# FINANCIAL PERFORMANCE ANALYSIS OF POWER GENERATING COMPANIES IN INDIA

A Thesis Submitted

To

**Sikkim University**

In Partial fulfilment of the requirement for the

**Degree of Doctor of Philosophy**

By

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*Dedicated to My*

*Loving Mother*

*&*

*In Memories of My*

*Beloved Father*

*Lt. JB. Rai*

*Respected Baraju*

*Tilay Rai*

## Certificate by Supervisor

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### CERTIFICATE

This is to certify that the thesis entitled **"Financial Performance Analysis of Power Generating Companies in India"** submitted to Sikkim University, Gangtok, in partial fulfilment of the requirements of the award of the degree of Doctor of Philosophy in the Department of Management, Sikkim University embodies the result of bonafide research work carried out by Aditya Rai under my guidance and supervision.

I recommend this thesis to be placed before the examiners for evaluation.

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(Aditya Rai)

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## DECLARATION

I, Aditya Rai hereby declare that the research work embodied in the thesis titled "**Financial Performance Analysis of Power Generating Companies in India**" submitted to Sikkim University for the award degree of Doctor of Philosophy, is my original work. The thesis has not been submitted for any other degree of this University or any other University.


Signature & name of Research Scholar

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***“Om Ah Hum Vajra Guru Padma Siddhi Hum”***

- **Aditya Rai**

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## List of Abbreviations

| Acronym | Expanded Form |
|---|---|
| AA | Average Assets |
| ADJ NI | Adjusted Net Income After Tax |
| ANCOVA | Analysis And Covariance |
| APSEB | Andhra Pradesh State Electricity Board |
| AR | Account Receivables |
| ARIMA | Autoregressive Integrated Moving Average |
| BSE | Bombay Stock Exchange |
| BU | Billion Units |
| CA | Current Asset |
| CEA | Central Electricity Authority |
| CL | Current Liabilities |
| COES | Cost Of Energy Source |
| EBIT | Earnings Before Interest And Tax |
| EDC | Expenditure During Construction |
| ENERGYDEV | Energy Development Company Ltd |
| EPS | Earnings Per Share |
| FDI | Foreign Direct Investors |
| FMCG | Fast Moving Consumer Goods |
| FPI | Foreign Portfolio Investors |
| GARCH | Generalized Autoregressive Conditional Heteroscedasticity |
| GBV | Growth In Book Value |
| GE | Generation Expenses |
| GIPCL | Gujarat Industries Power Limited |
| GOI | Government Of India |
| GNOA | Growth In Net Operating Asset |
| GW | Giga Watt |
| IPS | Irrigation Pump Sets |
| Invt | Inventory |
| KSK | |
| KW | Kilo Watt |
| LITL | Lanco Infratech |
| MAE | Mean Absolute Error |
| MSEB | Maharashtra State Electricity Board |
| MW | Mega Watt |
| NBVENTURES | Nava  Bharat Ventures Limited |
| NEEPC | North Eastern Electric Power Corporation |
| NHPC | National Hydro-Electric Power Corporation |
| NI | Net Income After Tax |
| NPTC (1988) | Nathpa Jhakri Power Transmission Corporation |

| | |
|---|---|
| NPTC (1989) | National Power Transmission Corporation |
| NSE | National Stock Exchange |
| NTPC | National Thermal Power Corporation |
| OI | Other Income |
| Pres D | Present Debt |
| Prev D | Previous Debt |
| REVA | Refined Economic Value Added |
| RMSE | Root Mean Squarred Error |
| ROA | Return On |
| RPOWER | Reliance Power |
| RTNPOWER | Rattan India Power Limited |
| SEB | State Electricity Board |
| Stdev | Standard Deviation |
| SJVN | Satluj Jal Vidyut Nigam Limited |
| TA | Total Assets Invested |
| TD | Total Debt |
| TE | Total Equity |
| T&D | Transmission And Distribution |
| TGARCH | Threshold Generalized Autoregressive Conditional Heteroskedasticity |
| TSE | Total Stock Holder’s Equity |
| THDC | Tehri Hydro Development Corporation |

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# Financial performance analysis of power generating companies in India

## Chapter I

### Introduction

### 1.1 Introduction and design of the study

Power acts as a catalyst for the development of any nation, be it developed, developing or under developed. Per capita consumption of electricity distinguishes between the developed, developing and underdeveloped nations. The importance of electricity can be seen and felt with the time moving ahead. One famous quote "stone age didn't come to an end due to the shortage of stones but due to the invention of more productive alternatives say copper, iron or bronze." Likewise, in the present time the usage of crude oil is high, but the era of crude oil will also come to an end not because crude oil will be scarce but electricity is more of an efficient alternative. It can be assumed that the use of electricity will increase in the near future. The journey has already started with the introduction of electric cars by few companies. Not only in the automobile sector but the revolution had already started in various other sectors too from agriculture, banking, FMCG, services, IT, manufacturing to all other important sectors. With the invention of new technologies in the agriculture sector, the demand for electricity has increased. The efficiency in the agricultural sector will not improve by just depending on the monsoon. Even the World Trade Organisation has been effectively promoting the use of information technology as an integral part of farming sector around the world. Now concepts like satellite farming also has already started in many developed foreign countries. Various machineries are used in farming like groundnut digger machine, farm tiller machine, mushroom machinery, hay baler, mini rice mill, farm cultivator, farm machinery, mist blower, macerator, multicrop cutter threshers, tractor thresher, rice vacuum emasculator, mould remover, potato grader, sugarcane strubber, farm machineries, gravity separator, farm reaper, better baling, farm plus laga, Panja farm machinery and mini corn thresher etc. All these machineries demand the use of electricity. Electric tractors are also already in the make. This is only one sector; other sectors too have already upgraded or is upgrading to new technologies.

Without the use of electricity life is unimaginable from charging mobiles, laptops, to use desktops, irons and watching televisions etc., even in kitchen foods are prepared using the electricity. Every room is lighted by the electric bulbs, from fans to air conditioners, everything is powered by electricity. Even the cars in future will be powered by electricity as already notified by the government of India. Some companies have already started manufacturing electric cars as pilot projects. In short electricity has become the main blood of our life, it suffices the needs from necessary till luxury. Understanding the importance of electricity, the government of India has passed a resolution of equal rights to get the benefit of electricity irrespective of caste creed and social status. The fact cannot be denied with the use of electricity we have reached the level of development we are in right now. Without electricity one cannot dream of achieving the heights of development humans have achieved so far.

