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Indian Stock Market

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Objectives of thesis

The core purpose of the thesis is to compare Indian stock indices with leading stock indices of the world. And to find out the relation on between different stock exchanges of the World to that with Indian stocks. One of the major purposes is also to find out how different stock indices fluctuations affect Indian indices. To achieve this goal there will be used the SAS statistical so ware by comparing indices through regression model. The secondary objective of the thesis is to predict the future stock prices of selected Indian stocks through me series analysis. Lastly to gain knowledge of stocks and be a useful tool in se ng up the IPO for the family business.

Methodology

The literature part of the thesis is done by reviewing and drawing key ideas from all me best investment books. Listening to market news and interviews. For the practical part will be used two types of mathematical methods; Regression Model, which will help in finding out the relation on between different world indices to that of India and their dependency on each other. And Time Series Analysis which will be used for forecasting future price of stocks.

The proposed extent of the thesis

30-40

Keywords

analysis, buying, company, correlation, dependency, indices, investment, market, predictions, stocks, supply

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Declaration

I declare that I have worked on my bachelor thesis titled "Stock Market Analysis: Business and Customers" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on date of submission November 2019

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Indian Stock Market

Abstract

As we all know the world is moving in a pace where it's quite hard to meet our requirements. And our necessities keep on increasing. People are living from pay-cheque to pay-cheque. So, it is very much necessary to generate a second source of income. And what better than investing in stocks. Investment in stocks allow us to form a habit of savings. The rising interest on stocks, captivates us to invest more. The thesis focuses on the criteria, key rules, the time to buy and sell stocks for investors. Another personal interest is to analyse the Indian stock market and compare it to different stock market of the world and find out the relation between them. Also analyse it with a method which allows the author to forecast future stock prices, to see the buying and selling opportunity and support the objective of the thesis.

Keywords: analyse, buying, company, correlation, dependency, indices, investment, market, predictions, stocks, selling.

Indický akciový trh

Abstrakt

Jak všichni víme, svět se pohybuje v tempu, kde je ticho těžké splnit vaše požadavky. A naše základní potřeby neustále rostou. Lidé žijí of výplaty po výplatu. Je tedy velmi důležité generovat druhý zdroj příjmů. A co lepší než investování do akcií. Investice do akcií nám umožňují vytvářet zvyk úspor. Rostoucí zájem o akcie nás podnítí k větší investici. Práce se zaměřuje na kritéria, klíčová pravidla, čas na nákup a prodej akcií pro začátečníky. Dalším osobním zájmem je analyzovat indický akciový trh a porovnat je s různými akciovými trhy světa a zjistit jejich vzájemný vztah. Rovněž jej analyzujte pomocí metody, která umožňuje autorovi předpovídat budoucí ceny akcií, aby viděl příležitost k nákupu a prodeji a podpořil cíl práce.

Klíčová slova :analyzovat, nakupovat, společnost, korelace, závislost, indexy, investice, trh, předpovědi, akcie, prodej.

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List of Abbreviation

STOCK FULL NAME	ABBREVIATION
Bombay Stock Exchange	BSE
Cipla Ltd.	CIPL
DAX	DAX
FTSE Singapore	FTSE
Hang-Seng	HANG-SANG
Housing Development Finance Corporation Ltd	HDFC
Hero MotoCorp Ltd.	HROM
ICICI Bank Ltd	ICBK
Infosys Ltd	INFY
Mahindra & Mahindra Ltd	MAHM
Maruti Suzuki India Ltd	MRTI
Nasdaq Composite	NASDAQ
Nikkei 225	NIKKEI
Ntpc Ltd	NTPC
Oil and Natural Gas Corporation India	ONGC
Dr. Reddy’s Laboratories Ltd	REDY
Standard and Poor’s 500	S&P 500
Sun Pharmaceutical Industries Ltd	SUN
Tata Consultancy Services	TCS
Tata Steel Ltd.	TICS
Wipro Ltd	WIPRO
Yes Bank	YES

(Investing.com, 2019)

1. Introduction

After the time money was invented human life became much easier as there was a common medium of exchange for buying and selling any commodity. As time and ages passed the world transformed. New inventions and discoveries lead us to this modern era. Now to be practical, for sustaining life, human needs these four bases: food, water, clothing, shelter. But for gaining all these basic human needs we require money. Human always worked hard to acquire all the comforts of life. But sometimes the money he earned was not just enough. So, to gain profit and consume more wealth human came with concept of stock market. Where with the proper wisdom he could earn more with doing less. Not only just to earn but the stock markets are great economic developers. They do the job of circulating money in the economy. So, it is a win-win situation for people and the country if no politics, involved. Investment in stock market is advantageous in many ways. Which the thesis will describe. We will see much more deeper concepts of stock market in this thesis. The thesis focuses on knowing the relations among world market. How the economy of one country depends on other? The thesis will discuss different types of market investment. When to buy and sell stocks. How stocks perform in different market situation. How investors should react in different market situation. Practical part will focus more on analysing the nature of relation between different world markets and forecasting of stock prices.

2. Objectives and Methodology

2.1 Objectives of Thesis

The core purpose of the thesis is to compare Indian stock indices with leading stock indices of the world. And to find out the relation between different stock exchanges of the World to that with Indian stock exchange. One of the major purposes is also to find out how different stock indices fluctuations affect Indian indices. To achieve this goal the author will use SAS statistical software by comparing indices through regression model. The secondary objective of the thesis is to predict the future stock prices of selected Indian stocks through time series analysis. Lastly to gain knowledge of stocks and be a useful tool in setting up the IPO for the family business.

2.2 Methodology

The literature part of the thesis is done by reviewing and drawing key ideas from all-time best investment books. Also, by consulting people belonging to investment fields. For the practical part the author will use two types of mathematical methods which are (i) Regression Model, which will help in finding out the relation between different world indices to that of India. And their dependency on each other. In other words, the cause-effect relationship. (ii) Time Series Analysis will help in predicting the future stock price and analysing the market trends.

2.3 Regression Model

The concept of regression was initially given by Statistician Francis Galton when he was engaged in the study of human inheritance. In regression model it is pre-assumed that there is a cause-effect relationship between the random variable. So, the random variable responsible for the cause- effect relationship is called Independent variable 'X'. It is also called causal variable. The remaining random variable which is affected is called the dependent variable 'Y'.

"*The relationship between X and Y as determined by a mathematical function is called Regression. If the relation between variable Y and X is determined by a linear function, then the relationship is called Linear Regression.*" (Statistics, 2005) The linear regression model is given below:

Regression Model: $Y = \boldsymbol{\alpha} + \boldsymbol{\beta}X$ ………………………(1)

Where,

Y = dependent variable

X = independent variable

$\boldsymbol{\alpha}$ = parameter of model

$\boldsymbol{\beta}$ = parameter of model

Why is it important to study Regression Model?

- We can know the nature of relationship between independent variable X and dependent variable Y. We can also find an estimated value $\hat{Y}$ of the dependent variable Y for a given value of $x_{(0)}$ of the independent variable X and say that it is equal to $\hat{Y} = \boldsymbol{\alpha} + \boldsymbol{\beta}\, x_{(0)}$. Therefore, the expected value of Y for a given value of $x_{(0)}$ of X can be estimated. The fitted line $\hat{Y} = \boldsymbol{\alpha} + \boldsymbol{\beta}\, x_{(0)}$ is also called prediction formula for predicting the value of Y for given X = x.
- We can identify the amount of change in the value of Y for a unit change in the value of X.

Coefficient of Determination: Denoted by R^2. Is the value which indicates the goodness of fit of the model. It means how closer the predictable value for the dependent variable will be given the independent variable, in real life. The value ranges from 0 to 1.

2.4 Time Series Analysis

We observe the occurrence of some phenomena in our day to day life at regular intervals of time. For example, supply of goods, imports, exports, prices of shares and stocks of company etc. The observation of such phenomena is made on a periodic basis. We study the phenomena and the time period and draw conclusions. This conclusion we make based upon phenomena and time period is called forecasting.

"The data collected to study the matter of business and industrial interest is based on time and hence are called time series data. The method of drawing inferences on different characteristics of time series by analysis of such data is called time-series analysis."

The time series model is as below:

Time Series Analysis: $Y_t = X_t\boldsymbol{\beta} + \boldsymbol{\mu}_t$……………………….(2)

Where,

Y_t = *time* (in days, months or year)

X_t = observations

$\boldsymbol{\beta}$ = parameter

$\boldsymbol{\mu}_t$ = error

Trend: Trend is the main component of time series. Trend means the general change or development in a direction of the time series data being analysed.

Usefulness of studying Time Series Data:

- It is easier to make future decisions based upon the analysis of the time series data from the past. The data helps us in analysing the situation and retaining from making mistakes in decision.
- We can predict the future value of the variable quantity through the help of time series data.
- Time series data are very much useful for government bodies to compare the present and past performances of economic activities and make reports of actual progress achieved.

3. Literature Review

The literature part of the thesis will focus on conceptualization the basic components of financial market. Describing strategies of investment. The time to buy and sale the stocks. Analysing various market situation and reaction of investors to the situation.

3.1 Introduction to Stocks

A stock in a general sense can have various meanings. But what we are talking here are the market stocks. Market stocks are the amount raised by a company or corporate from the public at the time of public issue, when the company is listed on the stock market. Now question may arise what is a stock market? Stock market is a platform or the base where the stocks are traded. Or in economic terms it is a place where buyers and sellers meet to exchange the stocks.

3.2 History of Indian Stock Market

India holds the position to be the oldest stock market in Asia. In about 1830, corporate stocks and shares were traded in banks. A small number of companies came together in 1875 and formed Bombay Stock Exchange shortly known as BSE. In 1956, the government of India recognised BSE as the first stock exchange of the country under the act of Securities Contracts Regulation. The stock exchange by that time was not advanced and reliable. Time passed and it developed. In 1986, it introduced BSE Sensex. (Sensex =sensitive index) The Bombay Stock Exchange index which was made from top 30 trading stocks in the market. In the 1980's due to economic crises and financial crises, the Government established SEBI- Securities and Exchange Boards of India (1999). SEBI controls the BSE. (nseindia,2019)

In 1992, the BSE crashed due to a scam. The Finance Minister Mr. Manmohan Singh pleaded the need of another Stock Exchange in competition with BSE. So, in November 1992, The National Stock Exchange (NSE) was established. It is the first electronically traded market of India. In 1996, NSE brought the S&P CNX Nifty (Nifty=National Fifty). The nifty index comprises of 50 stocks from 26 different sectors of the economy. (nseindia,2019)

3.3 What is traded on stock Market?

Stocks are traded on the stock market. Stocks or shares of various kinds of companies such as IT, Pharmaceutical, Commodities, Spices, Businesses, Mutual Funds etc. All these companies come under one roof to sell their shares to the common public. Shares can be bought in two different ways. Through a broker or buy online. If you have a very good knowledge of Stocks. (Economics, 2013)

3.4 How does the Indian Stock Market works?

The Indian stock market operates from Monday-Friday from IST 9:15-15:30. The share prices are decided based on market situations. There are many factors affecting the market. It reacts volatilely to different news, political situation, economic reforms or protests, global events etc. Indian stock markets are majorly news based. Let us see how stock prices are affected due to the news. The author is taking a recent example from the year 2016. It was the year of US election. It would be a benefit to India if Hillary Clinton won the election. It would probably lead the market to rise. And a loss to market if Donald Trump wins. So, the Prime Minister of India declared demonetization on the previous night of election results of US. i.e. 8th November,2016. The next day the results were out, and Trump won the election. So, these two-situation demonetization and victory of Trump lead the market to go down. On 8th November,2016 Nifty opened at 8540. High was 8559, low was 8480. And closed at 8543. Next day on the result announcement date it opened at 8067, high was 8476, low was 8002, and closed at 8432. The effect of election result was negative so was the effect of demonetization. It reduced the price of nifty by 111. So, it is highly volatile. (Economics, 2013)

3.5 Types of stocks and its Trading

Equity Stock

Before understanding equity stocks, we shall understand equity. Equity simply means ownership in an asset. Equity stocks or common stocks are shares owned by the public for any company. Equity are the riskiest stocks. If the market is good equity holders get good returns. But if the market is low, they have to bear losses. So, the equity holders are also called risk-bearers. E.g.: Ram buys 100 equity stocks of a company at ₹10 each. So, the total money invested is ₹1000. Then the share prices rise to ₹12. So, Ram decides to sell the shares. The selling price is ₹1200. Ram gains a profit of ₹200. Now if the stock prices drop to ₹8 and Ram fears that the prices will go further down. So, Ram decides to sell the shares. In this case selling price is ₹800. Ram must bear loss of ₹200.

Now let us imagine a scenario where a company is liquidated. In this case the company is liable to pay all the other members connected to the company first and at last equity holders are paid. So, there is a chance that equity holders are paid more profit if the company has money or paid no money at all.(organisation of commerce textbook, 2013)

Preference Shares.

Preference shares are special because these shareholders are given priority over equity shareholders for returns and dividends. Preference shareholders do not take much risk. So, the percentage of returns are low compared to equity shareholders. Also, during the time of liquidation, the company is liable to pay preference shareholders first. So, these shareholders do not have the disadvantage of losing money in any situation. (Organisation of commerce textbook)

3.6 Trading other than Stocks

Bonds

“A Bond is a fixed income investment in which an investor loans money to an entity which borrows the funds for a defined period of time at a variable or fixed investment rate.” (Investopedia, 2019) Generally, there is a 5-year lock in period of bonds. Bonds are issued by the company when in need of large amount of money. Rather from loaning through bank they invite investors to loan money. In return the investor gets a coupon rate as interest. In other words, bonds are like fixed deposits of banks which pays a high amount of interest. Generally, government bonds are great safety investment.

Mutual Funds

“A mutual fund is an investment vehicle made up of a pool of money collected from many investors for the purpose of investing in securities such as stocks, bonds, money market instruments and other assets.” (Investopedia, 2019) Mutual funds are maintained and observed by a professional money manager, typically in India an “advisor”. The objective of investing in stock is to earn capital gains from various funds.

