	-1.8110
	2.00 Singapore	-1.86264*	.35926	.000	-3.0116	-.7137
	3.00 U.K.	-1.46526*	.35926	.004	-2.6142	-.3163
	4.00 Japan	-1.24081*	.35926	.025	-2.3897	-.0919
	5.00 U.S.A.	**-.70759**	**.35926**	**.569**	**-1.8565**	**.4413**
	6.00 Netherlands	**-.92583**	**.35926**	**.215**	**-2.0747**	**.2231**
	7.00 Germany	**-.31355**	**.35926**	**.994**	**-1.4625**	**.8354**
	8.00 Cyprus	**-.24383**	**.35926**	**.999**	**-1.3927**	**.9051**

Conclusion:

The result of multiple comparison test is shown in the following table:

	Mauritius	Singapore	U.K.	Japan	U.S.A.	Netherland	Germany	Cyprus	France
Mauritius	_								
Singapore	#	_							
U.K.	*	#	_						
Japan	*	#	#	_					
U.S.A	*	*	#	#	_				
Netherland	*	#	#	#	#	_			
Germany	*	*	*	#	#	#	_		
Cyprus	*	*	*	#	#	#	#	_	
France	*	*	*	*	#	#	#	#	_

Where,

= There is no significant difference between total investments in India from both countries.

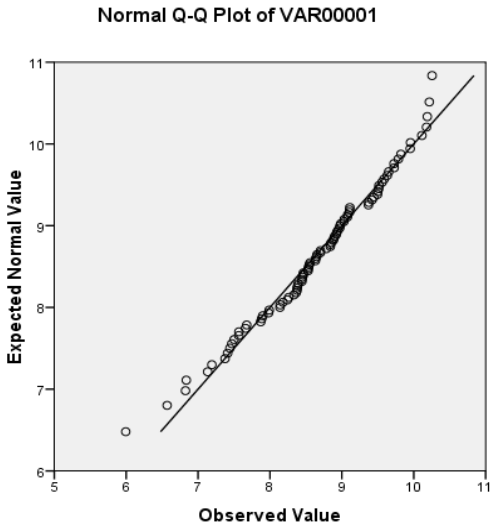
***** = There is significant difference between total investments in India from both countries.

4.6.2 ANOVA for Sector wise flow of FDI in India (In Crore Rs.):

To test the equality of the total investments of FDI in various sectors in India.

Table6: Sector wise flow of FDI in India

SECTORS	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
SERVICES SECTOR *	21047	26589	28411	20958	15539	24656	26306	13294	27369
CONSTRUCTION	11786	5623	7329	4350	3571	15236	7248	7508	4652
COMPUTER C&S	2155	5103	11727	12338	7546	9012	1654	7987	14162
TELECOMMUNICATIONS	2121	8749	12621	13586	5149	3804	2656	6896	13372
AUTOMOBILE IND.	4424	6989	8792	13544	5077	14605	6011	7191	16760
DRUGS & PHARMACEUTICALS	713	3875	4382	6908	6008	4347	8384	9027	9052
TRADING	1254	2697	5212	5609	5709	18422	1596	4738	16755
CHEMICALS	7866	4686	4157	1935	5055	7678	2923	6519	4658
POWER	401	5729	1931	1328	2621	8348	7878	3436	4296
HOTEL & TOURISM	930	920	3427	1707	1810	1754	17777	2949	4740



The normal Q-Q plot for total investments in various sectors.

Hypothesis:

H_0: There is no significant difference between total investments in various sectors.

V/s

H_1: There is significant difference between total investments in various sectors.

Test of Homogeneity of Variances:

SPSS software is used to obtain the table of test of homogeneity of variances. Levene Statistic is:

Levene Statistic	df1	df2	Sig.
2.057	8	81	.055

From the above table, we observe that, the p value (0.055) > 0.05.

Therefore the assumption of homogeneity of variances is valid.

By using SPSS software the test of ANOVA table is:

ANOVA TABLE for sector wise investment in India

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.011	8	1.376	1.899	.071
Within Groups	58.712	81	.725	_	_
Total	69.723	89	_	_	_

From the above table,

We observe that p value (0.71) >0.05 value. Therefore we accept H_0, at 5% LOS.