Electricity plays a vital part in the growth of any country’s economy. Without the use of electricity, one cannot think about finishing many of the everyday jobs be in household activities or industrial activities. Even the Government of India has come up with many schemes to improvise the power generation capacity in India. The Government of India has specially focused on the renewable energy, even though still the major part of power is produced using the coal and hydro. Such an important sector which supports all the other sector is facing a major problem. Power sector is segregated into power generation, transmission and distribution. The main focus is in the power generation as it is the main source of supply. Life comes to standstill without electricity.

There are many players in the sector on the basis of ownership like private ownership, government ownership and on public private partnership. The power generation companies in India is segregated according to the different types of ownership and different fuel mix in the energy portfolio. Renewable energy is playing a very vital role in the changing weight of energy portfolio.

## 1.2 Scenario of electricity generation in India

According to the ministry of power the power generation in India is in a growth trajectory, the overall growth of power generation is as follows: -

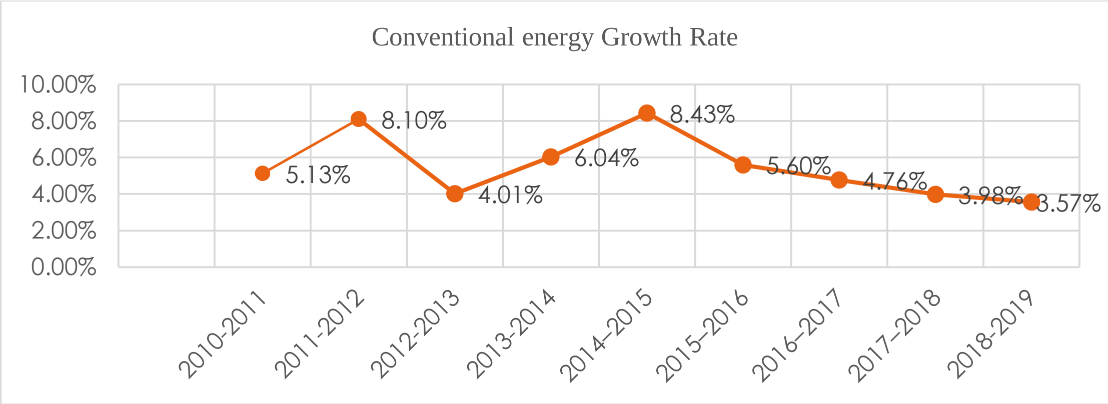
Table: 1.a Details of power generation growth (Conventional) in India.

| Year | Power generation in billion units (BU) | Growth rate |
|---|---|---|
| 2009–2010 | 771.551 BU | |
| 2010–2011 | 811.143 BU | 5.13% |
| 2011–2012 | 876.87 BU | 8.10% |
| 2012–2013 | 912.056 BU | 4.01% |
| 2013–2014 | 967.15 BU | 6.04% |
| 2014–2015 | 1048.673 BU | 8.43% |
| 2015–2016 | 1107.386 BU | 5.60% |
| 2016–2017 | 1160.141 BU | 4.76% |
| 2017–2018 | 1206.306 BU | 3.98% |
| 2018–2019 | 1249.337 BU | 3.57% |

Source: Ministry of Power.

The power generation in the above table includes generation from the conventional sources only. The growth rate for the power generation using conventional source is not very impressive in India. The same has been depicted by the chart in next page.

Chart 1.a Power generation growth rate (Conventional source of energy)




Source: Created by the researcher.

As depicted in the above Chart 1.a, the growth rate of the power generation in India using the conventional sources of energy is having a downward trend. The growth rate from 2010–11 to 2013–14 was quite volatile but after the year 2015–16 to 2018–19 the growth rate has fallen sharply.

Table: 1.b Category wise generation performance (2017–2018).

| Category | Growth rate |
|---|---|
| Hydro | Reduced by 3.06% |
| Thermal | Increased by 4.31% |
| Nuclear | Increased by 1.13% |
| Bhutan import | Increased by 14.94% |
| Renewables | Increased by 24.88% |
| Overall growth rate | 5.35% |

Source: Ministry of Power.

The total installed capacity of power in India as on 31st Jan 2019 is 3,49,288MW. The contribution of state is 24%, central 29.7% and private sector 46.1%. The composition of total thermal is 63.9%, hydro 13%, nuclear 1.9%, renewable 21.2%. It is quite clear from the data sets and discussions that the growth rate of power generation through conventional sources of energy is decreasing and the growth of power generation through non-conventional sources of energy is increasing. Examples for different forms of non-conventional energies are wind energy, solar energy, bio energy, ocean energy, hydro energy, energy extracted from wastes etc. Jagran Josh, (2015), India has a capacity of 1,95,000MW of non-conventional sources of energy out of which solar energy is 31%, ocean energy (including geo thermal) 30%, wind energy 10% and biomass 26%. (Ministry of Statistics and Programme Implementation, Government of India, (2018), Solar energy is one of the fastest growing sector in the renewable (non conventional) segment, due to its abundance and potential in India. Within the year 2016–17, the country has already installed the solar power with a capacity of 12.28GW as compared to only 6.76GW in the previous year. The impressive growth rate of 81.65% within a period of one year.

### 1.3 Background of power sector (international)

The history of power generation is no more befuddling than the financial position of the power generating companies in the present-day ratio. On one end the western world claims to have first started the power generating techniques and in the other end the Atharvaveda script claims to tell a different story. The aim of this thesis is not to justify whose claim is right but it is of immense importance to put forward the facts. The Vedic scriptures which are older than Indus valley civilization or most of the other modern civilization claims to have mentioned about the use and techniques of electricity generation. According to Devi Chand, translator of Kanda (Book) XX of the Atharvaveda, the Vedic literature is not just about mythology but more about science. Devi Chand have translated many of the hymns related to electricity mentioned in the Atharvaveda.

Chapter 2: Hymn XV verse 2: Adha te vishwamanu haasadishtaya aapo nimneva sevanaa havishmatah yatparvate na samasheeta haryata indrasya vajrah shnathita hiranyayah. Translation:

Devi Chand, *"Just as all productive works of the manufacturer depend upon waters flowing down with speed, so do all the desired objects of him depend upon you (Electricity), as its powerful striking force cannot be obstructed by any cloud, or mountain in the way. It smashes all impediments, with its radiant energy".*

The above hymn clearly states that the people of Vedic society was aware about the uses and the process of electricity generation through the use of hydro power.

According to western literatures Englishman Stephen Gray demonstrated electric conduction for the first time due to which glass friction generators were invented in Germany, Layden (1740). Benjamin Franklin carried forward the work of Stephen Gray which later on led to the invention of battery by Alessandro Volta in 1800. In 1808 Humphry Davy came up with the concept of arc lamp after which Hans Christian Oersted showed the relationship between electricity and magnetism. Michael Faraday and Joseph Henry made a revolution by inventing electric motor in 1820, also it was introduced that the electric current can be produced in a wire moving near a magnet–which was the concept of generator. Frenchman Hippolyte Pixii invented first rudimentary dynamo in 1832 after which in 1860 Antonio Pacinotti took it to next level by making it possible to continuously supply direct current power. After many years i.e., 1879 Thomas Edison came up with an idea of less powerful incandescent lamp.