Debentures

“A debenture is a type of debt instrument which is not secured by physical assets or collateral.” (Investopedia, 2019) There are two types of debentures convertible and non-convertible debentures. The convertible debentures after a period converts into equity shares. This is a good option for investors to invest in as they can get a higher return on equity.

3.7 Current Market Situation in India

Let’s talk about something economical to understand more about the present market scenario. India is an emerging economy. Investing in an emerging economy will always generate good returns. During the last few years many acts, political events and movements, constitutional changes brought drastic change in various economic sectors in India. These boost ups the economy leading to better exchanges. Telecom companies and IT sector have developed majorly in the past four-five years.(ibef.org,2019)

Let us now look at the acts performed in India in the past few years and its impact on the market. The Prime Minister of India launched the “Make in India” concept on 15th September, 2014. The goal was to raise the manufacturing sector of India and make India the hub of global manufacturing. The below table shows the result of the step taken. (ibef.org,2019)

Table 1: Manufacturing Business

Manufacturing Business	**Percentage**	
	2014	**2013**
Margin increase in part of 6 months	37%	30%
Margin expected to increase in the next 12 months	47%	54%

(pwe,2019)

From the table above, we can clearly see there is a major jump in the manufacturing sector. So, investment in this sector can lead to a good amount of returns.

There was another act in the following year 2015. The “Digital India” act launched on 1st July 2015. The main aim was to provide internet facility to all the rural areas of India and to improve the digital literacy. It can be said that this act of government has really changed the shape of Indian economy and market. Almost every sector of the economy is now connected digitally, and the work is done more speedily and effortlessly than before. The E-governance can now provide services to all the gram panchayats. Also due to this step the energy sector acquired a great business. Let us investigate statistics below. (ibef.org,2019)

Table 2: E – Government

E - Government	**Year**	
	2015	**2014**
Transaction (E - Taal)	$6.95 BN	$3.53 BN

(pwe,2019)

Besides manufacturing and digitalization there were also launched programs for healthcare and better sanitization which lead to better health of public and maintaining hygiene. The following table/chart represent the statistics of the health care sector.

Table 3: E - Government

E - Government	Year	
	2018	**2017**
Expected Growth	$6 BN	$3 BN

(pwe,2019)

Budget was disclosed on 1st February 2018 by Finance minister Mr. Arun Jaitley. This year's budget focuses on the development of the agriculture sector, healthcare and infrastructure in rural areas. These three sectors are developing faster and there are many good opportunities in investing in these. The data from the government says that the employment opportunities in the prime eight sectors of the economy which includes IT, travelling and manufacturing will increase by 136000. According to ASSOCHAM, the labour force of India will increase by approximately 160-170 million by 2020 due to its population growth. This will lead to an increase in GDP. The GDP is currently growing with rate of 7.2. Increased GDP means increase in foreign exchange. The Central Statistics Organisation says that corporate earnings will increase by 15-20% in 2018-2019. (ibef.org,2019)

3.8 Things to be taken care of while Investing

There are no proper rules to be followed while investing in the market. As the market is volatile, it can turn anytime. Perhaps this is the only field where without following the rules we can earn much.

However, we must keep something in mind.

- An individual should only invest how much he/she can afford to lose.
- Mr. Sudarshan Sukhani in his book ("Trading the Markets") says "don't go against the market. Go with the flow of market." It means let the market decide if it is rising or falling. And make decision after the market throw you hints.
- There's a famous English idiom "Don't put all your eggs in one basket." Same applies with market. One must diversify his/her investment in various economic fields. So, if one sector fails to give the return, we must not lose all our investment.
- We must choose a very wise advisor or refer to the market every now and then to be alert with everything going on.
- Every one of us has a thought of making big money in short time. But it can lead us to destroying our investment if not planned properly. So instead of running for monthly big gains one must go for yearly good returns.
- Always use stop losses.

- "The 15-minute rule: When markets open, wait for 15 minutes, then identify the high and low of this period. Only buy when prices go above the first 15-minute high. Sell only if prices go below the first 15-minute low (specially for traders)"(Sukhani,2012)
- Stocks are good for long term investment. But if the investor expects lotteries from the stock market, he/she will be disappointed. Expectations must be reasonable.

Thus, by keeping certain things in mind or keeping your own rule book one can earn well through stocks.

3.9 How does Investor and Traders invest in different market situation?

Let us first know what the key difference between investing and trading is. Investing is wealth building by buying and holding of stocks, bonds or mutual funds for a long period of time. Investors expect 10-15% of the profit margin per year. Trading means to buy and sell stocks or commodities more frequently. Traders imagine acquiring 10-20% returns per month. Market can show us various phases it can sometimes be stable, sometimes choppy, highly volatile or low. In short it can be bullish or bearish. Make money in market through trend. Trend is movement of money in one direction. So, we need to know whether it is an up-trend or down-trend. "*When the market creates higher highs and higher lows it is uptrend.*" "*When there is lower highs and lower lows it is a downtrend.*" There is a saying of market "Buy Low Sell High". (Sukhani,2012)

Bullish Market: Bullish market is when most stocks in the market rises. In this time traders and investors should put their stocks to sell. But be alert! When a market is bullish there are major chances of correction. Also, technical analysis should be made like following the chart patterns. Evaluating highs and lows. (Sukhani,2012)

Bearish Market: Bearish market is when shares prices runs low. In this time of downmarket investors and traders should look out for proper companies by studying its fundamentals and analysing financial statements and then buy companies shares. This is the time to buy the shares at lower prices. Once gone down the market will rise again. (Sukhani,2012)

Choppy Market: Choppy market is a situation where one cannot decide the correct position of the market. It may go high in the starting of the day, come back to low in the next few hours and end it where it started. One should play safe and avoid any kind of new investment in the market. (Sukhani,2012)

Market Crash: Crash of market can be expected once a decade. Not that it is compulsory, but who likes to fall ill or wishes to fall ill! So, it can be said that there is no definite time to enter the market but there is a definite time to leave the market. As you feel the market will go more down take your stop losses and come out of it with minimum loss.(Sukhani,2012)

3.10 How and When to buy stock?

The author would like to emphasize on making savings. After deducting all expenses whatever money, the person's left with should be used in investing. One should start small and slow. One must know what amount of money you can afford to lose. So, for beginners SIP is a very good thing to invest in. SIP stands for Systematic Investment Plans. Instead of paying a lump sum amount to a mutual fund investor can pay it periodically in a small amount. The period may vary from weekly to monthly. By this method there is no worry to pay the full amount at once. As you pay it periodically it creates a habit of saving and generates wealth in the future. This is a good process for students to save money. Also, for jobbers who cannot accumulate fat amount of wealth in the short run.

Here are some points to look for while buying stocks or investing in any funds:

- How will the company survive the Expanding Markets? One should have an eye on the sales graph of the company. This is the era where technology keeps updating and replaces the older one. For example, Televisions when invented were rare things. And its sales were high. Then came the mobile and internet which affected the television business. Although televisions are still in business, but their sales are quite lower than before. So, a company must think how in the expanding markets with its services it can make the customers happy and so to their investors. For example, updating the television and connecting it with internet, phones and laptop. (Fisher, 1996)
- To develop products and services that will still increase total sales potential. The management should take into consideration their current product and emphasize on making new products for future not only for higher sales but for company's growth too. It is a matter of management's attitude. It is a company that has both a good rating on the first point and an affirmative attitude on the second that is likely to be of greatest investment interest. (Fisher, 1996)
- Research and Development: One should observe how much amount a company spends on research and development. Many financial analysts compare the figures of research and development of various companies. These figures can give a guideline of one company doing an abundance of research and the other not quite much. It depends on the company what do they include in the list of research and so their figures differ. For example, testing and developing of new product some companies include this expense as research and development and some in production and engineering. (Fisher, 1996)

- Above average sales organization: A company achieving a good sales target is good. But it sets a standard of success when its sales repeatedly to its customers. The extraordinary services of the products are what makes the company's sales going. It is easier to set standards of production and finance department of the company by using some averages or ratio. But it's quite a difficult task to set advertisement and sales target. So, one must buy a stock comparing the overall sales of various companies. As this figure directly reflects its management's contribution to the products. (Fisher, 1996)
- Worthy Profit Margins: This is the thing which every investor is looking for in a company's financial statements. The first step in examining the profit as quoted by Mr. Fisher is to study a company's profit margin, that is, to determine the number of cents of each dollar of sales that is brought down to operating profit. Knowing the profit margins of different companies of the same industry will help you more in selection of stocks. From it we can understand that companies with smaller profit margins nearly always increase their profit margins by a greater percentage when in good years as compared to lower cost companies, whose profit margins also get better but not to so great a degree. (Fisher, 1996)
- Keeping the Profit Margins: We just not want to invest in any company that has a good profit margin but want to invest in a company which can maintain its profit margin in the future or even increase it. The success of a stock purchase doesn't depend on what is generally known about a company at the time the purchase is made. Rather it depends on what gets to be known about it after the stock has been bought. [Philip Fisher, "Common Stocks and Uncommon Profits, Page 64] so, the future profits are of greater interest to investors. For this the company should emphasize on Cost cutting. It can be done by purchasing raw material in bulk or by bringing down the break-even point. Sometimes due to the competitors the profit margins are also increased. (Fisher, 1996)
- Great Labour Relations: The personnel are regarded as the limbs of an organization. Without them no task can take place. A company ensuring higher care of employees indicates motivated workers. And motivated workers bring good production which later leads to higher sales and growth of company. And growth of company buys them wealthy investors. (Fisher, 1996)
- Awesome Executive Relations: Executives are the mediators between the company and customers. They are the deal maker or deal breaker. So, we want to ensure the management along with the labours is also taking care of their executives. After all they are the one to bring in the business! (Fisher, 1996)

- Depth in management: The key here is to maintain the key person of business. What happens to a company when its CEO retires or leaves the company? The goodwill be affected and so will the investors trust in the company. In this scenario the investor should have an idea of what should be done to prevent disaster. However, companies worthy of investment are those that grows continuously. At what point in the future the company will reach a point where it cannot take advantage of the coming opportunities unless it develops executive talents. (Fisher, 1996)
- Great cost-analysis: This is another key aspect in which a company should have its mark. Resource allocation is an easy task, if done by the right person. An investor can’t really say if the company has allocated the resources properly or not, but he/she can properly say if resources allocation is not done properly. The best that the careful investor usually can do in this field is to recognize both the importance of the subject and his own limitations in making a worthwhile appraisal of it. A company well above in business aspects will also be above average in the field can be only known when the top management understands the basic importance of expert accounting controls and cost analysis. (Fisher, 1996)
- Great Industry Specifics: A company should know how much better or weak they are than their rivalries. This will give a company a clear picture of where they stand. SWOT analysis is the best way to find this out. A company however doesn’t want to lose their customers as they invest in them. From an investor point, one might disagree to invest in a company which is inferior. A competitive investor may see some growth and might invest in it, but a passive investor is more concerned about his money and returns. A company can outperform and rule this pillar by outstanding customer services or excellent product marketing strategy. (Fisher, 1996)
- Long-Range Outlook on Profit: Some companies will conduct their affairs to gain the greatest possible profit right now. Others will deliberately curtail maximum immediate profits to build up good will and thereby gain greater overall profits over a period of years. Treatment of customers and vendors are examples of it. Good relations with not only customers but also with the supply chain are important. At the times of unfavourable market conditions, the build-up relation will benefit the company and not profit. An investor should put his money in a company who knows how to work with profit. (Fisher, 1996)
- Low Risk of Dilution in Future: The intelligent investor should not buy stocks simply because they are cheap but only if they ensure a major gain to him. It is the time to talk about the company's ability to generate equity at times of need. An investor will always

want to invest in a company which is stable and has a sufficient amount of cash so that in several future years if there is a time of recession it can still survive. If equity financing will be occurring within several years of time of common stock purchase, and if this equity financing will leave common stockholders with only a small increase in subsequent per-share earnings, only one conclusion is justifiable. This is that the company has a management with sufficiently poor financial judgment to make the common stock undesirable for a worthwhile investment. (Fisher, 1996)

- Communicates Risks Too: We all want to invest in a company which has sound values and ethics. It is in the nature of the business cycle that unfavourable markets occur, profit goes down or demand of certain product drops. Does the management need to talk about this to its investors? Naturally yes! As a shareholder of the company we have the rights to know what is going in and around the company. How if a company makes losses consecutively for several years and then there is a time to shut down the business? What about the investors' money and trust? Can the company get back on its feet again and gain the reputation it had earlier? (Fisher, 1996)
- Unquestionable Integrity: The management of the company is far closer to its assets than its shareholders are. They can use it as they want to. But it is not always certain that they are using it for themselves. So, the investor should only invest in a company whose management has highly developed sense of trusteeship and moral responsibility towards their shareholders. If there is a lack of trusteeship in the management one should not invest in that company. (Fisher, 1996)

However, in today's time it is hard to find the companies which fulfil all the above criteria for investors to invest in. So, Mr. Fisher says if the company fails to fulfil some of them it's okay to invest in it. But if it fails to fulfil in major of them than you must not invest in that company.

3.11 Fisher's Scuttlebutt Method

After checking out all the fifteen points in a company we can decide to invest or not. But the question arises where do we get all this information from? Fisher's scuttlebutt method. Scuttlebutt method is talking or using "The Main Street Resources". The resources to this method are suppliers of company, trade unions, research and development department and former employees of the company. It's a bit tricky to rely on the information given by a former employee. It sometimes contains the deepest and truest information hidden from common public. And sometimes misinterpreted information maybe because of the employ got fired or left because of justified grievances. These are some of the people who can give some depth information which can be later used in analysing and decision making of purchasing a stock. Other ways of researching for a proper stock are checking on different companies of the same field and doing SWOT analysis for having a clearer picture. (Fisher, 1996)

Lastly, this method is very much useful for investors, but the investor may not have time to go through all this aspect and apply it. So, one must seek the help of a professional advisor who can select the best stock for them. (Fisher, 1996)

3.12 When to sell Stock?

There are many reasons why an investor might want to sell his/her stocks. One of the major reasons to invest is to have a good amount of money in times of financial emergency. Or for further education of your children, buying your dream house or car etc.