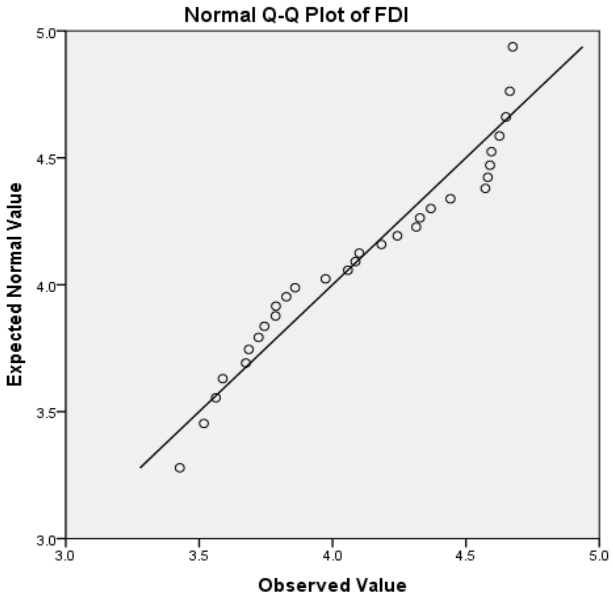
Therefore we conclude that, there is no significant difference between total investments in various sectors.

4.6.3 ANOVA for flow of FDI under the RBI‘s top 5 regional offices (in crore Rs.):

To test the equality of the total investments of FDI under the RBI’s regional offices in India.

Table7: flow of FDI under the RBI’s top 5 regional offices

Year	MUMBAI	NEW DELHI	CHENNAI	BANGALORE	AHMEDABAD
2009-10	39409	46197	4852	3653	3876
2010-11	27669	12184	6133	6115	3294
2011-12	44664	37403	7235	6711	4730
2012-13	47359	17490	15252	5553	2676
2013-14	20595	38190	12595	11422	5282
2014-15	38933	42252	23361	21255	9416



The normal plot for total investments under the top 5 RBI’s regional offices.

Hypothesis:

H_0: There is no significant difference between total investments under the top 5 RBI's regional offices.

V/s

H_1: There is significant difference between total investments under the top 5 RBI's regional offices.

Test of Homogeneity of Variances:

SPSS software is used to obtain the table of test of homogeneity of variances. Levene Statistic is:

Levene Statistic	df1	df2	Sig.
1.119	4	25	.370

From the above table, we observe that, the p value (0.370) >0.05.

Therefore the assumption of homogeneity of variances is valid.

By using SPSS software the test of ANOVA table is:

ANOVA Table investment under the RBI's regional offices

Source of variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	**3.524**	**4**	**.881**	**17.373**	**.000**
Within Groups	**1.268**	**25**	**.051**	**_**	**_**
Total	**4.792**	**29**	**_**	**_**	**_**

From the above table,

We observe that p value (0.000) < 0.05 value. Therefore we reject H0, at 5% LOS.

Therefore we conclude that, there is significant difference between total investments under the top 5 RBI's regional of offices.

Post Hoc Tests for Multiple Comparisons:

Tukey HSD						
(I) countries	(J) countries	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00 Mumbai	**2.00 New Delhi**	**.08219**	**.13001**	**.968**	**-.2996**	**.4640**
	3.00 Chennai	.54700*	.13001	.002	.1652	.9288
	4.00 Bangalore	.66024*	.13001	.000	.2784	1.0421
	5.00 AHMEDABAD	.89365*	.13001	.000	.5118	1.2755
2.00 New Delhi	**1.00 Mumbai**	**-.08219**	**.13001**	**.968**	**-.4640**	**.2996**
	3.00 Chennai	.46481*	.13001	.012	.0830	.8466
	4.00 Bangalore	.57806*	.13001	.001	.1962	.9599
	5.00 AHMEDABAD	.81146*	.13001	.000	.4296	1.1933
3.00 Chennai	1.00 Mumbai	-.54700*	.13001	.002	-.9288	-.1652
	2.00 New Delhi	-.46481*	.13001	.012	-.8466	-.0830
	4.00 Bangalore	**.11325**	**.13001**	**.905**	**-.2686**	**.4951**
	5.00 AHMEDABAD	**.34665**	**.13001**	**.088**	**-.0352**	**.7285**
4.00 Bangalore	1.00 Mumbai	-.66024*	.13001	.000	-1.0421	-.2784
	2.00 New Delhi	-.57806*	.13001	.001	-.9599	-.1962
	3.00 Chennai	**-.11325**	**.13001**	**.905**	**-.4951**	**.2686**
	5.00 AHMEDABAD	**.23341**	**.13001**	**.398**	**-.1484**	**.6152**
5.00 AHMADABAD	1.00 Mumbai	-.89365*	.13001	.000	-1.2755	-.5118
	2.00 New Delhi	-.81146*	.13001	.000	-1.1933	-.4296
	3.00 Chennai	**-.34665**	**.13001**	**.088**	**-.7285**	**.0352**
	4.00 Bangalore	**-.23341**	**.13001**	**.398**	**-.6152**	**.1484**

*. The mean difference is significant at the 0.05 level.

Conclusion:

The result of multiple comparison test is shown in the following table:

	Mumbai	New Delhi	Chennai	Bangalore	Ahmadabad
Mumbai	_				
New Delhi	#	_			
Chennai	*	*	_		
Bangalore	*	*	#	_	
Ahmadabad	*	*	#	#	_

Where,

= There is no significant difference between the FDI under the two RBI's Regional offices.

***** = There is significant difference between the FDI under the two RBI's regional offices.

CHAPTER 5

LIMITATIONS

5.1 Issues & Challenges for FDI in India

1) Resource challenge

2) Equity challenge

3) Political challenge

4) Federal challenge

5) Lack of clear cut and transparent policies for FDI

6) High tariff rates & corporate tax rate by international standards

7) Stringent labour laws

8) Land acquisition issues

9) Environmental rigid policies

5.2 Prohibited Sectors for FDI

- Arms & ammunition
- Atomic energy
- Railway transport
- Coal & lignite
- Mining of iron, manganese, chrome, gypsum, gold, diamonds, copper, Zinc
- Gambling & Betting
- Lottery Business
- Agriculture(with certain exceptions) & Plantations (other than Tea plantations)

CHAPTER 6

CONCLUSION

CONCLUSIONS

- There is increasing trend observed in FDI during the period of 2006-07 to 2014-15 with slight fluctuations.

- Mauritius invests more in India as compared to other countries and U.S.A. invests very low in India.

- Among all the top sectors in India, investments in service sector are more from FDI inflow which is 28% as compared to other sectors and very poor i.e. only 5% of investments are done in power sector from FDI inflow.

- The positive upward trend is observed in GDP of India over the period of study.

- Among the top investing countries in India, U.K. has highest coefficient of variation which is 86% and we conclude that there is very high variation in investments from U.K. in India as compared to other countries. Mauritius has less coefficient of variation near to 24% which shows that Mauritius is most consistent country as compare to other countries.

- Among the RBI's regional offices in India, Bhubaneshwar has highest coefficient of variation which is 105% and we conclude that there is very high variation in investments of inflow of FDI. Hyderabad has less coefficient of variation near to 28% which shows that Hyderabad is most consistent RBI's regional office as compare to other RBI's regional offices.

- The linear trend model is well fitted. We see that, for next 5 year the growth curve of GDP is increasing order.

- The linear trend model is well fitted. We see that, the growth curve of FDI for next 5 year is increasing order.

- There is significant impact on GDP due to FDI inflow in India.

- There is significant difference between total investments in India by various countries.

- There is no significant difference between total investments of inflow of FDI in various sectors.

- There is significant difference between total investments of inflow of FDI under the top 5 RBI's regional offices.

CHAPTER 7

REFFERENCES

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4) www.fdi.gov.in

5) www.RBI.org.in

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Software used:

- Minitab 17
- SPSS
- MS-Excel
- R-Programme
- MS-Word office