### 1.4 Background of power sector in India

Slowly, India also after its independence in 1947 saw different phases in the power sector. The country has its own story to tell when one recalls the history of power sector. The Britishers first set their power plants in India after opening of power plants in England and America. Calcutta got the opportunity to have its first Electricity Corporation in whole of India as the Britishers had first set Calcutta as the British India Capital. Also, being the Industrial region Calcutta could place a high demand for electricity. Darjeeling due to its geographical advantage and the area used as sanatorium by the Britishers got the opportunity to have its first hydropower plant in India. The demand for electricity could be sufficed by the tea industry which was set in Darjeeling. So according to the records Darjeeling has installed the first hydel power plant in India Sidrabong. The total capacity of the Sidrabong hydel power station was 130kW. Sidrabong hydel power station in Darjeeling was commissioned in the year 1896. This station was installed mainly to supply electricity in the Darjeeling tea plantations. Even though at the start its electricity power generation capacity was only 130kW, later on in 1933 additional 1000kW was installed to supply power in the other parts of West Bengal. After three years, that is in 1899 after the setting up of Darjeeling power station, Emambagh power station was set up which became the first thermal power station in India. Emambagh power station was commissioned by Calcutta Electricity Supply Company, later on due to increasing demand for electricity additional power station were installed in Howrah, Alipore and Ultadanga. The capacity of these three power stations combined was 2065kW. Ultadanga was the largest power station with a capacity of 1200kW followed by Alipore power station 700kW and Howrah power station 165kW. The main objective of all these power stations was to supply power to jute industry in and around Calcutta.

South India too could not remain aloof from the developments of power sector. The importance and need of electricity were felt in South India too. The effect of which was the installation of Sivasamudran power station in the year 1902. This power station was setup in Mysore and was commissioned under the Cauvery power scheme. The main motive behind setting up power station in Mysore was to supply electricity in the Kolar gold mines.

### 1.5 Brief history of power sector in India

India witnessed its first hydro-electric station at the end of $19^{th}$ century in 1897 at Darjeeling. Calcutta Electricity Supply Corporation was the first corporation in India to supply the electricity in 1899. Unfortunately, the life of hydroelectric dam of Darjeeling ended in the month of August 2016 after generating electricity for more than hundred years. The structure of power sector in India can be segregated within the following years – 1910, 1948, 1974–79, 1991 and 2003. Localized private electricity supply in urban areas from 1900 to 1948 used to supply electricity. In 1910, electricity act was passed to regulate the power sector by then the British Indian Government. After the independence, India had to manage the power sector in a very efficient way, so as to at least suffice the current demand and future demand for making of modern India. So, in order to check the monopoly of private players "Electricity (supply) Act 1948 was passed. Central electricity authority (CEA) at the central level and state electricity boards (SEB) at state levels was constituted for the first time in India. CEA was constituted as to have control over the entire power sector. SEA was to mainly focus on generation, transmission and distribution of electricity at the state level. It was from the year 1974 to 79 in the fifth five-year plan, the government of India took an active part in the generation and bulk transmission of power at the state levels. The main aim of GOI in doing so was to support the state in both the generation and transmission of electricity.

The CEA took the responsibility of setting up large power projects in meeting the power requirements within the country.

Different corporations were set up after these five-year plans –

- National thermal power corporation (NTPC), 1975.
- National hydro-electric power corporation (NHPC), 1975.
- North eastern electric power corporation (NEEPC), 1976.
- Tehri hydro development corporation (THDC), 1988.
- Nathpa jhakri power transmission corporation (NPTC), 1988.
- National power transmission corporation (NPTC), 1989 now named as power grid.

After the liberalization of Indian economy in 1991. Power sector too has witnessed participation from the private players in the generation of electricity. In the year 1998 Electricity Regulatory Commission Act was passed. The Act constituted electricity commissions both at the centre and the states.

- Electricity Act 1910

  The Indian Electricity Act 1910 was the first electricity act passed by the British Indian Government in India. It contained the pertinent provisions concerning generation and supply of power in India. The main aim of passing this act was also to bring power sector in the purview of legal jurisdiction.

- Electricity Act 1948

  It was the first post-independence Electricity Act passed in India. This Act initiated the birth of Central Electricity Authority of India and State Electricity

Boards in India. State Electricity Boards function within the states under the central electricity authority for the proper planning and synchronisation in the national level.

- Electricity Act 1991

  The Electricity Act 1948 was amended in the year 1991 to encourage the private players in the power sector of India. Private participation was allowed only in the generation of electricity in order to save SEBs from the competition.

- Electricity Act 1998

  The main objective of this act was the formation of regulatory bodies of power sector in each state of India. In each state, State Electricity Regulatory Commission was formed after the enactment of this act.

- Electricity Act 2003

  Electricity Act 2003 was mainly enacted to restructure the power sector in India. The main objective of the act was to separate generation, transmission and distribution corporations into single entity in order to make it efficient by encouraging competition.

- Electricity (Amendment) Act 2007The main aim of the act was to make power sector commercially viable and increase the growth rate at the same time. The act also has focused on the harmony and coordination of state and centre.

### 1.6 Segregations of power sector in India

Power generating companies are just a fragment of power sector companies in India. Power sector means the sector which focuses on the production and trading of electricity in narrow sense. Power sector in India is divided into three segments viz., power generating companies, power transmission companies and power distribution companies. Power sector companies are under the control of central government, state government, private owners or stake holders, partnership between central government and state government, central government and private owners and state government and private owners. Indian power sector in 21st century has transformed a lot since its inception from the 19th century. Electricity Act 2003 specifically has stated to separate power generating companies, power transmission companies and power distributing companies into separate entities. Earlier this three power companies were not distinctly separated. Still it is not hundred percent segregated as mandated by the Electricity Act of 2003.

Power generating companies also operate under the control of central government, state government, private owners or stake holders, partnership between central government and state government, central government and private owners and state government and private owners. Most of the power generating companies are listed in Bombay Stock Exchange (BSE) and National Stock Exchange, except few controlled by the state government. There are eighteen power sector companies listed in Bombay Stock Exchange relating to power generation, power transmission and power distribution companies. Out of eighteen power sector companies listed in BSE, ten companies are specifically related to power generating companies.