Well, these are personal reasons why you want to sell your stock. Let's talk about some financial reasons, wherein you might want to sell your stock. The first reason is when there is a mistake in the initial purchase of stocks, and it is clearly visible that holding on to this stock will lead to only loss. At this time an investor should sincerely accept his/her mistake and sell the stock with less profit or bearing some loss. It is very important to understand and accept your mistake as an investor to prevent further larger amount of losses. An investor must be honest with himself/herself. "The long-range profits from really good common stocks should more than balance the losses from a normal percentage of such mistakes." (Fisher, 1996, Page-106) Second reason why an investor should sell off his/her stocks is when over a period of time the company fails to maintain the standards of qualifying the fifteen points of buying a stock. So, an investor should constantly guard his/her investment. A company fails to maintain its standards when there is a change in higher level of management. Or the company no longer has the drive to increase its markets. Generally, it happens when the new top executives are not as strong as the predecessors. Thus, after a while of investing in the same company it has stop growing and is exhausted it is the time to sell the stocks. If an investor has been sincere in his choices and maintained the standards of purchasing stocks than the third reason of selling stocks is when the investor is sure about no interesting and attractive opportunities of investment in the future. If an investor is investing his funds in a company from quite earlier and now the growth prospect of the company has stabilized it is time to sell the stocks. (Fisher, 1996)

3.13 Dividends

A dividend is what an investor is waiting for after he/she invests in stocks. It is a payout given by the company to its investor quarterly or annually or sometimes monthly if a company is doing extremely well from the part of company's profit or reserves. As it is said one is more interested in the interest on capital rather than the capital. Sometimes investors buy the stocks not because of the price but because of the dividend paid on it. What if when investing in this type of company, the company stops paying the dividend and says it will use the earnings for some business purpose like buying new plant or launching a new product line? Will it be beneficial for the investor? One aspect of it says the investor will be unhappy as its primary goal is not satisfied. The other aspect says its good as the company will make progress which will later increase its market value. Let us say it’s a risk. If the company uses its retained earnings in the purpose of improving some aspects of the company and its attempt fails miserably both the company and investor, make loss. Another way when a stockholder is not benefited is when the management starts piling up cash and liquid assets over the need. In this way the management overthinks of his security and gathers too much of liquid assets. Let us take an example of a fictitious company. A company ABC is very good in attaining market growth. It pays the stockholders very well. Let’s assume it uses 50% of its earnings to pay dividend. Years passes and the company is still doing well and now it only requires 25% of earnings to pay dividends. So now, there's a meeting of the Board of Directors where half of them says to increase the dividends and remaining half says to maintain the dividends and invest the remaining amount in growth stocks. So, in this case if they raise the dividends than the higher stockholders will not be benefited as much as the lower or normal stockholders because of the taxes. And if they choose to maintain the dividend standard and invest the remaining part in growth stocks all the stockholders and company will be benefited. But again, it depends on the company. The regularity of the dividend flow is more affected while taking this decision of raising the dividend or to plough back the profit. (Fisher, 1996)

3.14 A Growth Stock

Every investor has a wish to earn higher gains in market. Who doesn’t? In this fast-growing world, it’s quite difficult to fulfil all your needs in just your salary. And especially when you are earning member of family. The important question is “To buy a stock currently or not to buy?” One might trip over answering this question. Sometimes you make decisions by not investing in a stock which later creates fortunes in the market. Investing also depends on how much time you can devote in research and studying the market. (Fisher, 1996)

Here is how you can hunt for a growth stock:

- One of the important factors in analysing a stock as growth stock is to have a deep knowledge and relations with companies’ executives and senior members.

- Secondly, talking to other people who invests regularly and are updated with all the news of the market. As they are more insightful people in investment field one can get their opinion quickly and a great help in choosing a growth stock.
- Thirdly, it is important to check whether the company has all the essential fifteen points discussed earlier to buy the stock. Figures like sales should be analysed. Is there a tremendous high in sales of company?
- One of the helpful resources in finding out a growth stock are from well-known brokerage firms. These reports are not for everyone but special people. Also, financial periodicals and magazines are a good source of it. But not all are accurate.
- Lastly, take a view over the company's balance sheet. How is the capitalization structure? And what is its financial position. (Fisher, 1996)

4. Practical Part

The practical part of the thesis will focus on finding out the relation between two variables which in this content will be two different indices of world. And forecasting the prices of selected stocks.

4.1 Introduction

For the practical part of the thesis the author will use two methods as mentioned earlier in the methodology. These two methods will help in collecting the indices of different stock markets and making the analysis of whether the market is correlated or not? Is there any relation between them? Does correction in different stock market of the world effects to Indian market? If yes than how much? How can I predict the future stock prices of my portfolio?

4.2 Regression Model Examples

The author will use SAS Enterprise Guide for computing the regression model. For the analysis the dependent variable will be Indian index, BSE in all the calculations. And the independent variable will be various indices of the world.

The author proposes hypothesis as under:

H_0 : There is no relation between World index and BSE

H_A : There is a relation between World index and BSE

We will check the hypothesis with the help of t-value, p-value comparing it with alpha α=0.05.

We accept the H_0if p-value > α and reject the H_A

We accept the $H_A$if p-value < α and reject the H_0

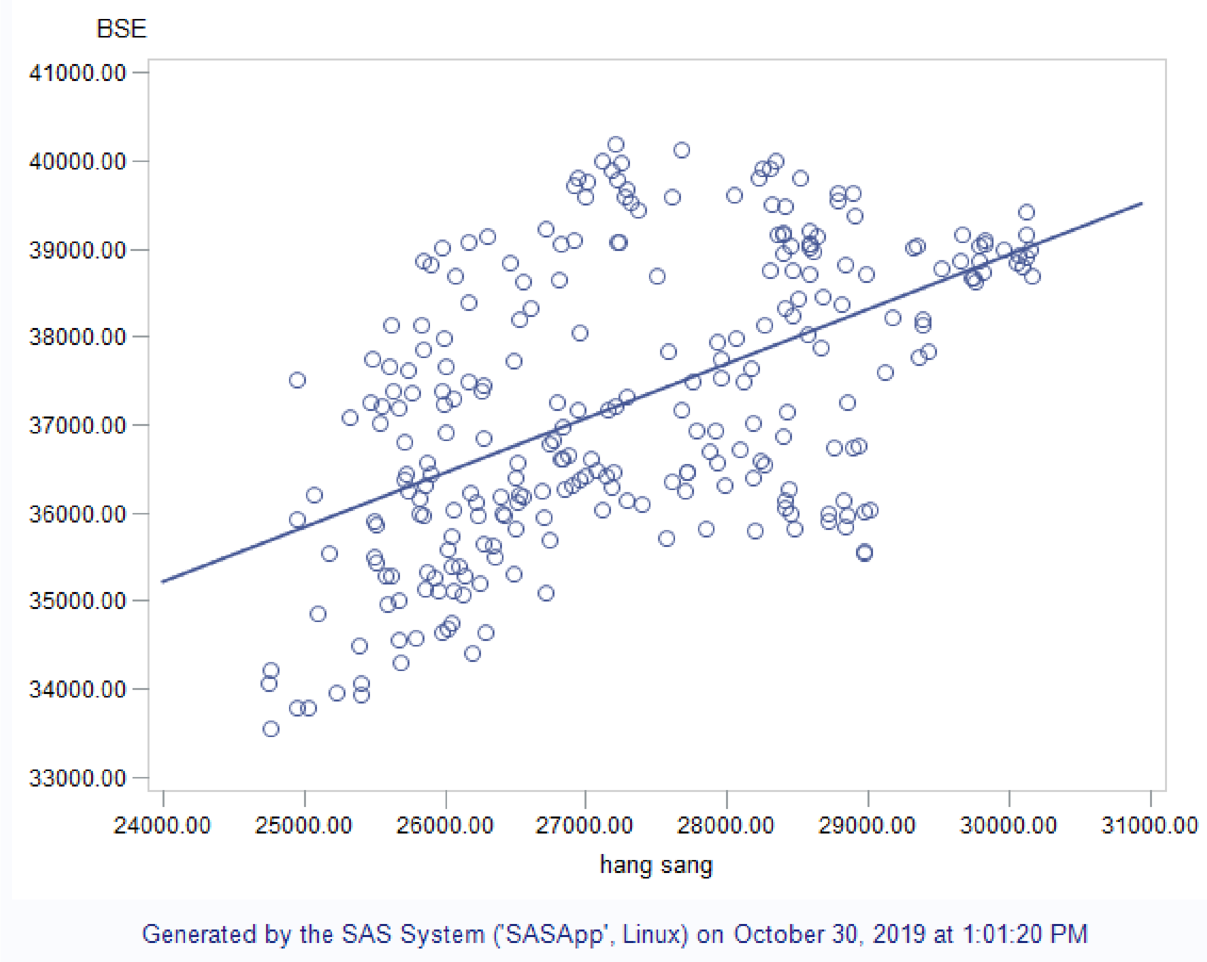
4.2.1. Hang-seng and BSE

The author wants to know whether there is any relation between Hang-sang and BSE? Is BSE affected due to any correction in Hang-seng?

H_0 : There is a relation between Hang-seng and BSE

H_A : There is no relation between Hang-seng and BSE

Figure 1: Scatter plot diagram Hang Seng - BSE



(SAS, own creation,2019)

From the above chart we can see there is a positive correlation between hang-seng and BSE. The chart shows an uptrend.

Figure 2: Regression Result Hang-sang – BSE.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: BSE

Number of Observations Read	264
Number of Observations Used	264

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	197154506	197154506	106.72	<.0001
Error	262	484009458	1847364		
Corrected Total	263	681163964			

Root MSE	1359.17782	R-Square	0.2894
Dependent Mean	37257	Adj R-Sq	0.2867
Coeff Var	3.64810		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	20340	1639.73230	12.40	<.0001
hang sang	1	0.62002	0.06002	10.33	<.0001

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(SAS, own creation,2019)

Interpretation:

Y= BSE (Intercept) X= hang-seng

Regression Model: Y = 20340 + 0.62002x

r^2= 0.2894 =28.94% which means if there is a change in hang-sang than it will affect 29% to BSE.

Checking the Hypothesis

T-value for the intercept is 12.40, p-value is < 0.0001. α = 0.05

T-value for the hang-sang is 10.33, p-value is < 0.0001. α = 0.05

Therefore, p-value < α

I.e. 0.0001< 0.05

So, we reject the null hypothesis and accept the alternative hypothesis which means there is a relation between hang sang and BSE. From the equation, if hang-sang increases by 100 points than BSE will increase by 62 points.

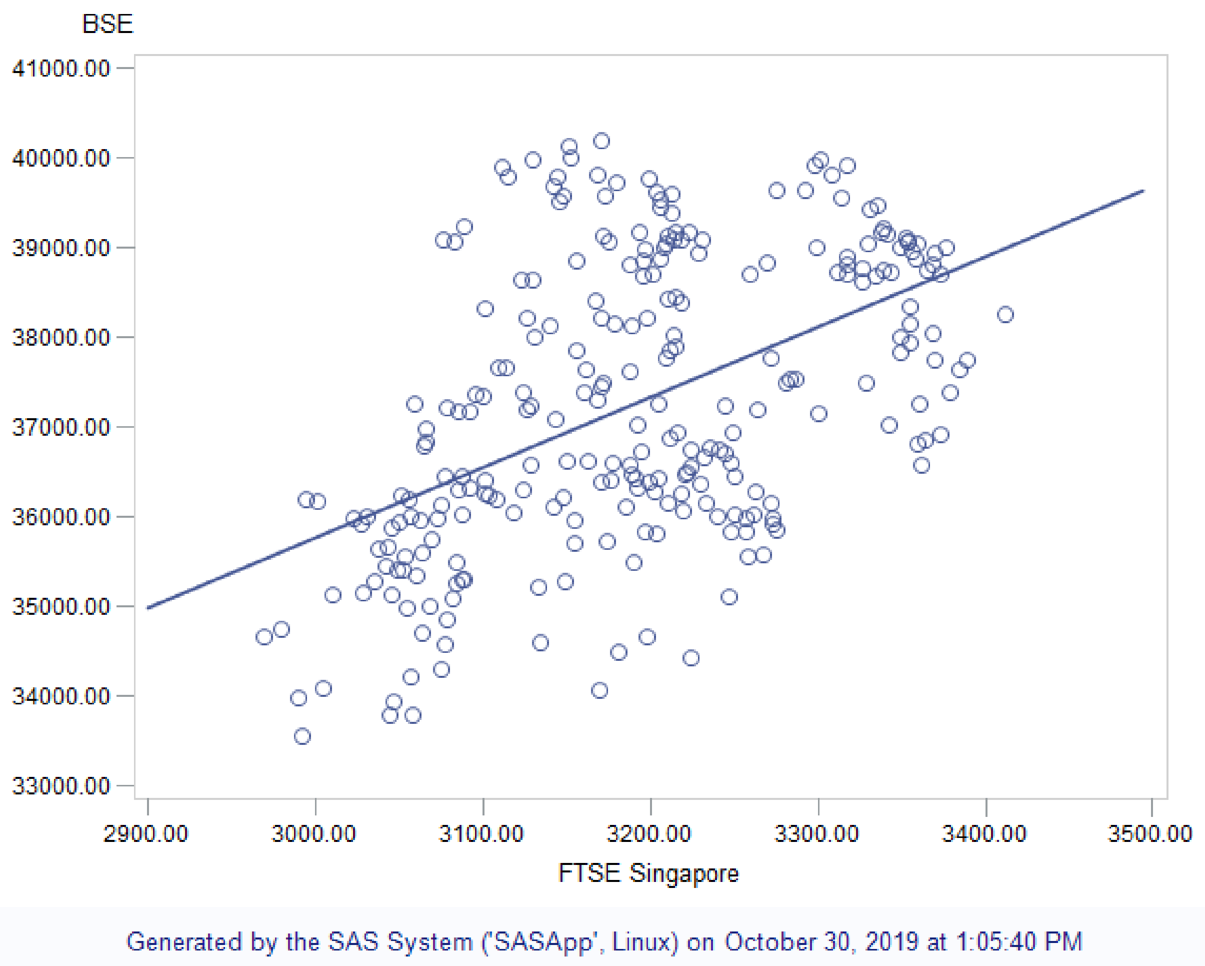
4.2.2. FTSE Singapore and BSE

Is there a correlation between FTSE Singapore and BSE? If yes, what kind of correlation it is? Does changes in FTSE Singapore effects BSE?