### 1.7 Power generating companies listed in Bombay Stock Exchange

Different Electricity Acts were passed in India from 1910 to 2007. The main objective of all the acts were directly or indirectly related with the growth of the power sector in India. The purpose of the electricity Act 1910 was to bring the power sector within the legal jurisdiction. Electricity Act 1991 was crucial as it encouraged the private players as well within the power sector in India. The main objective of the Electricity Act 2003 was to separate generation, transmission and distribution corporations in order to encourage competition and efficiency. Ultimately Electricity (Amendment) Act 2007 was passed to make power sector commercially viable and increase the momentum of growth rate within the power sector in India.

On an explicit note, The Acts from 1910 to 2007 focused on the following objectives:

- To bring power sector within the legal jurisdiction.
- To encourage private players.
- To separate generation, transmission and distribution entity.
- To make power sector commercially viable.
- To increase the momentum of the growth rate in the power sector.
- To encourage transparency.

Many private players entered into the power sector as they were encouraged by the various Electricity Acts. Even the Government players were affected in many ways both positively and negatively.

Stock market is the pillar of any country's economy, as it provides capital to various sectors. Various types of Investors (Retail, Institutions, FPI, and FDI) provides capital to various types of organisations.

In this context, power sector too cannot remain aloof from the benefits of capital accumulation through stock market. Various power sector companies both government and private entities have been listed in the stock market. Stock market is not just the place for capital accumulation but it also acts as the mirror of the company listed within it.

There are more than 30 utility companies listed in the BSE (Bombay Stock Exchange) and NSE (National Stock Exchange) in India. The listed power sector companies belong to both the government and private ownership. The area of their operations belongs to generation, distribution and transmission of electricity. All the power generating companies will be selected from the overall power sector companies listed in Bombay Stock Exchange.

Table 1.c Utilities related companies listed in BSE.

| Sl. No | Security code | Security name | Security group |
|---|---|---|---|
| 1 | 532898 | POWERGRID | A |
| 2 | 532155 | GAIL | A |
| 3 | 500390 | RELINFRA | A |
| 4 | 500400 | TATAPOWER | A |
| 5 | 532939 | RPOWER | A |
| 6 | 532430 | BFUTILITIE | A |
| 7 | 532779 | TORNTPOWER | A |
| 8 | 532754 | GMRINFRA | A |
| 9 | 533096 | ADANIPOWER | A |
| 10 | 500084 | CESC | A |
| 11 | 532514 | IGL | A |
| 12 | 533098 | NHPC | A |
| 13 | 532524 | PTC | A |
| 14 | 539957 | MGL | A |
| 15 | 533148 | JSWENERGY | A |
| 16 | 532555 | NTPC | A |
| 17 | 539254 | ADANITRANS | A |
| 18 | 532708 | GVKPIL | B |
| 19 | 533269 | WABAG | A |
| 20 | 533292 | A2ZINFRA | B |
| 21 | 522275 | GET&D | A |
| 22 | 517300 | GIPCL | B |
| 23 | 532627 | JPPOWER | B |
| 24 | 513683 | NLCINDIA | A |
| 25 | 533122 | RTNPOWER | A |
| 26 | 513023 | NBVENTURES | A |
| 27 | 532997 | KSK | B |
| 28 | 532702 | GSPL | A |
| 29 | 533206 | SJVN | A |
| 30 | 540750 | IEX | B |
| 31 | 532778 | LITL | B |
| 32 | 534597 | RTNINFRA | B |
| 33 | 532219 | ENERGYDEV | B |

Source: S&P BSE Utilities.

The utility sector signifies stocks relating to electric, gas and water firms and also integrated firms. The electric or power sector companies again is segregated into generation, transmission and distribution of electricity.

Table 1.d List of power generating companies listed in BSE.

| Sl.no | Security code | Security name | Security group |
|---|---|---|---|
| 1 | 532939 | RPOWER | A |
| 2 | 533098 | NHPC | A |
| 3 | 532555 | NTPC | A |
| 4 | 517300 | GIPCL | B |
| 5 | 533122 | RTNPOWER | A |
| 6 | 513023 | NBVENTURES | A |
| 7 | 532997 | KSK | B |
| 8 | 532778 | LITL | B |
| 9 | 533206 | SJVN | A |
| 10 | 532219 | ENERGYDEV | B |

Source: BSE.

The above-mentioned power generating companies in Table 1.d will be selected for the research.

Basis of selecting the power generating companies in a sample are as follows: -

1) The company should be the part of power sector in India.
2) The company should be listed in the Bombay stock exchange.
3) The company's primary focus should be in the power generation.
4) The company should be controlled by the central government, state government and private promoters.
5) Top 6 power generating companies having the highest market capitalization will be selected both from the government owned and privately-owned power generating companies.
6) The minimum market capitalization should be more than 100 crores.
7) Top 6 power generating companies based on their total installed power generation capacity will be selected both from government and privately-owned corporations.
8) The power generating company should not be producing electricity in a captive basis.

Table 1.e List of power generating companies on the basis of selection criteria.

| Sl.no | Company name | Part of power sector company | Listed in BSE | Primary focus | Government / private stake | Market capitalization | Installed power generation capacity |
|---|---|---|---|---|---|---|---|
| 1 | RPOWER | Yes | Yes | Power generation | Private | 1728Cr | 6000MW |
| 2 | NHPC | Yes | Yes | Power generation | Central Government | 22980.88Cr | 7071.2MW |
| 3 | NTPC | Yes | Yes | Power generation | Central Government | 125809.32Cr | 53,651MW. |
| 4 | GIPCL | Yes | Yes | Power generation | State Government | 1056.49Cr | 1009.4MW |
| 5 | RTNPOWER | Yes | Yes | Power generation | Private | 673.27Cr | 2700MW |
| 6 | NBVENTURES | Yes | Yes | Captive basis | Private | 1607.18Cr | _ _ |
| 7 | KSK | Yes | Yes | Power generation | Private | 41.13Cr | 2072MW |
| 8 | LITL | Yes | No | Power generation | Private | 138.87Cr | _ _ |
| 9 | SJVN | Yes | Yes | Power generation | Central Government & State Government. | 9451.17Cr | 4018MW |
| 10 | ENERGYDEV | Yes | Yes | Power generation | Private | 35.67Cr | 310MW |

Source: Compiled by the researcher.

The data in the above Table 1.e gives the clear picture as to the size of the different power generating companies in terms of market capitalization. Out of 10 power generating companies listed in the BSE, three power generating companies are controlled by the central government, one power generating company is under the state government and the other six power generating companies are controlled by the private promoters. All the three power generating companies controlled by the central government has the highest market capitalization as compared to the power generating companies controlled by the state government and private promoters. Even though the market capitalization of the private power generating companies are low, it is very much important to test the financial performance as it also contributes a lot in the generation of the power. A comparative analysis among the private, central government state government owned power generating companies will be conducted using various financial ratios. In terms of installed power generation capacity too government power generating companies have high capacity as compared to the privately-owned power generation companies. Out of ten power generating companies, three are governed by the central government one by the state government and the remaining six are controlled by the private promoters. Out of six privately-owned power generating companies, one company is suspended by the exchange (BSE) and another company produces electricity only in the captive basis, and the other two power generating companies have a market capitalization less than 100Cr. so the two power generating companies amongst the private power generating companies is selected for the purpose of the study.

Table 1.f: List of private power generating companies on the basis of market cap and installed capacity.

| Sl. no | Company name | Market capitalization | Installed capacity |
|---|---|---|---|
| 1 | RPOWER | 1728Cr. | 6000MW |
| 2 | RTNPOWER | 673.27Cr. | 2700MW |

Source: Compiled by the researcher.

From the above Table 1.f; it is very clear that 2 companies having the highest market capitalization and total installed capacity are RPOWER and RTNPOWER. So, these two companies will be included in the sample from the population of the private power generating companies listed in the Bombay Stock Exchange.

Table 1.g List of Central Government owned power generating companies.

| Sl. no | Company name | Market capitalization | Installed capacity |
|---|---|---|---|
| 1 | NTPC | 22980.88Cr. | 7071.2MW |
| 2 | NTPC | 125809.32Cr. | 53,651MW. |
| 3 | SJVN | 9451.17Cr. | 4018MW |

Source: Compiled by the researcher.

All, the three power generating companies are selected for the purpose of the study, as mentioned in the above Table 1.g, as all the three power generating companies qualify all the factors set to be kept as the sample for the purpose of the study.

Table 1.h List of State Government owned power generating company

| Sl. no | Company name | Market capitalization | Installed capacity |
|---|---|---|---|
| 1 | GIPCL | 1056.49Cr. | 1009.4MW |

Source: Compiled by the researcher.

GIPCL is the only power generating company listed in the Bombay Stock Exchange and it qualifies all the criteria kept to be selected as the sample to fulfil the purpose of the study. Hence GIPCL is also included in the sample to conduct the study.

Table 1.i List of power generating companies selected as sample.

| Sl.no | Company name (Government) | Sl.no | Company name (private) | Sl.no | Company name (State) |
|---|---|---|---|---|---|
| 1 | NTPC | 1 | RPOWER | 1. | GIPCL |
| 2 | NHPC | 2 | RTNPOWER | | |
| 3 | SJVN | | | | |

Source: compiled by the researcher.

The above Table 1.i gives the final picture as to which companies are included in the sample. The companies are not segregated on the basis of the source which they are using to generate the electricity, as this will lead to more confusion and the financial data related to each source is not available freely, so keeping the time constraint in mind the research sample has been designed accordingly. This also has become one of the major limitations of the study but suggestions can be given after the results will be derived from the financial data. The financial ratio has been calculated considering the nature of the power generating companies. The importance and advantage of using financial ratio is that irrespective of the size of the companies, it allows intercompany comparison.

### 1.8 Details about the sample power generating companies

RPOWER

RPOWER or Reliance Power Limited belongs to the Reliance group which is one of the largest conglomerates in India. The main objective of establishing RPOWER by the reliance group is to develop, construct and operate power project in India and as well as abroad. The company has a capacity of 6000MW electricity generation capacity. The company has a diversified power generation plants through the usage of Coal, Gas, Solar, Hydro, wind, and other renewable energy. The company has projects under development in Himachal Pradesh Hydro project (138MW), Uttaranchal Hydro project (400MW), Arunachal Pradesh Hydro project (4220MW), Chitrangi Hydro project (3960MW), Samalkot Hydro project (2400MW), Krishnapatnam hydro power (3960MW). The operational projects are in Rajasthan Solar CSP 100MW, Solar PV 40MW, Rosa 1200MW, Madhya Pradesh Butibori 600MW, Sasan 3960MW, Maharastra wind 45MW.

NHPC

NHPC also known as National Hydroelectric Power Corporation was formed in the year 1975, the sole objective of the corporation was to generate electricity with the use of Hydro power. As per the record mentioned in its official website NHPC has generated 22625 million units of electricity as on 2017–2018. The total completed projects relating to Hydro including joint venture are 22 with a capacity of 6971.2MW, total wind project 1 with a capacity of 50MW and total solar project 1 with a capacity of 50MW. The company has total 24 completed projects with a generating capacity of 7071.2MW. It has 2800MW electricity generating projects under construction, 8 projects having a capacity of 5133MW which is awaiting clearances and other various projects which is under investigative stage, joint venture and projects on turnkey basis with a generating capacity of 12522.25MW.

NTPC

National Thermal Power Corporation (NTPC) was established in the year 1975. The main objective of the NTPC was to help in growing the electric generation capacity in the country. It started generating electricity using fossil fuels and later on it transformed itself into one of the biggest power generators in India. It started generating electricity using hydro, nuclear and other renewable sources too. NTPC was given the status of Mini Ratna in the year 2018. It has a total commissioned project worth 53,651MW.

GIPCL

Gujarat Industries Power Company Ltd. was established in the year 1985, under the law of Government of Gujarat. The total installed projects of GIPCL is 1009.4MW. Having its head office situated in Vadodara Gujarat, GIPCL has its aim to be a leader in the national level power sector of India. The corporation generates electricity using various means like, gas, lignite, solar and wind plants. It is also focusing in the renewal source of energy to achieve the Government of India mission of achieving 175GW of renewal energy latest by 2022. The company has a capacity of 75MW in renewable energy segment.

RTN Power

Rattan Power belongs to the Rattan India group. This power generating corporation focuses in the use of coal and thermal energy. It has an installed capacity of 2700MW (Amravati Thermal Power Projects) and 2700MW Nasik Thermal Power Projects. Some of the projects are commissioned and some of the projects are yet to commission.

SJVN

Satluj Jal Vidyut Nigam Limited (SJVN) is categorised as Mini Ratna category I and is controlled by the Government of India and Government of Himachal Pradesh. Government of India holds 62.68% share and Government of Himachal hold 26.85% share, remaining share is in hold by the general public. The company has a total power generating capacity of 4018MW. SJVN focuses in thermal, hydro, wind, and solar energy.

## 1.9 Objectives of the study

This study has four main objectives

1) To conduct financial performance analysis for the power generating companies in India listed in the Bombay Stock Exchange (BSE).
2) To segregate the financial performance on the basis of ownership.
3) To check the presence of seasonality on the data points of few important financial metrics for the selected power generating companies in India.
4) To find the impact of financial metrics as reported in the annual report by the power generating companies on its share price volatility of the selected power generating companies listed in Bombay Stock Exchange (BSE).