H_0 : There is a relation between FTSE Singapore and BSE

H_A : There is no relation between FTSE Singapore and BSE

Figure 3: Scatter plot diagram FTSE Singapore - BSE



(SAS, own creation,2019)

From the above chart we can see there is a positive correlation between hang-sang and BSE. The chart shows an uptrend.

Figure 4: Regression Result FTSE Singapore – BSE.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: BSE

Number of Observations Read	264
Number of Observations Used	264

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	173903970	173903970	89.82	<.0001
Error	262	507259994	1936107		
Corrected Total	263	681163964			

Root MSE	1391.44057	R-Square	0.2553
Dependent Mean	37257	Adj R-Sq	0.2525
Coeff Var	3.73470		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	12238	2641.28296	4.63	<.0001
FTSE Singapore	1	7.84088	0.82732	9.48	<.0001

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(SAS, own creation,2019)

Interpretation:

Y= BSE (Intercept) X= FTSE Singapore

Regression Model: Y = 12238 +7.84088x

r^2=0.2553 =25.53% which means if there is a change in FTSE Singapore than it will affect 25% to BSE.

Checking the Hypothesis

T-value for the intercept is 4.63, p-value is < 0.0001. α = 0.05

T-value for the hang-sang is 9.48, p-value is < 0.0001. α = 0.05

Therefore, p-value < α

I.e. 0.0001< 0.05

So, we reject the null hypothesis and accept the alternative hypothesis which means there is a relation between FTSE Singapore and BSE. From the equation, if FTSE increases by 100 points than BSE will increase by 784 points.

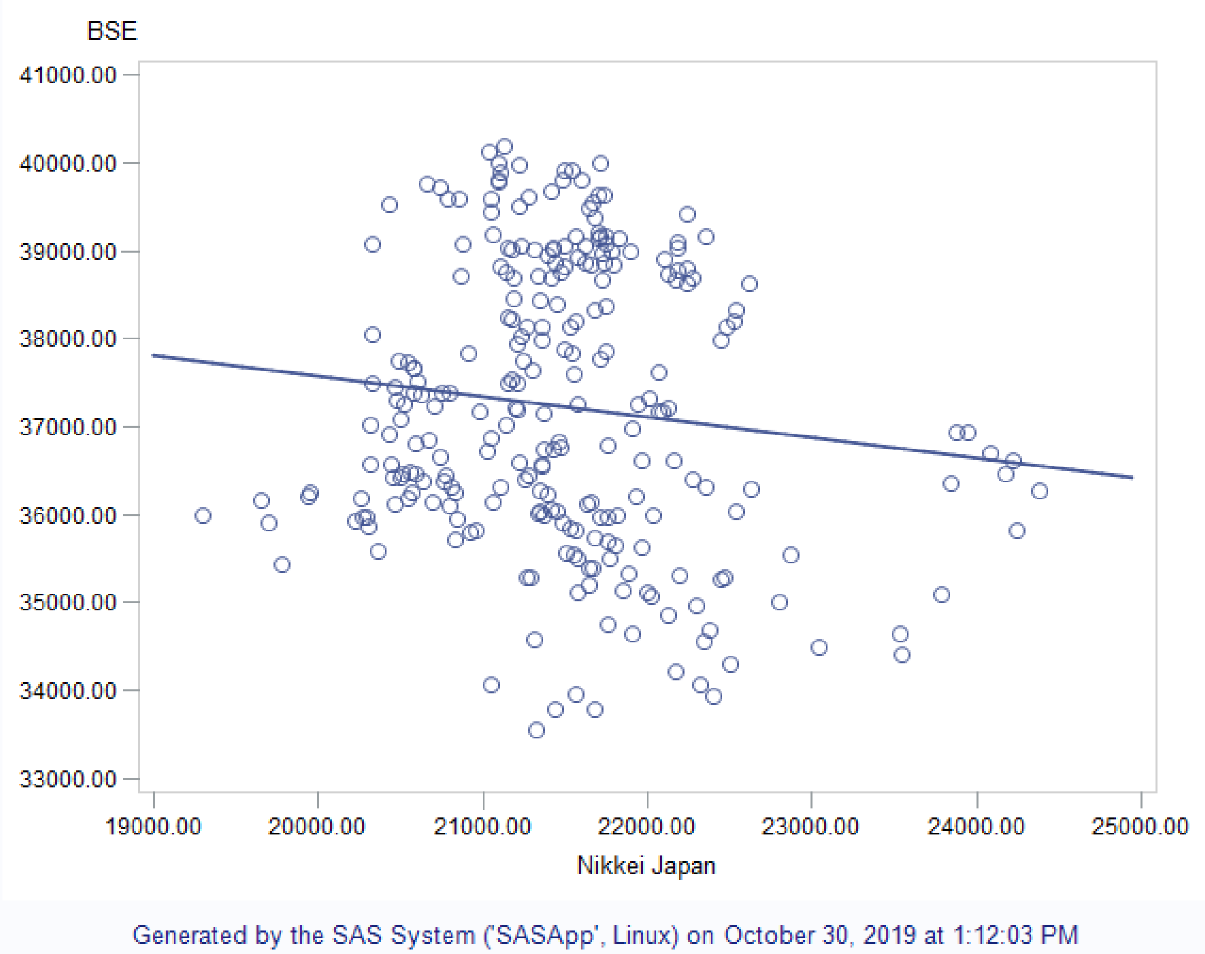
4.2.3. Nikkei and BSE

Is there a correlation between Nikkei and BSE? If yes, what kind of correlation it is? Does changes in Nikkei effects BSE?

H_0 : There is a relation between Nikkei and BSE

H_A : There is no relation between Nikkei and BSE

Figure 5: Scatter plot diagram Nikkei - BSE



(SAS, own creation,2019)

From the above chart we can see there is a negative correlation between hang-sang and BSE. The chart shows a downtrend.

Figure 6: Regression Result Nikkei – BSE.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: BSE

Number of Observations Read	264
Number of Observations Used	260
Number of Observations with Missing Values	4

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	9571154	9571154	3.75	0.0540
Error	258	658949967	2554070		
Corrected Total	259	668521121			

Root MSE	1598.14569	R-Square	0.0143
Dependent Mean	37230	Adj R-Sq	0.0105
Coeff Var	4.29261		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	42235	2587.22700	16.32	<.0001
Nikkei Japan	1	-0.23297	0.12035	-1.94	0.0540

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(SAS, own creation,2019)

Interpretation:

Y= BSE (Intercept) X= Nikkei

Regression Model: Y = 42235 -0.23297x

r^2=0.0143 =1.43% which means if there is a change in Nikkei than it will affect1.43% to BSE. which is very less.

Checking the Hypothesis

T-value for the intercept is 16.32, p-value is < 0.0001. α = 0.05

T-value for the hang-sang is -1.94, p-value is > 0.0001. α = 0.05

Therefore, p-value > α

I.e. 0.0540 > 0.05

So, we accept the null hypothesis and reject the alternative hypothesis which means there is no relation between Nikkei and BSE.

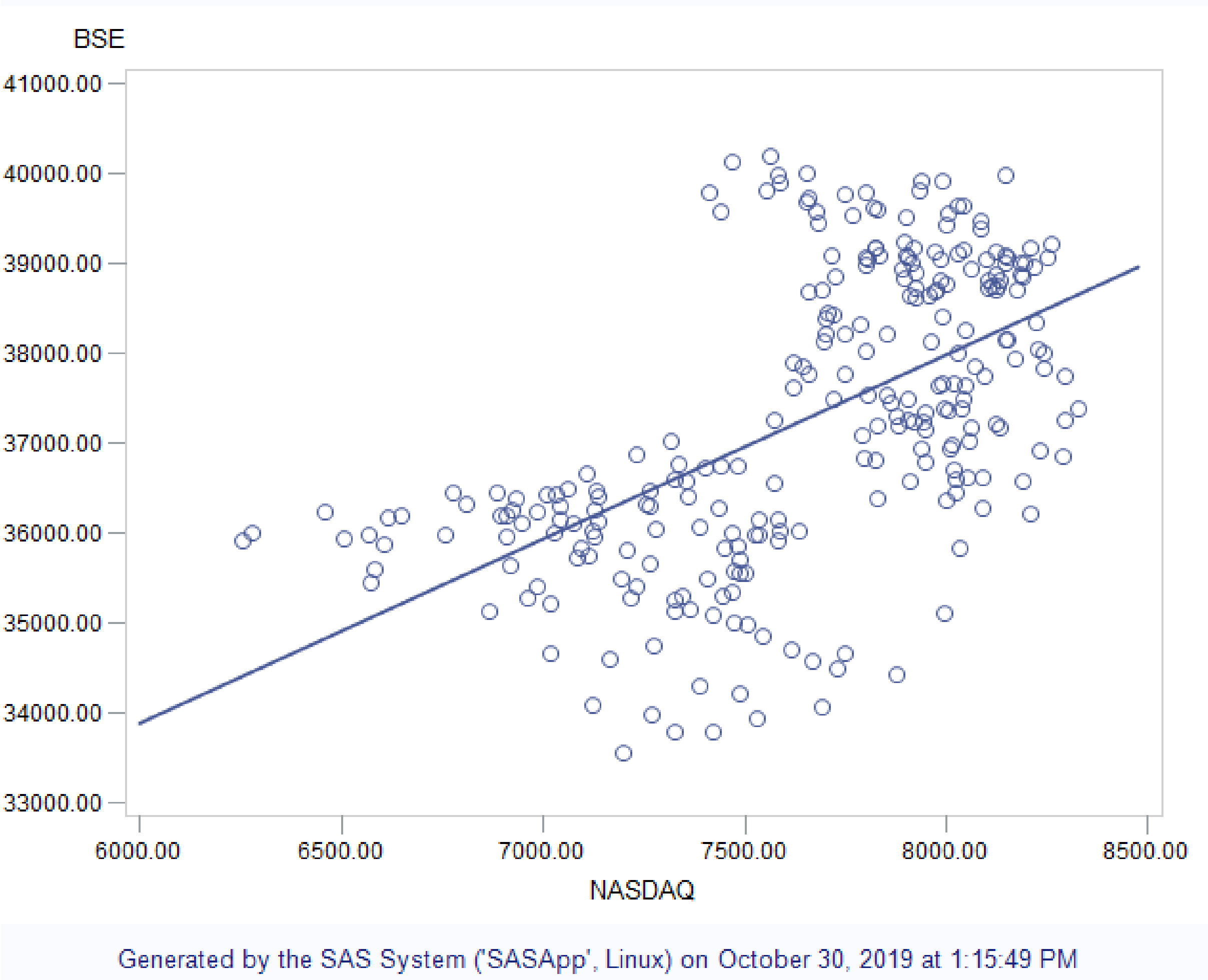
4.2.4. NASDAQ and BSE

Is there a correlation between NASDAQ and BSE? If yes, what kind of correlation it is? Does changes in NASDAQ effects BSE?

H_0 : There is a relation between NASDAQ and BSE

H_A : There is no relation between NASDAQ and BSE

Figure 7: Scatter plot diagram NASDAQ - BSE



(SAS, own creation,2019)

From the above chart we can see there is a positive correlation between hang-sang and BSE. The chart shows an uptrend.

Figure 8: Regression Result NASDAQ – BSE.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: BSE

Number of Observations Read	264
Number of Observations Used	264

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	220493035	220493035	125.40	<.0001
Error	262	460670929	1758286		
Corrected Total	263	681163964			

Root MSE	1326.00377	R-Square	0.3237
Dependent Mean	37257	Adj R-Sq	0.3211
Coeff Var	3.55906		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	21564	1403.75078	15.36	<.0001
NASDAQ	1	2.05219	0.18326	11.20	<.0001

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(SAS, own creation,2019)

Interpretation:

Y= BSE (Intercept) X=NASDAQ

Regression Model: Y = 21564+2.05219x

r^2=0.3237 =32.37% which means if there is a change in NASDAQ than it will affect 32% to BSE.

Checking the Hypothesis

T-value for the intercept is 15.36, p-value is < 0.0001. α = 0.05

T-value for the hang-sang is 11.20, p-value is < 0.0001. α = 0.05

Therefore, p-value < α

I.e. 0.0001< 0.05

So, we reject the null hypothesis and accept the alternative hypothesis which means there is a relation between NASDAQ and BSE. From the equation, if hang-sang increases by 100 points than BSE will increase by 205 points.