   The annual financial reports published by the power generating companies through the Bombay Stock Exchange has been used to explore objective one and two. Financial ratio has been calculated in order to study the financial performance of the selected power generating companies listed in the Bombay Stock Exchange, India. Some of the financial ratios are customized considering the nature of the power generating companies. After calculating different important financial ratio, the companies' performance is categorized on the basis of rank score ascertained according to their performance. The objective three, which is related in confirming the presence of patterns or seasonality in the important financial metrics of selected power generating companies, the sequential plot and cycle plot has been used. In order to justify the last objective that is, to find the impact of financial metrics as reported in the annual report by the power generating companies on its share price volatility of the selected power generating companies listed in Bombay Stock Exchange (BSE), non-parametric Wilcoxon Signed rank test has been used.

# Chapter II

## Literature review

### 2.1 Literature related to financial performance analysis

Paun (2017), The researcher has focused in the study of the financial performance of power sector companies. His area of the study was Romania. The main objective of his article was to understand if any differences existed in the financial performance among the different energy producers. The findings of the study was that the companies which were using fossil fuel to generate electricity, such companies were performing better. The other important finding of the study was that most of the power sector companies did not had a sound financial position. The paper was concluded by mentioning the following suggestion innovation by the power sector companies may help improve their profitability.

Vyas (2015), It was found that NTPC's financial performance was better out of the five power sector companies that were selected for the pupose of study. The findings of the study was that the power sector as whole was depending too much in the supply of coal. The researcher suggested through this paper, that the power sector should focus more in the renewable sources of energy rather than only depending on coal. The researcher also mentioned about the importance of quality and reliability which may act as a catalyst for the growth of the country economically.

Khurana and Banerjee (2015), Clearly mentioned about the fund allocated by the Cabinet Committee on Economic Affairs in the year 2012 for the power generation sector in India. A total of Rs1.9 trillion was sanctioned to revive the power generation sector. The main objective of the study was to conduct financial performance mainly of the State Electricity Boards. They conducted this study for a period of eight years from

2003 to 2011. This article has mainly focused on the financial crises of Indian power sector in 2011.

Ranganathan (2005), the huge loss of Rs 4.56Cr. in the year 1992 and Rs 33Cr. in the year 2001–02 in the power sector was mainly due to the high transmission and distribution losses (T&D). Due to the high T&D loss, there was a high increase in the cost price gap. The researcher has genuinely revealed the total loss faced by the power sector companies in India and therefore proved the weak financial position of various companies in the Indian power sector.

Sankar (2003), the only State Electricity Board to be running in profit was Andhra Pradesh State Electricity Board (APSEB) till the year 2000. It was noted by the researcher that after the year 2000, the APSEB was the highest loss-making firm. The article has rationally justified that even the profit-making firm can turn into a huge loss-making firm. The findings of the article noted that the main reason for the loss was, tariff rate could not be hiked as required by the firm.

Kannan & Pillai (2001), all most all the State Electricity Boards (SEBs) were found to have high number of employees, normally which was higher than what was required. This situation of over employed staffs was found both in the administrative and technical level. The substantial losses which were faced by many SEBs was the compensation structure of government. The suggestion as inked in this article was that the financial condition of the SEBs could improve if the SEB's were allowed to function as autonomous-cum-service Corporation, which is already mentioned in the Electricity Act.

Das & Parikh (2000), according to the researchers, among all the loss generating SEBs, Maharashtra State Electricity Board (MSEB) was running in profit. The overall loss of all the SEBs in India came to around Rs10, 684Cr in the year 1997–98. The main findings of this paper as to what made MSEB profitable was, better technology and improvement in all the technical aspect, increase in tariff rate, hiring of efficient managers, restructuring capital structure, all this strategy made MSEB one of the most profitable SEBs in India during that time period, when all the other SEBs were facing huge losses.

Rai & Prakash, (2019), have explained the importance of power generating sectors. They have nicely depicted the importance of power sector in building any country's economy.Their main area of study was the power generating companies listed in the Bombay Stock Exchange (BSE). It was found that the government owned power generating companies performed much better as compared to that controlled by the private players.

Reddy & Sumithra (1997), studied various factors that affected the financial problems faced by the Karnataka SEB. The SEB of Karnataka could not keep itself in isolation from the effects of the other loss-making firms. The findings of this article have highlighted many important points, some of which are, in order to conceal the T&D losses, the Karnataka SEB gave other reason, relating to irrigation pump sets (IPS) which was not true.

### 2.2 Literature relating to power sector

Kapur (1983), the worldwide scenario relating to power consumption have changed drastically. Now the consumption pattern is more based on the renewable source of energy like hydro, solar, wind energy etc. rather than steam energy. The journey started from steam energy to crude oil and to various other renewable source of energy. The suggestion in the article is that India too should focus in the renewable source of energy, so that the country can cut the level of dependence on coal and crude oil.

Singh (1990), has come up with a very insightful article, where he has logically explained the points related to the problems created by the large dams. He has noted in his article that the large dams are not efficient technology wise, due to the size of it. In the latter half of this article the researcher has proposed that smaller dams are more profitable as compared to the larger dams. The reason explained behind this is that the technology in smaller dams could be controlled easily as compared to that with the larger dams.

Sant & Dixit (1996), the main objective of this article was to see whether the farmers can afford the marginal increase in the power tariff rate. The findings of their work were, the farmers had the potential in bearing the marginal increase in tariff rate. This was because the water which was used for non-food cash crops was supplied largely from the irrigated water and due to which there would be no adverse effect on the food grains price in the market.

Wood & Kodwani (1997), have highlighted in their paper, that it is better to segregate generation, transmission and distribution power companies in India. They also have noted the importance of privatising the electricity supply industry in India. This strategy of Indian government would give an extra edge to develop the country economically.

Dixit, Sant, & Wagle, (1998), the main objective of the paper was to analysis the power sector model of Orissa. The State had framed the model in consultation with the World Bank. But the reality was, even though the Orissa model was successful, the World Bank was unaware about many ground realities relating to the power sector in Orissa.

D'Sa, Murthy, & Reddy, (1999), the liberalization of 1991 acted as a doorway for the private players to start power generation. It was also good for India as the capacity for power generation increased due to this initiative to allow private players by the Indian Government. Even though the power generation was increased, their problems were now faced by the private players in initiating the process of power generation. Lot many challenges and hindrances too paved the way. There were many complaints by the private players such as problems relating to financial arrangements, in obtaining clearances, agreement contracts related to fuel supply and litigation. The private sector played a vital role in increasing the power generation in the country but without considering the transmission and distribution capacity. This created problem for all power generating companies leading to needless competition. The government of India had to invite private players as they did not have surplus funds to invest in the sector. An invitation to the private players was the last resort. Irrespective of the increasing private players, the government owned power generating companies still hold an important place in the country.

Baijal (1999), the researcher has portrayed that the power sector will become efficient if the privatisation of the power sector is encouraged. The privatisation will help in removing the various lacunas when owned by the government, which will ultimately speed up the process and increase efficiency of the power sector companies.

Ranganathan, Restructuring Indian Power Sector (1999), after reviewing the article written by Pradip Baijal, Special Secretary of Power, and the researcher noted that there should be more competition in the wholesale electricity market. He pointed out that the competition is good only if it is healthy, which will ultimately give some winning advantages to power sector and also improve the financial of the power companies.

Gurtoo & Pandey (2001), according to the researcher many reforms took place in the power sector of Uttar Pradesh but the reality was that the reforms was just a desperate move to cover past mistakes. The reforms were not a conscious and structured planning by the government of Uttar Pradesh. Various reforms have taken place but not all have clear future plans, some are done just to conceal the past errors and mistakes. The plans should be future oriented rather than just concealing the past data/errors. Even small efforts can have an overall impact in the sector.

Phadke & Rajan (2003), the researchers have highlighted how the power sector can achieve financial success. It is not only enough to have private participants in the power sector to improve the financial performance of the overall power sector. The government should also encourage proper competition among the participants in the power sector to achieve the desired results. The researchers in this article have raised many important issues, one of which is only encouraging private players is not sufficient, there has to be the equal opportunity for every participant in the power sector. This can be achieved to some extent by encouraging healthy competition in the power sector.

Santhakumar, V., (2003), has highlighted many important points in this paper. The insight that could be drawn from this paper is that the influence of political party can affect the organisation to a large extent. He has nicely portrayed, how the left front political party affected the power sector in making various reforms in the sector. The pay offs of such anti liberalization is analysed by the researcher, the findings of this paper is that the middles class received the subsidy rather than the lower class. The other findings of the study is that some political parties had a different stand on the participation from the private players in the power sector. But still such parties could not take out the biasness in their decisions when it came to giving of subsidy.

Ranganathan, Electricity Act 2003:

Moving to a Competitive Environment (2004), it is observed from this article that the transmission sector has been out from the periphery of the Electricity Act 2003. The other part of the power sector like generation and distribution was encouraged in both creation of the competition and privatisation. It is also highlighted by the paper that due to the absence of competition in the transmission sector, this will ultimately affect the whole power sector.

Mathur & Johal (2004), in the entire value chain, it is known that the distribution segment is the riskiest. The main objective of this paper is to analyse the equity-based return on various risk parameters associated with the power sector companies within the value chain. There are three segments of power sector, power generation companies, power transmission companies and the power distribution companies. Among these three sectors, power distribution should also be taken care of as ultimately these distribution companies sell the electricity only if these companies are profitable and can give money to the power generation companies or else ultimately it will have a negative impact on both the power generating and transmitting companies.

According to Raghavan (2004), according to the paper it is known that the power sector used to be controlled by the private operators during the last quarter of the nineteenth century. Only the urban areas used to be focused by the private operators during those eras.  It is not that in 1991, it was for the first time the door was open to the private players in the power sector. If we gaze through the history initially the electricity was sold by the private players only, only afterwards the concept of social welfare came and the fundamental right to have access on the electricity was introduced. The government took control over the power sector.

Jain (2004), before introducing any reforms by the government of Punjab, to solve the internal problems faced by its state electricity board, as introduced and funded by the World Bank, the government of Punjab should first try to understand its internal problems. This had happened in Orissa too, it is very important to understand the root of the problem. The World Bank may not have access to the problems in the periphery level.

Katiyar (2005), illegal hooking of lines both in domestic and agriculture category was the main reason for T&D losses relating to power companies. One of the reasons for the financial performance of the power companies to get affected is due to the illegal hooking of lines. This problem of illegal hooking exists not only in the domestic category but in the agricultural category too.

Abhyankar (2005), Madhya Pradesh SEB, faced loss mainly due to the bifurcation of the state into two parts, Chhattisgarh got bifurcated from the state of Madhya Pradesh. The power sector in Madhya Pradesh was structured under the shadow of the Asian Development Bank. This also brought no change in Madhya Pradesh SEB. There are many factors for the financial performance of the power companies to get affected, one of the most important is political issues.

According to Sinha (2005), the concept of privatisation, unbundling, corporatisation and regulation is a concept borrowed by the Indian government from the World Bank. The model where the model got implemented was Orissa. This model failed in Orissa. This kind of study has been conducted by some other researchers too, so it is very true that the ground reality has to be first checked by the state government before applying the models set by various international agencies.

Shreekumar, Reddy, & Raghu (2007), Andhra Pradesh Electricity Board (APSEB) is one of the most efficient SEBs in India. The researcher of this paper has added critical insights to it, even though the APSEB was efficient, the increasing demand for the electricity in the rural areas was not considered by the APSEB.

### 2.3 Literature relating to methodologies

DuPont analysis is very efficient in checking the financial performance of any organisation, Mehta (2015). Return on equity is one of the most efficient tools used for financial statement analysis to evaluate company's effectiveness to translate equity into profit or revenues.

Mgbame & Ikhatua, (2013) investigated the effect of accounting information on the share price return volatility in Nigeria using GARCH (1, 1), TGARCH (1, 1) and EGARCH (1, 1) models. The results using this model was found that the accounting information explains and accounts for share price volatility in Nigerian stock market or exchange.

According to Karmakar, (2006) the long-term stock price volatility has been examined using the GARCH (1, 1) and TARCH (1, 1) model. The results using the GARCH (1, 1) model in India was existence of time varying volatility and results using TARCH (1, 1) model found asymmetry in volatility.

Gentry & Shen, (2010), the researcher has focused mainly on the methodology to conduct the financial appraisal of any company in the industry. The article has focused on the ongoing debate between the ways of accounting and stock market of conducting the financial appraisal for the company. Accounting being the past data related process and the market being the future expectation of the investors. So, this paper has tried to give a rational judgement as to whether both the methodology can be mixed or overlapped in conducting the financial performance analysis of any firm. This study has tried to prove that financial performance of the firm is not a single unidimensional construct. Also, it cannot be possible to mix the accounting dimension and stock market dimension to show the complete picture of its financial performance. The researchers have advised to focus on a particular dimension before deciding to accept any methodology and design the hypothesis and theory accordingly to conduct a study on the financial performance appraisal of any company.