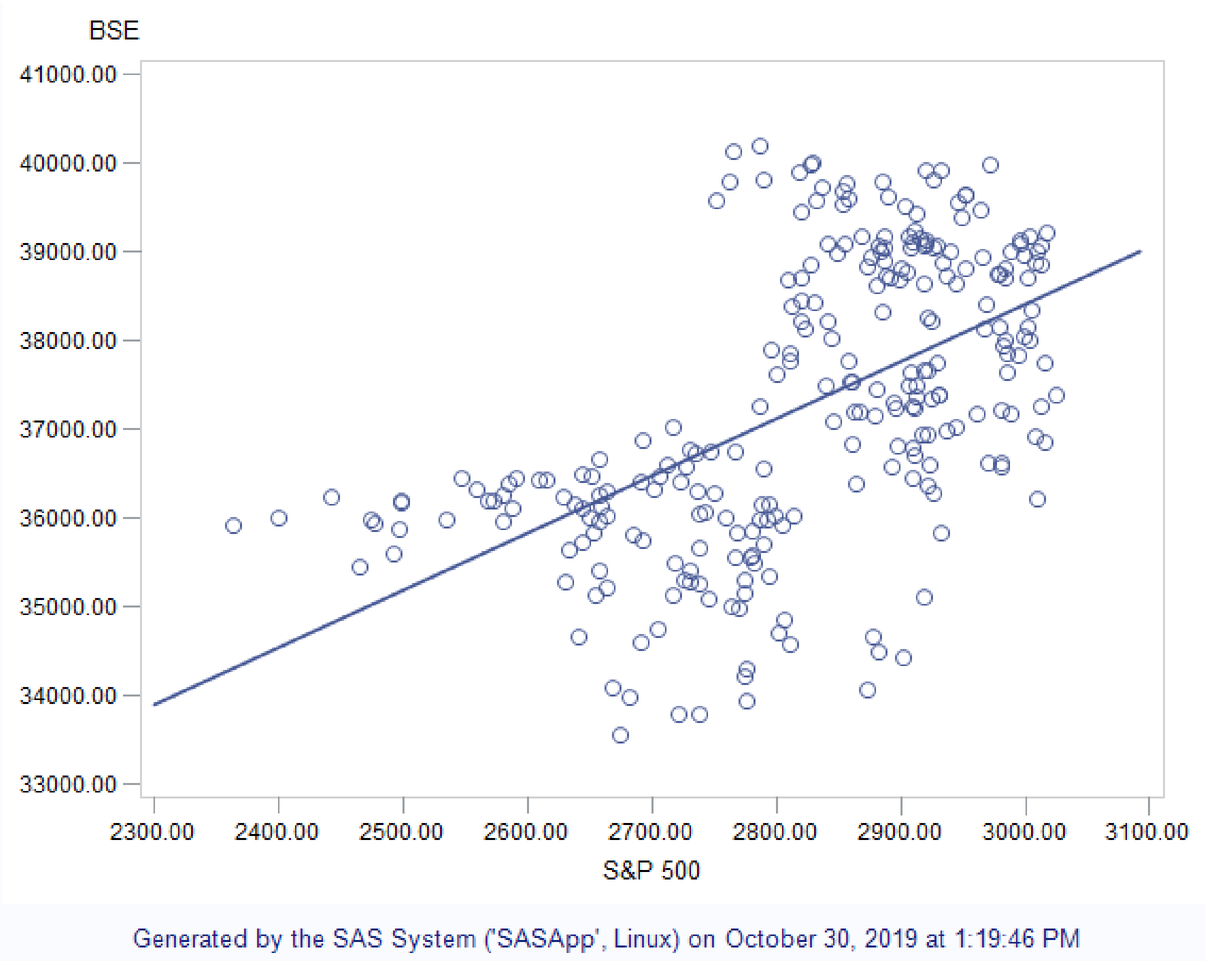
4.2.5. S&P 500 and BSE

Is there a correlation between S&P 500 and BSE? If yes, what kind of correlation it is? Does changes in S&P 500 effects BSE?

H_0 : There is a relation between S&P 500 and BSE

H_A : There is no relation between S&P 500 and BSE

Figure 9: Scatter plot diagram S&P 500 - BSE



(SAS, own creation,2019)

From the above chart we can see there is a positive correlation between S&P 500 and BSE. The chart shows an uptrend.

(**Figure 10:** Regression Result NASDAQ – BSE.)

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: BSE

Number of Observations Read	264
Number of Observations Used	264

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	207179396	207179396	114.52	<.0001
Error	262	473984568	1809101		
Corrected Total	263	681163964			

Root MSE	1345.02840	R-Square	0.3042
Dependent Mean	37257	Adj R-Sq	0.3015
Coeff Var	3.61012		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	19046	1703.72507	11.18	<.0001
S&P 500	1	6.45327	0.60303	10.70	<.0001

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(SAS, own creation,2019)

Interpretation:

Y= BSE (Intercept) X= S&P 500

Regression Model: Y =19046 +6.45327x

r^2=0.3042 =30.42% which means if there is a change in S&P 500 than it will affect 30% to BSE.

Checking the Hypothesis

T-value for the intercept is 11.18, p-value is < 0.0001. α = 0.05

T-value for the hang-sang is 10.70, p-value is < 0.0001. α = 0.05

Therefore, p-value < α

I.e. 0.0001< 0.05

So, we reject the null hypothesis and accept the alternative hypothesis which means there is a relation between S&P 500 and BSE. From the equation, if S&P 500 increases by 100 points than BSE will increase by 645points.

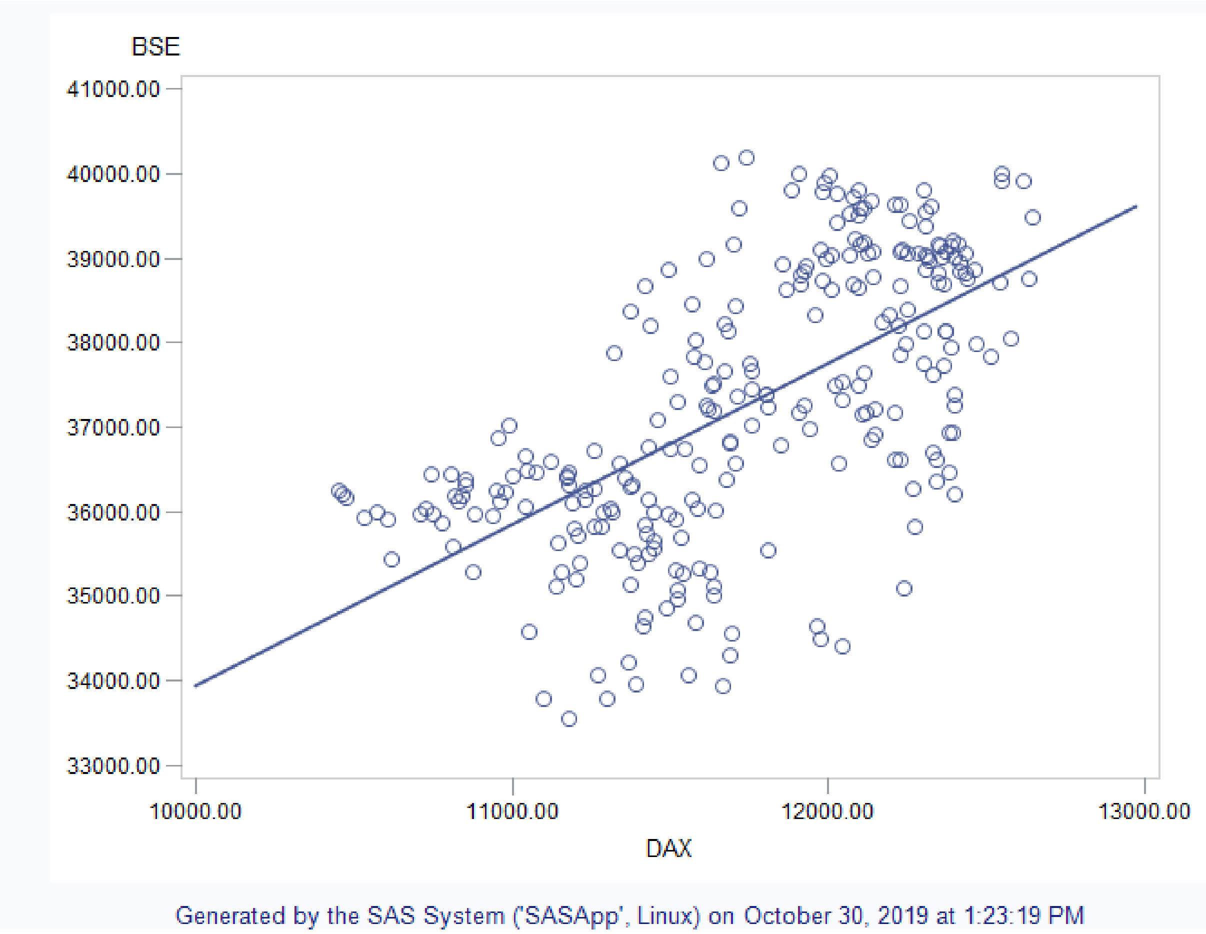
4.2.6. DAX and BSE

Is there a correlation between DAX and BSE? If yes, what kind of correlation it is? Does changes in DAX effects BSE?

H_0 : There is a relation between DAX and BSE

H_A : There is no relation between DAX and BSE

Figure 11: Scatter plot diagram - BSE



(SAS, own creation,2019)

From the above chart we can see there is a positive correlation between DAX and BSE. The chart shows an uptrend.

Figure 12: Regression Result DAX - BSE.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: BSE

Number of Observations Read	264
Number of Observations Used	264

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	262754440	262754440	164.53	<.0001
Error	262	418409524	1596983		
Corrected Total	263	681163964			

Root MSE	1263.71789	R-Square	0.3857
Dependent Mean	37257	Adj R-Sq	0.3834
Coeff Var	3.39188		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	14836	1749.71997	8.48	<.0001
DAX	1	1.91013	0.14891	12.83	<.0001

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(SAS, own creation,2019)

Interpretation:

Y= BSE (Intercept) X= DAX

Regression Model: Y =14836+1.91013x

r^2=0.3857 =38.57% which means if there is a change in DAX than it will affect 38% to BSE.

Checking the Hypothesis

T-value for the intercept is 8.48, p-value is < 0.0001. α = 0.05

T-value for the hang-sang is 12.83, p-value is < 0.0001. α = 0.05

Therefore, p-value < α

I.e. 0.0001< 0.05

So, we reject the null hypothesis and accept the alternative hypothesis which means there is a relation between DAX and BSE. From the equation, if DAX increases by 100 points than BSE will increase by 191points.

4.3 Time Series Analysis

For the time series analysis, the author has selected three stocks per field of economy, from the Indian stock market. The fields are banking, industries, healthcare, IT and automobiles. The stock prices of every stock are gathered from November 2009 until November 2019 on a monthly basis. The aim is to find trends and forecast future prices of each stock for the coming 12 months. And to see which sector is doing well. The author will use equation (2) from the methodology part of time series as stated in the beginning of the thesis.

Calculating Procedure: Import data to SAS. Then carry the regression procedure. Our explanatory variable will be time and dependent variable will be various stocks. Run the procedure. Take note of the equation. Name it first(original) equation. Then again go to the imported data and delete the last cell for quantity dependent variable. Run again the procedure. Take note of the new equation. With the help of new equation find out the value of missing cell. And for forecasting the data use the first(original) equation. All the calculations are shown at the end of thesis in Appendix part.

5. Results and Discussions

This chapter will serve the purpose of giving results mainly discussing the practical part of the thesis, wherein the author has used fundamental methods of regression model and time series analyses.

5.1. Results: Regression Model

By analysing various World indices with India, it is found that there is a kind of linear relationship with every index included in the thesis. Using the scatter plot diagram and regression coefficient "r" which is derived from square root of coefficient of determination"r^2" we can determine the type of linear relationship between the two indices which are:

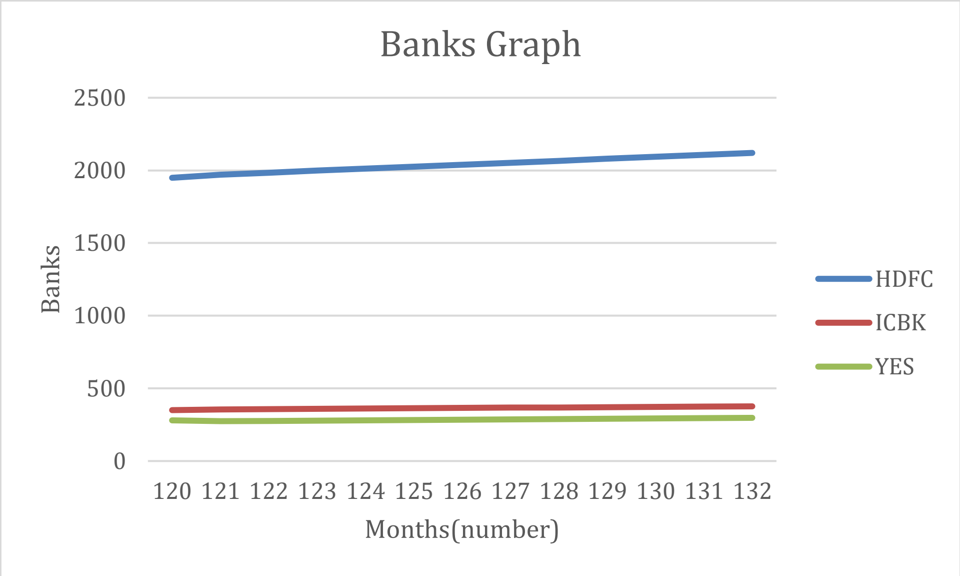
- Hang-Sang and BSE→Positively correlated→ r = 0.53 i.e. medium correlation
- FTSE Singapore and BSE→Positively correlated→ r = 0.50 i.e. medium correlation
- Nikkei and BSE→Negatively correlated→ r = 0.11 i.e. very weak correlation
- NASDAQ and BSE→Positively correlated→ r = 0.56 i.e. medium correlation
- S&P 500 and BSE→Positively correlated→ r = 0.55 i.e. medium correlation
- DAX and BSE→Positively correlated→ r = 0.62 i.e. medium strong correlation

Positive correlation implies that whenever world indices rises BSE also rises and whenever world indices fall, BSE also falls. Negative correlation implies whenever world index (Nikkei) rises, BSE falls. And whenever world index (Nikkei) falls, BSE rises.

5.2. Results: Time Series Analysis

The charts below are forecast for each sector of the economy for the following twelve months based on data for the past ten years. Charts will help in identifying which sector is worth investing in the future and making own portfolio.

Graph 1: Banking Forecast.

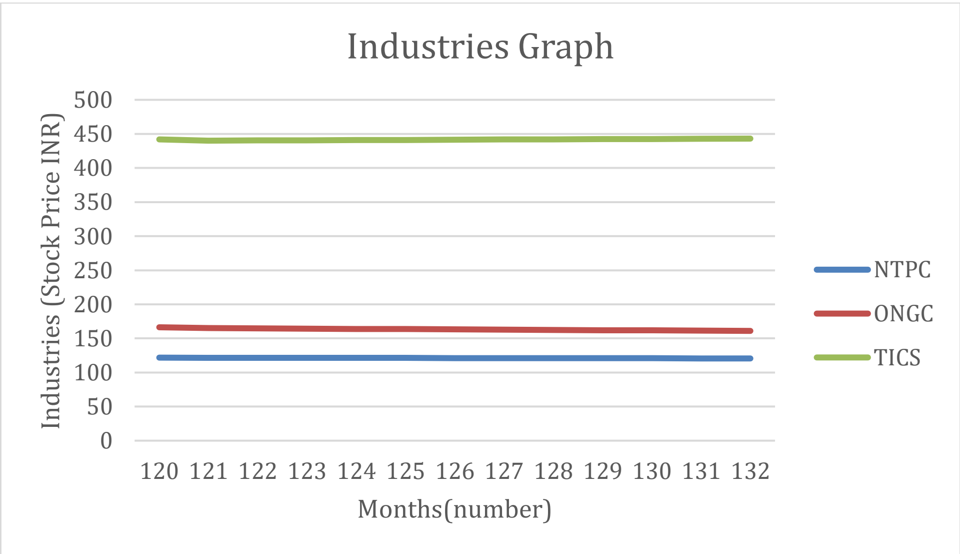


Own creation,2019

The graph of banking indicates forecast of future stock price three banks. From the overall analysis banking sector is in uptrend. HDFC seems growth stock as compared to ICBK and YES. Investment is banking is recommended.

Result: **BUY**

Graph 2: Industries Forecast.

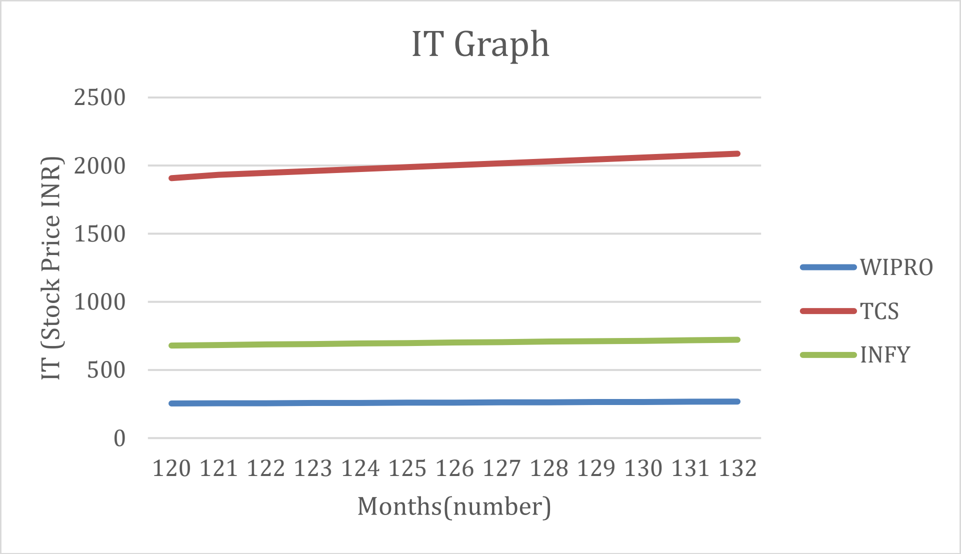


Own Creation, 2019

The above graph comprises of big industries of India two of which are handled by government. i.e. ONGC and NTPC. But Industries forecast is a negative trend. NTPC and ONGC are losing shares. Meanwhile TISC is showing uptrend. Investment is not recommended.

Result: **NO, BUYING**

Graph 3: IT Forecast.

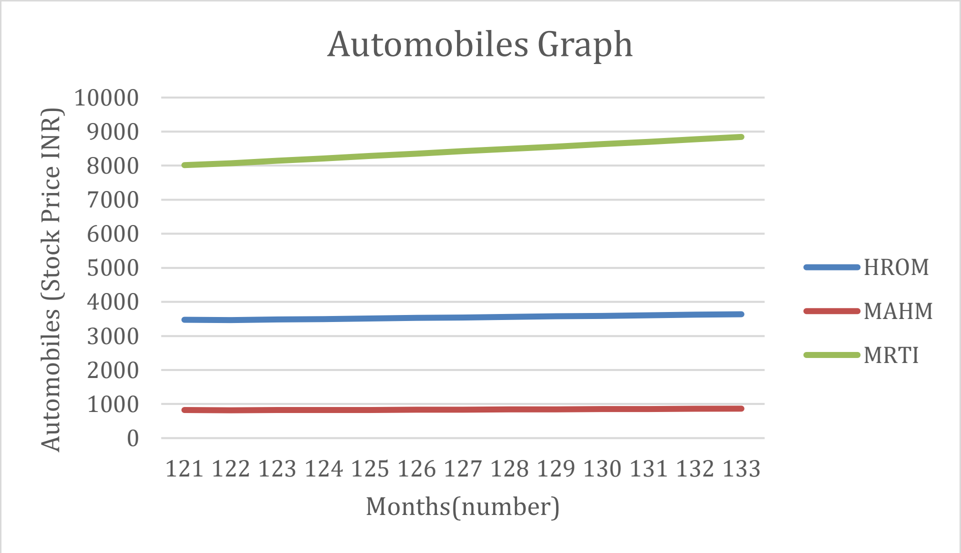


Own Creation, 2109

IT is a booming sector nowadays. The selected IT companies are doing very well. IT is in uptrend. Investment in IT is recommended.

Result: **STRONG BUY**

Graph 4: Automobile Forecast.

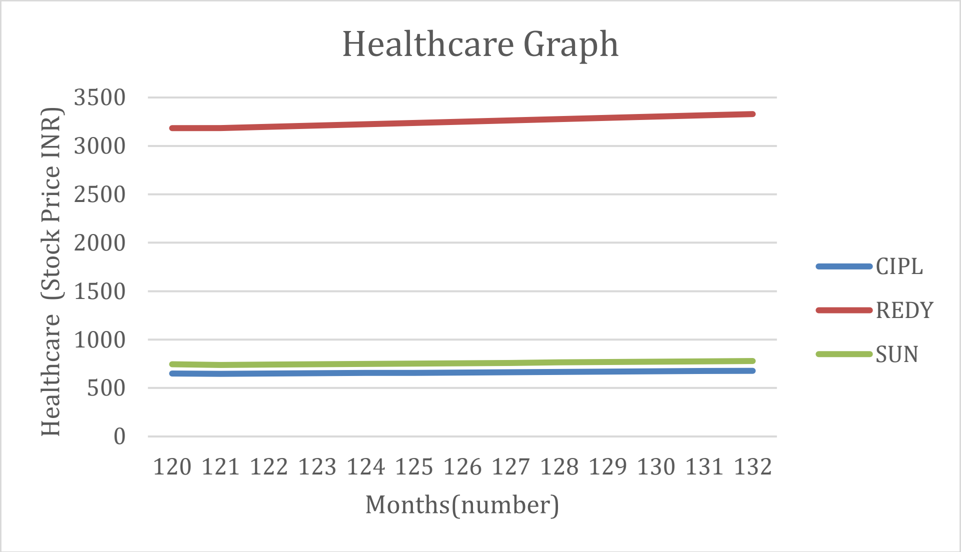


Own creation,2019

Automobiles sector , from the above graph is seen booming. These companies are old and have made goodwill. Automobiles are safe bet. Investment is recommended.

Result: **STRONG BUY**

Graph 5: Healthcare Forecast.



Own creation,2019

Healthcare sector is also seen booming from the above graph. All the three stocks are performing well. SUN and CIPLA are appearing to be on same track. REDY is high value generating and rising stock. Investment is recommended.

Result: **STRONG BUY**

From the study of graph, it can be said that all the sectors are in boom except the industrial sector. For the investors it is a good opportunity to invest in banking, automobiles, IT and Healthcare sectors as they can generate a good result. For conservative investors it is good to pick stocks from various sectors and make own portfolio to avoid risk.

From the overall analysis of the practical part it is found that India’s Market relation with world market are getting strong which leads to direct foreign investment, collaboration with multinational companies, good trade relations which indeed rises the share market.

6. Conclusion

The main objective of the thesis was to find out relation between Indian Stock Market and other Stock market of the World. And predicting the future stock prices of selected Indian stocks to know how the market is doing and which sectors are doing well. So, the investors can invest in them. Regression Model and Time Series Analysis are two great methods in achieving the goal.

It is seen in the Result part that Indian stock Market is positively correlated with many World Stock Market. Which means it is highly effected if any other World Market faces any circumstances. The higher the value of "r", higher effects. More tied with foreign markets ,more stronger market relation.

It is worth investing in Indian Market. As investing money in a developing nation will be worth in future. The Trade-War between USA-China has opened emerging markets for India and a great opportunity to make itself a giant producer. Due to the trade war many manufacturing companies are moved to India and Southeast Asian countries. As a third-world country labour is cheap here which attracts foreign clients to bring in the business. From the results above Banking, IT services, Automobiles and Healthcare are in the boom. From these four sector IT services and Healthcare are the two which are worth investors notice. India has been a leading provider of medicines and drug to many countries. IT is newly emerged in India and slowly and steadily spreading its wings. Moreover, India's geographical location helps in many ways to bring business. Snow-peak mountain, cool ocean breezes, desert and varied culture all at the same place. India is working hard in developing the tourism sector.

However, the thesis is concerned to lower risk-taking investors and does not promise that the methods shown in the thesis will be 100% successful while investing in the markets. These are just suggestions to use money in the financial market rather than saving in banks. Financial market can give larger interest than banks. Also, investors are urged to not just rely on the methods described in thesis but to also use different other methods or seek help of financial instructor.

Mr Sudarshan Sukhani always say one must know how much he could afford to loss. Which the author agrees. And, that an investor should have a stop loss marked while investing. It saves oneself from losing more. There are always many ways to plan an investment keeping in mind the amount and risk.

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8. Appendix

8.1 Banking

Selected stocks ICBK, HDFC and YES

Xt = time Yt = ICBK

Figure 13: Original Result ICBK.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: ICBK

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	487762	487762	283.06	<.0001
Error	118	203334	1723.16866		
Corrected Total	119	691096			

Root MSE	41.51107	R-Square	0.7058
Dependent Mean	244.69600	Adj R-Sq	0.7033
Coeff Var	16.96434		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	133.34522	7.62647	17.48	<.0001
time	1	1.84051	0.10940	16.82	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 11:49:02 AM

(SAS, own creation,2019)

Yt =133.34522 + 1.84051xt

Figure 14: Missing Frequency Result ICBK.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: ICBK

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	451137	451137	277.46	<.0001
Error	117	190237	1625.95426		
Corrected Total	118	641374			

Root MSE	40.32312	R-Square	0.7034
Dependent Mean	242.83000	Adj R-Sq	0.7009
Coeff Var	16.60549		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	135.28480	7.43967	18.18	<.0001
time	1	1.79242	0.10761	16.66	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:05:23 PM

(SAS, own creation,2019)

y’t= 135.28480 + 1.79242xt

Forecasting: y’t(120) = 135.28480 + 1.79242(120) ⇒350.3752

Y(121) = 133.34522 + 1.84051(121) ⇒356.04572

Y(122) = 133.34522 + 1.84051(122) ⇒357.88622

Y(123) = 133.34522 + 1.84051(123) ⇒359.72672

Y(124) = 133.34522 + 1.84051(124) ⇒361.56722

Y(125) = 133.34522 + 1.84051(125) ⇒363.40772

Y(126) = 133.34522 + 1.84051(126) ⇒365.24822

Y(127) = 133.34522 + 1.84051(127) ⇒367.08872

Y(128) = 133.34522 + 1.84051(128) ⇒368.92922

Y(129) = 133.34522 + 1.84051(129) ⇒370.76972

Y(130) = 133.34522 + 1.84051(130) ⇒372.61022

Y(131) = 133.34522 + 1.84051(131) ⇒374.45072

Y(132) = 133.34522 + 1.84051(132) ⇒376.29122

Xt = time Yt = HDFC

Figure 15: Original Result HDFC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: HDFC

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	26570134	26570134	1349.98	<.0001
Error	118	2322454	19682		
Corrected Total	119	28892589			

Root MSE	140.29190	R-Square	0.9196
Dependent Mean	1149.15375	Adj R-Sq	0.9189
Coeff Var	12.20828		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	327.31600	25.77460	12.70	<.0001
time	1	13.58409	0.36971	36.74	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:01:53 PM

(SAS, own creation,2019)

Yt = 327.31600 + 13.58409xt

Figure 16: Missing Frequency Result HDFC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: HDFC

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	25861526	25861526	1303.39	<.0001
Error	117	2321487	19842		
Corrected Total	118	28183013			

Root MSE	140.86080	R-Square	0.9176
Dependent Mean	1142.10462	Adj R-Sq	0.9169
Coeff Var	12.33344		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	327.84324	25.98900	12.61	<.0001
time	1	13.57102	0.37590	36.10	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:06:57 PM

(SAS, own creation,2019)

y’t = 327.84324 + 13.57102x’t

Forecasting : y’(120) = 327.84324 + 13.57102(120) ⇒1949.16564

Y (121) = 327.31600 + 13.58409(121) ⇒1970.99089

Y (122) = 327.31600 + 13.58409(122) ⇒1984.57498

Y (123) = 327.31600 + 13.58409(123) ⇒1998.15907

Y (124) = 327.31600 + 13.58409(124) ⇒2011.74316

Y (125) = 327.31600 + 13.58409(125) ⇒2025.32725

Y (126) = 327.31600 + 13.58409(126) ⇒2038.91134

Y (127) = 327.31600 + 13.58409(127) ⇒2052.49543

Y (128) = 327.31600 + 13.58409(128) ⇒2066.07952

Y (129) = 327.31600 + 13.58409(129) ⇒2079.66361

Y (130) = 327.31600 + 13.58409(130) ⇒2093.2477

Y (131) = 327.31600 + 13.58409(131) ⇒2106.83179

Y (132) = 327.31600 + 13.58409(132) ⇒2120.4158

Xt = time Yt = YES

Figure 17: Original Result YES.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: YES

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	624400	624400	136.78	<.0001
Error	118	538681	4565.09581		
Corrected Total	119	1163082			

Root MSE	67.56549	R-Square	0.5368
Dependent Mean	148.48033	Adj R-Sq	0.5329
Coeff Var	45.50467		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	22.49477	12.41322	1.81	0.0725
time	1	2.08241	0.17806	11.70	<.0001

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(SAS, own creation,2019)

Yt = 22.49477 + 2.08241xt

Figure 18: Missing Frequency Result YES.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: YES

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	660361	660361	155.58	<.0001
Error	117	496620	4244.61902		
Corrected Total	118	1156981			

Root MSE	65.15074	R-Square	0.5708
Dependent Mean	149.13395	Adj R-Sq	0.5671
Coeff Var	43.68606		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	19.01895	12.02040	1.58	0.1163
time	1	2.16858	0.17386	12.47	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:09:04 PM

(SAS, own creation,2019)

y't = 19.01895 + 2.16858x't

Forecasting: y' (120) = 19.01895 + 2.16858(120) ⇒279.24855

Y (121) = 22.49477 + 2.08241(121) ⇒274.46638

Y (122) = 22.49477 + 2.08241(122) ⇒276.54879

Y (123) = 22.49477 + 2.08241(123) ⇒278.6312

Y (124) = 22.49477 + 2.08241(124) ⇒280.71361

Y (125) = 22.49477 + 2.08241(125) ⇒282.79602

Y (126) = 22.49477 + 2.08241(126) ⇒284.87843

Y (127) = 22.49477 + 2.08241(127) ⇒286.96084

Y (128) = 22.49477 + 2.08241(128) ⇒289.04352

Y (129) = 22.49477 + 2.08241(129) ⇒291.12566

Y (130) = 22.49477 + 2.08241(130) ⇒293.20807

Y(131) = 22.49477 + 2.08241(131) ⇒295.29048

Y(132) = 22.49477 + 2.08241(132) ⇒297.37289

8.2 Industries

Stocks: NTPC, ONGC, TISC

Xt = time Yt= NTPC

Figure 19: Original Result NTPC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: NTPC

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1543.00858	1543.00858	5.27	0.0235
Error	118	34572	292.98209		
Corrected Total	119	36115			

Root MSE	17.11672	R-Square	0.0427
Dependent Mean	128.01783	Adj R-Sq	0.0346
Coeff Var	13.37057		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	134.28070	3.14471	42.70	<.0001
time	1	-0.10352	0.04511	-2.29	0.0235

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:13:41 PM

(SAS, own creation,2019)

Yt = 134.28070 - 0.10352xt

Figure 20: Missing Frequency Result NTPC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: NTPC

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1519.58987	1519.58987	5.14	0.0252
Error	117	34570	295.47367		
Corrected Total	118	36090			

Root MSE	17.18935	R-Square	0.0421
Dependent Mean	128.05958	Adj R-Sq	0.0339
Coeff Var	13.42293		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	134.30124	3.17146	42.35	<.0001
time	1	-0.10403	0.04587	-2.27	0.0252

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:19:40 PM

(SAS, own creation,2019)

y't = 134.30124 - 0.10403xt

Forecasting : y'(120) = 134.30124 - 0.10403(120) ⇒121.81764

Y(121) = 134.28070 - 0.10352(121) ⇒121.75478

Y(122) = 134.28070 - 0.10352(122) ⇒121.65126

Y(123) = 134.28070 - 0.10352(123) ⇒121.54774

Y(124) = 134.28070 - 0.10352(124) ⇒121.44422

Y(125) = 134.28070 - 0.10352(125) ⇒121.3407

Y(126) = 134.28070 - 0.10352(126) ⇒121.23718

Y(127) = 134.28070 - 0.10352(127) ⇒121.13366

Y(128) = 134.28070 - 0.10352(128) ⇒121.03014

Y(129) = 134.28070 - 0.10352(129) ⇒120.92662

Y(130) = 134.28070 - 0.10352(130) ⇒120.82310

Y(131) = 134.28070 - 0.10352(131) ⇒120.71958

Y(132) = 134.28070 - 0.10352(132) ⇒120.61606

Xt = time Yt = ONGC

Figure 21: Original Result ONGC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: ONGC

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	20315	20315	24.06	<.0001
Error	118	99646	844.45361		
Corrected Total	119	119961			

Root MSE	29.05948	R-Square	0.1693
Dependent Mean	187.88092	Adj R-Sq	0.1623
Coeff Var	15.46697		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	210.60568	5.33885	39.45	<.0001
time	1	-0.37562	0.07658	-4.90	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:15:51 PM

(SAS, own creation,2019)

Yt = 210.60568 - 0.37562xt

Figure 22: Missing Frequency Result ONGC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: ONGC

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	18741	18741	22.14	<.0001
Error	117	99046	846.54575		
Corrected Total	118	117787			

Root MSE	29.09546	R-Square	0.1591
Dependent Mean	188.27109	Adj R-Sq	0.1519
Coeff Var	15.45402		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	210.19066	5.36815	39.16	<.0001
time	1	-0.36533	0.07764	-4.71	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:21:27 PM

(SAS, own creation,2019)

y’t = 210.19066 - 0.36533xt

Forecasting : y’(120) = 210.19066 - 0.36533(120) ⇒166.35106

Y(121) = 210.60568 - 0.37562(121) ⇒165.15566

Y(122) = 210.60568 - 0.37562(122) ⇒164.78004

Y(123) = 210.60568 - 0.37562(123) ⇒164.40442

Y(124) = 210.60568 - 0.37562(124) ⇒164.02880

Y(125) = 210.60568 - 0.37562(125) ⇒163.63518

Y(126) = 210.60568 - 0.37562(126) ⇒163.27756

Y(127) = 210.60568 - 0.37562(127) ⇒162.90194

Y(128) = 210.60568 - 0.37562(128) ⇒162.52632

Y(129) = 210.60568 - 0.37562(129) ⇒162.1507

Y(130) = 210.60568 - 0.37562(130) ⇒161.77508

Y(131) = 210.60568 - 0.37562(131) ⇒161.39946

Y(132) = 210.60568 - 0.37562(132) ⇒161.02384

Xt= time Yt = TISC

Figure 23: Original Result TISC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: TISC

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	10909	10909	0.72	0.3977
Error	118	1786965	15144		
Corrected Total	119	1797874			

Root MSE	123.06002	R-Square	0.0061
Dependent Mean	423.38592	Adj R-Sq	-0.0024
Coeff Var	29.06569		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	406.73334	22.60874	17.99	<.0001
time	1	0.27525	0.32430	0.85	0.3977

Generated by the SAS System ('SASApp', Linux) on November 22, 2019 at 4:20:05 PM

(SAS, own creation,2019)

Yt = 406.73334 + 0.27525xt

Figure 24: Missing Frequency Result TISC.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: TISC

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	12704	12704	0.83	0.3631
Error	117	1783272	15242		
Corrected Total	118	1795976			

Root MSE	123.45702	R-Square	0.0071
Dependent Mean	423.75050	Adj R-Sq	-0.0014
Coeff Var	29.13437		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	405.70338	22.77798	17.81	<.0001
time	1	0.30079	0.32946	0.91	0.3631

Generated by the SAS System ('SASApp', Linux) on November 22, 2019 at 4:22:53 PM

(SAS, own creation,2019)

y’t = 405.70338 + 0.30079x’t

Forecasting : y(120) = 405.70338 + 0.30079(120) ⇒441.79818

Y(121) = 406.73334 + 0.27525(121) ⇒440.03859

Y(122) = 406.73334 + 0.27525(122) ⇒440.31384

Y(123) = 406.73334 + 0.27525(123) ⇒440.58909

Y(124) = 406.73334 + 0.27525(124) ⇒440.86434

Y(125) = 406.73334 + 0.27525(125) ⇒441.13959

Y(126) = 406.73334 + 0.27525(126) ⇒441.41484

Y(127) = 406.73334 + 0.27525(127) ⇒441.69009

Y(128) = 406.73334 + 0.27525(128) ⇒441.96534

Y(129) = 406.73334 + 0.27525(129) ⇒442.24059

Y(130) = 406.73334 + 0.27525(130) ⇒442.51584

Y(131) = 406.73334 + 0.27525(131) ⇒442.79109

Y(132) = 406.73334 + 0.27525(132) ⇒443.06634

8.3 IT

Stocks: WIPRO, TCS, INFY

Xt= time Yt= WIPRO

Figure 25: Original Result WIPRO.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: WIPRO

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	189338	189338	323.25	<.0001
Error	118	69116	585.72980		
Corrected Total	119	258454			

Root MSE	24.20186	R-Square	0.7326
Dependent Mean	185.94575	Adj R-Sq	0.7303
Coeff Var	13.01555		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	116.56988	4.44640	26.22	<.0001
time	1	1.14671	0.06378	17.98	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:45:44 PM

(SAS, own creation,2019)

Yt = 116.56988 + 1.14671xt

Figure 26: Missing Frequency Result WIPRO.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: WIPRO

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	183802	183802	311.32	<.0001
Error	117	69077	590.40447		
Corrected Total	118	252879			

Root MSE	24.29824	R-Square	0.7268
Dependent Mean	185.32092	Adj R-Sq	0.7245
Coeff Var	13.11144		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	116.67544	4.48306	26.03	<.0001
time	1	1.14409	0.06484	17.64	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:52:50 PM

(SAS, own creation,2019)

y’t = 116.67544 + 1.14409xt

Forecasting : y’(120) =116.67544 + 1.14409(120) ⇒253.96624

Y(121) = 116.56988 + 1.14671(121) ⇒255.32179

Y(122) = 116.56988 + 1.14671(122) ⇒256.46850

Y(123) = 116.56988 + 1.14671(123) ⇒257.61521

Y(124) = 116.56988 + 1.14671(124) ⇒258.76192

Y(125) = 116.56988 + 1.14671(125) ⇒259.90863

Y(126) = 116.56988 + 1.14671(126) ⇒261.05534

Y(127) = 116.56988 + 1.14671(127) ⇒262.20205

Y(128) = 116.56988 + 1.14671(128) ⇒263.34876

Y(129) = 116.56988 + 1.14671(129) ⇒264.49547

Y(130) = 116.56988 + 1.14671(130) ⇒265.64218

Y(131) = 116.56988 + 1.14671(131) ⇒266.78889

Y(132) = 116.56988 + 1.14671(132) ⇒267.93560

Xt = time Yt = TCS

Figure 27: Original Result TCS.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: TCS

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	28260835	28260835	904.61	<.0001
Error	118	3686442	31241		
Corrected Total	119	31947276			

Root MSE	176.75132	R-Square	0.8846
Dependent Mean	1085.97758	Adj R-Sq	0.8836
Coeff Var	16.27578		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	238.39563	32.47298	7.34	<.0001
time	1	14.00962	0.46580	30.08	<.0001

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(SAS, own creation,2019)

Yt = 238.39563 + 14.00962xt

Figure 28: Missing Frequency Result TCS.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: TCS

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	26990609	26990609	885.43	<.0001
Error	117	3566519	30483		
Corrected Total	118	30557128			

Root MSE	174.59402	R-Square	0.8833
Dependent Mean	1076.11101	Adj R-Sq	0.8823
Coeff Var	16.22454		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	244.26467	32.21283	7.58	<.0001
time	1	13.86411	0.46592	29.76	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:53:57 PM

(SAS, own creation,2019)

y’t = 244.26467 + 13.86411xt

Forecasting : yt(120) = 244.26467 + 13.86411(120) ⇒1907.95787

Y(121) = 238.39563 + 14.00962(121) ⇒1933.55965

Y(122) = 238.39563 + 14.00962(122) ⇒1947.56927

Y(123) = 238.39563 + 14.00962(123) ⇒1961.57889

Y(124) = 238.39563 + 14.00962(124) ⇒1975.58851

Y(125) = 238.39563 + 14.00962(125) ⇒1989.59813

Y(126) = 238.39563 + 14.00962(126) ⇒2003.60775

Y(127) = 238.39563 + 14.00962(127) ⇒2017.61737

Y(128) = 238.39563 + 14.00962(128) ⇒2031.62699

Y(129) = 238.39563 + 14.00962(129) ⇒2045.63661

Y(130) = 238.39563 + 14.00962(130) ⇒2059.64623

Y(131) = 238.39563 + 14.00962(131) ⇒2073.65585

Y(132) = 238.39563 + 14.00962(132) ⇒2087.66547

Xt = time Yt = INFY

Figure 29: Original Result INFY.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: INFY

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1770187	1770187	387.62	<.0001
Error	118	538885	4566.82357		
Corrected Total	119	2309072			

Root MSE	67.57828	R-Square	0.7666
Dependent Mean	470.90125	Adj R-Sq	0.7646
Coeff Var	14.35084		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	258.77287	12.41557	20.84	<.0001
time	1	3.50625	0.17809	19.69	<.0001

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(SAS, own creation,2019)

Yt = 258.77287 + 3.50625xt

Figure 30: Missing Frequency Result INFY.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: INFY

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1721767	1721767	373.90	<.0001
Error	117	538765	4604.82985		
Corrected Total	118	2260532			

Root MSE	67.85890	R-Square	0.7617
Dependent Mean	469.05756	Adj R-Sq	0.7596
Coeff Var	14.46707		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	258.95859	12.52006	20.68	<.0001
time	1	3.50165	0.18109	19.34	<.0001

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(SAS, own creation,2019)

y't = 258.95859 + 3.50165xt

Forecasting : y(120) = 258.95859 + 3.50165(120) ⇒679.15695

Y(121) = 258.77287 + 3.50625(121) ⇒683.02912

Y(122) = 258.77287 + 3.50625(122) ⇒686.53537

Y(123) = 258.77287 + 3.50625(123) ⇒690.04162

Y(124) = 258.77287 + 3.50625(124) ⇒693.54787

Y(125) = 258.77287 + 3.50625(125) ⇒697.05412

Y(126) = 258.77287 + 3.50625(126) ⇒700.56037

Y(127) = 258.77287 + 3.50625(127) ⇒704.06662

Y(128) = 258.77287 + 3.50625(128) ⇒707.57287

Y(129) = 258.77287 + 3.50625(129) ⇒711.07912

Y(130) = 258.77287 + 3.50625(130) ⇒714.58537

Y(131) = 258.77287 + 3.50625(131) ⇒718.09162

Y(132) = 258.77287 + 3.50625(132) ⇒721.59787

8.4 Automobiles

Stocks: HROM, MAHM, MRTI

Xt = time Yt = HROM

Figure 31: Original Result HROM.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: HROM

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	35084710	35084710	211.88	<.0001
Error	118	19539063	165585		
Corrected Total	119	54623773			

Root MSE	406.92171	R-Square	0.6423
Dependent Mean	2505.52917	Adj R-Sq	0.6393
Coeff Var	16.24095		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1561.14618	74.76017	20.88	<.0001
time	1	15.60964	1.07237	14.56	<.0001

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(SAS, own creation,2019)

Yt = 1561.14618 + 15.60964xt

Figure 32: Missing Frequency Result HROM.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: HROM

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	35574135	35574135	219.00	<.0001
Error	117	19005095	162437		
Corrected Total	118	54579230			

Root MSE	403.03438	R-Square	0.6518
Dependent Mean	2503.76303	Adj R-Sq	0.6488
Coeff Var	16.09715		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1548.76178	74.36037	20.83	<.0001
time	1	15.91669	1.07554	14.80	<.0001

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(SAS, own creation,2019)

y’t = 1548.76178 + 15.91669x’t

Forecasting : y(120) =1548.76178 + 15.91669(120) ⇒3458.76458

Y(121)= 1561.14618 + 15.60964(121) ⇒3449.91262

Y(122)= 1561.14618 + 15.60964(122) ⇒3465.52226

Y(123)= 1561.14618 + 15.60964(123) ⇒3481.13190

Y(124)= 1561.14618 + 15.60964(124) ⇒3512.35118

Y(125)= 1561.14618 + 15.60964(125) ⇒3512.35118

Y(126)= 1561.14618 + 15.60964(126) ⇒3527.96082

Y(127)= 1561.14618 + 15.60964(127) ⇒3543.57046

Y(128)= 1561.14618 + 15.60964(128) ⇒3559.18010

Y(129)= 1561.14618 + 15.60964(129) ⇒3574.78974

Y(130)= 1561.14618 + 15.60964(130) ⇒3590.39938

Y(131)= 1561.14618 + 15.60964(131) ⇒3606.00902

Y(132)= 1561.14618 + 15.60964(132) ⇒3621.61866

Xt = time Yt = MAHM

Figure 33: Original Result MAHM.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: MAHM

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2827708	2827708	442.55	<.0001
Error	118	753974	6389.61232		
Corrected Total	119	3581682			

Root MSE	79.93505	R-Square	0.7895
Dependent Mean	543.88842	Adj R-Sq	0.7877
Coeff Var	14.69696		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	275.78244	14.68577	18.78	<.0001
time	1	4.43150	0.21065	21.04	<.0001

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(SAS, own creation,2019)

Y = 257.78244 + 4.43150xt

Figure 34: Missing Frequency Result MAHM.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: MAHM

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2895722	2895722	493.94	<.0001
Error	117	685909	5862.47026		
Corrected Total	118	3581631			

Root MSE	76.56677	R-Square	0.8085
Dependent Mean	543.82866	Adj R-Sq	0.8069
Coeff Var	14.07921		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	271.36083	14.12667	19.21	<.0001
time	1	4.54113	0.20433	22.22	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:34:57 PM

(SAS, own creation,2019)

y't = 271.36083 + 4.54113x't

Forecasting : y′(120) = 271.36083 + 4.54113(120) ⇒816.30363

Y(121) = 257.78244 + 4.43150(121) ⇒811.99394

Y(122) = 257.78244 + 4.43150(122) ⇒816.42544

Y(123) = 257.78244 + 4.43150(123) ⇒820.85694

Y(124) = 257.78244 + 4.43150(124) ⇒825.28844

Y(125) = 257.78244 + 4.43150(125) ⇒829.71994

Y(126) = 257.78244 + 4.43150(126) ⇒834.15144

Y(127) = 257.78244 + 4.43150(127) ⇒838.58294

Y(128) = 257.78244 + 4.43150(128) ⇒843.01444

Y(129) = 257.78244 + 4.43150(129) ⇒847.44594

Y(130) = 257.78244 + 4.43150(130) ⇒851.87744

Y(131) = 257.78244 + 4.43150(131) ⇒856.30894

Y(132) = 257.78244 + 4.43150(132) ⇒860.74044

Xt = time Yt = MRTI

Figure 35: Original Result MRTI.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: MRTI

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	709544953	709544953	508.68	<.0001
Error	118	164595791	1394880		
Corrected Total	119	874140744			

Root MSE	1181.05021	R-Square	0.8117
Dependent Mean	3824.40792	Adj R-Sq	0.8101
Coeff Var	30.88191		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-422.56182	216.98403	-1.95	0.0539
time	1	70.19785	3.11245	22.55	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:27:26 PM

(SAS, own creation,2019)

Yt = -422.56182 + 70.19785xt

Figure 36: Missing Frequency Result MRTI.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: MRTI

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	695463161	695463161	494.90	<.0001
Error	117	164416690	1405271		
Corrected Total	118	859879851			

Root MSE	1185.44121	R-Square	0.8088
Dependent Mean	3792.80630	Adj R-Sq	0.8072
Coeff Var	31.25499		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-429.73427	218.71546	-1.96	0.0518
time	1	70.37568	3.16348	22.25	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 12:33:37 PM

(SAS, own creation,2019)

y’t = -429.73427 + 70.37568x’t

Forecasting: y′ (120) = -429.73427 + 70.37568(120) ⇒8015.34733

Y(121) = -422.56182 + 70.19785(121) ⇒8071.37803

Y(122) = -422.56182 + 70.19785(122) ⇒8141.57588

Y(123) = -422.56182 + 70.19785(123) ⇒8211.77373

Y(124) = -422.56182 + 70.19785(124) ⇒8281.97518

Y(125) = -422.56182 + 70.19785(125) ⇒8352.16943

Y(126) = -422.56182 + 70.19785(126) ⇒8422.36728

Y(127) = -422.56182 + 70.19785(127) ⇒8492.56513

Y(128) = -422.56182 + 70.19785(128) ⇒8562.76298

Y(129) = -422.56182 + 70.19785(129) ⇒8632.96083

Y(130) = -422.56182 + 70.19785(130) ⇒8703.15868

Y(131) = -422.56182 + 70.19785(131) ⇒8773.35653

Y(132) = -422.56182 + 70.19785(132) ⇒8843.55438

8.5 Healthcare

stocks: CIPL, REDY, SUN

Xt= time Yt= CIPL

Figure 37: Original Result CIPL.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: CIPL

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1142856	1142856	167.97	<.0001
Error	118	802868	6803.96842		
Corrected Total	119	1945724			

Root MSE	82.48617	R-Square	0.5874
Dependent Mean	476.27167	Adj R-Sq	0.5839
Coeff Var	17.31914		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	305.82641	15.15446	20.18	<.0001
time	1	2.81728	0.21738	12.96	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 1:00:02 PM

(SAS, own creation,2019)

Yt = 305.82641 + 2.81728xt

Figure 38: Missing Frequency Result CIPL.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: CIPL

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1175024	1175024	178.40	<.0001
Error	117	770619	6586.48887		
Corrected Total	118	1945643			

Root MSE	81.15719	R-Square	0.6039
Dependent Mean	476.34706	Adj R-Sq	0.6005
Coeff Var	17.03741		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	302.78289	14.97361	20.22	<.0001
time	1	2.89274	0.21658	13.36	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 1:04:26 PM

(SAS, own creation,2019)

y’t = 302.78289 + 2.89274x’t

Forecasting: y′(120) = 302.78289 + 2.89274(120) ⇒649.91169

Y(121) = 305.82641 + 2.81728(121) ⇒646.78263

Y(122) = 305.82641 + 2.81728(122) ⇒649.60045

Y(123) = 305.82641 + 2.81728(123) ⇒652.41827

Y(124) = 305.82641 + 2.81728(124) ⇒655.23609

Y(125) = 305.82641 + 2.81728(125) ⇒658.05391

Y(126) = 305.82641 + 2.81728(126) ⇒660.87173

Y(127) = 305.82641 + 2.81728(127) ⇒663.68955

Y(128) = 305.82641 + 2.81728(128) ⇒666.50737

(129) = 305.82641 + 2.81728(129) ⇒ 669.32519

Y(130) = 305.82641 + 2.81728(130) ⇒672.14301

Y(131) = 305.82641 + 2.81728(131) ⇒674.96083

Y(132) = 305.82641 + 2.81728(132) ⇒677.77865

Xt = time Yt = REDY

Figure 39: Original Result REDY.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: REDY

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	25028212	25028212	74.94	<.0001
Error	118	39409658	333980		
Corrected Total	119	64437870			

Root MSE	577.91016	R-Square	0.3884
Dependent Mean	2386.20833	Adj R-Sq	0.3832
Coeff Var	24.21876		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1588.57348	106.17438	14.96	<.0001
time	1	13.18405	1.52298	8.66	<.0001

Generated by the SAS System ('SASApp', Linux) on November 18, 2019 at 1:01:24 PM

(SAS, own creation,2019)

Yt = 1588.57348 + 13.18405xt

Figure 40: Missing Frequency Result REDY.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: REDY

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	25021637	25021637	74.58	<.0001
Error	117	39255862	335520		
Corrected Total	118	64277499			

Root MSE	579.24104	R-Square	0.3893
Dependent Mean	2382.85714	Adj R-Sq	0.3841
Coeff Var	24.30868		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1581.92703	106.87073	14.80	<.0001
time	1	13.34884	1.54577	8.64	<.0001

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(SAS, own creation,2019)

y’t = 1581.92703 + 13.34884x’t

Forecasting: y(120) = 1581.92703 + 13.34884(120) ⇒3183.78783

Y(121) = 1588.57348 + 13.18405(121) ⇒3183.84353

Y(122) = 1588.57348 + 13.18405(122) ⇒3197.02758

Y(123) = 1588.57348 + 13.18405(123) ⇒3210.21163

Y(124) = 1588.57348 + 13.18405(124) ⇒3223.39568

Y(125) = 1588.57348 + 13.18405(125) ⇒3263.57973

Y(126) = 1588.57348 + 13.18405(126) ⇒3249.76378

Y(127) = 1588.57348 + 13.18405(127) ⇒3262.94783

Y(128) = 1588.57348 + 13.18405(128) ⇒3276.13188

Y(129) = 1588.57348 + 13.18405(129) ⇒3289.31593

Y(130) = 1588.57348 + 13.18405(130) ⇒3302.49998

Y(131) = 1588.57348 + 13.18405(131) ⇒3315.68403

Y(132) = 1588.57348 + 13.18405(132) ⇒3328.86808

Xt= time Yt= Sun

Figure 41: Original Result SUN.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: SUN

Number of Observations Read	120
Number of Observations Used	120

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	1962751	1962751	50.18	<.0001
Error	118	4615369	39113		
Corrected Total	119	6578121			

Root MSE	197.77082	R-Square	0.2984
Dependent Mean	515.00150	Adj R-Sq	0.2924
Coeff Var	38.40199		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	291.63304	36.33471	8.03	<.0001
time	1	3.69204	0.52119	7.08	<.0001

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(SAS, own creation,2019)

Yt= 291.63304 + 3.69204xt

Figure 42: Missing Frequency Result SUN.

Linear Regression Results

The REG Procedure
Model: Linear_Regression_Model
Dependent Variable: SUN

Number of Observations Read	120
Number of Observations Used	119
Number of Observations with Missing Values	1

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	2049505	2049505	53.03	<.0001
Error	117	4522040	38650		
Corrected Total	118	6571545			

Root MSE	196.59581	R-Square	0.3119
Dependent Mean	515.68008	Adj R-Sq	0.3060
Coeff Var	38.12360		

Parameter Estimates					
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	286.45546	36.27219	7.90	<.0001
time	1	3.82041	0.52464	7.28	<.0001

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(SAS, own creation,2019)

y’t = 286.45546 + 3.82041x’t

Forecasting: y(120) = 286.45546 + 3.82041(120) ⇒744.90466

Y(121) = 291.63304 + 3.69204(121) ⇒738.36988

Y(122) = 291.63304 + 3.69204(122) ⇒742.06192

Y(123) = 291.63304 + 3.69204(123) ⇒745.75396

Y(124) = 291.63304 + 3.69204(124) ⇒749.44600

Y(125) = 291.63304 + 3.69204(125) ⇒753.13804

Y(126) = 291.63304 + 3.69204(126) ⇒756.83008

Y(127) = 291.63304 + 3.69204(127) ⇒760.52212

Y(128) = 291.63304 + 3.69204(128) ⇒764.21416

Y(129) = 291.63304 + 3.69204(129) ⇒767.90620

Y(130) = 291.63304 + 3.69204(130) ⇒771.59824

Y(131) = 291.63304 + 3.69204(131) ⇒775.29028

Y(132) = 291.63304 + 3.69204(132) ⇒778.98232