Nice, (1991) The article has focused on two of the main aspects to study the financial performance of the organisation, the first one being the comparison between the organisation's expenses and its revenues, normally the researcher has not just studied the comparison but has observed whether the corporation is able to cover its expenses by the revenue. The second aspect being the study of net loss which is the difference between revenue and expenses, the researcher has observed the series of net loss for the different number of years. This study has considered a very important aspect that the age of the organisation also determines the performance of any organisation and ultimately affects the financial performance too. As the newly formed organisation may face a few important problems of coordination among the workers, the new strategy and rules might not be fit for the organisation and inexperience may lead to many errors which will have effect on the financial performance. So, the theory built on this construct is that as the organisation matures it will improve on many aspects and finally the financial performance too. The researcher has used revenue/expense ratio and the net loss per passenger to quantitatively measure the financial performance of the selected corporation.

Capon, U, & Hoenig, (1990), Different variables has been used to study the financial performance of any corporation but it has always been a long debate on which models are appropriate. This paper has conducted meta-analysis using three hundred twenty results published in various renowned sources. The main findings of this paper include that the factors identified in both the ANCOVA and counting methodology to conduct financial performance includes growth, capital investment, industry concentration, advertising and size used as environment variables. Both the counting and ANCOVA methodology recognised growth, low capital investment, firm advertising, market share and R&D. It was also found by the counting methodology that product and service quality, corporate social responsibility, less diversification, lower level of debts, vertical integration to have positive relationships with the firm's financial performance. It is also found as mentioned in many papers that focus on organisational issues, capacity utilisation that more work has to be focused on explanatory variables. The paper has also mentioned that the following variables – marketing expenses, inventory and type of its control, consumer vs. industrial sales, have little effect and have little directional relation to financial performance.

Shashua & Goldschmidt, (1974), the researchers have focused to develop a financial model in-order to evaluate a system more efficiently. They have worked to develop a financial Index as to measure the financial performance of one system to another. This article has been divided into three parts, first part briefly discuses about the methodology, second part explains how probabilistic meaning with a statistical confidence region can be provided for various ratings and in the last part the model has been applied to evaluate the financial performance of Kibbutzes (agricultural firms) in Israel. The researcher has tried to build an Index considering indicators and ratios. The various ratios used by the researcher in this paper are profit margin, capital margin, returns to owners, equity ratio, working capital ratio and activity ratio. The different appropriate weights were assigned to get the required ratings using the following three methods that is egalitarian, value judgement and principal component. The paper concluded by stating that the Index to be effective in measuring the firm's financial performance as all the components mixed in one to make Index will give the results considering different angles. The author has also cautioned to use different and appropriate variables for different industries.

Choi & Wang, Stakeholder Relations and the Persistence of Corporate Financial Performance (2009), in this paper the researcher has kept the nonfinancial-stakeholders as a main variable to examine the affect in the financial performance of any firm. The author has included employees, suppliers, customers and communities. The researcher has tried to study the relationship between the nonfinancial-stakeholders and the firm's financial performance. Many studies have found positive variables between the two variables. The stake holder's relationship was measured by computing the community relations, employee's relations, diversity and environment and product dimensions. To measure the corporate financial performance, return on asset and Tobin's *q* is used by the researcher. Several variables were included as control to check the persistence of profit in the firm i.e., technological knowledge estimated in terms of research and development investment, firm risk in terms of long-term debt to total assets ratio, firm size in terms of natural logarithm of total sales and firm age. The persistence of firm was measured by using the first-order auto regressive models. The final results of this study supported the hypothesis stating high stake holder relation ratings helps firm to earn superior profits and also helps the poorly performing firms to get good results if the firm focuses in improving the stake holder relationship.

Jensen, (1971), the researcher's main objective is to develop analytical classification techniques to evaluate financial performance of a company rather than the existing methods which are more systematic, objective and repeatable in nature by different electronic computers or humans. The various variables used by the researcher to measure the financial performance of the firms were slope of sales/average sales, standard deviation of sales/average sales, earnings per share/closing price, dividends per share/closing price, long-term debt/common equity, slope of closing price/average closing price, standard deviation of closing price/average closing price, slope of number of shares traded/numbers of shares outstanding, standard deviation of number of shares traded/number of shares outstanding.

Palmon & Sun, (1997), the researchers are trying to relate the firm's financial performance with layoffs. For this the researchers have used the data from the New York Times and The Wall Street Journal. The news relating to layoffs were used in order to study the financial performance of the firm using the stock return as the parameter. It was also considered that no other news came within the period of twelve days' time interval. They have computed cumulative abnormal returns for three alternative periods during the publication date of each layoff announcement. They have used *t* statistics in parentheses tests to test the null hypothesis. They also conducted several other nonparametric tests to check whether any of the results are encouraged by a skewed distribution of the return. Three profitability measures such as profit margin, return on asset and return on equity were used. The real sales measure was used after adjusting the inflation.

Bacidor, Boquist, Milbourn, & Thakor, (1997), the researchers have tried to find the better financial measurement techniques, according to them it is very much important for any financial measure to ask how much operating profit is generated by the invested capital to generate profit in any firm. They have used REVA to measure the financial performance of the selected firm. They concluded by writing REVA is a most effective way of measuring financial performance of any firm as this methodology asses a capital charge for a period equal to the weighted average cost of capital times the market value of the firm at the beginning of the period.

Ferguson & Leistikow, (1998), the researcher has conducted the comparative analysis between EVA (Economic Value Added) and REVA (Refined Economic Value Added) which are both a measure of operating performance. They have proved EVA to be more efficient financial measurement tool as compared to REVA. The main difference between EVA and REVA is that EVA is calculated as earnings net of capital charge based on the firm's capital cost and net asset value (net asset is considered as the value of firm's assets and not as market value of the firm's business), REVA is also similar to EVA but the capital charge is based on the firm's market value and not on net asset value.

Albrecht & Thomas, (1998), the researcher has commented that REVA is more efficient tool to measure financial performance as compared to EVA. The researcher has highlighted few but very important points as, capital is measured by the market value in REVA and periodic book earnings are measured as earnings. Accordingly, high market value means the deteriorating present performance of the managers, due to which the managers won't be interested in increasing the market value. They also have stated REVA can provide inferior signals as compared to EVA and share price movements. The reason being simple two incompatible elements, market values and periodic returns has been used in REVA. They have concluded their paper by writing in order to get effective results either EVA and periodic earnings or only the changes in share price movements can be seen.

Bacidore, Boquist, Milbourn, & Thakor, (1999), the researcher has commented, if REVA is less correlated with abnormal stock returns due to which it is not considered a better measurement for financial performance, then how EVA can be considered a better option to REVA as it has even lower correlation. The researcher has tried to prove that REVA still is a better option than EVA as financial performance measurement tool.

Choi & Wang, Stakeholder Relations and the Persistence of Corporate Financial Performance, (2009), the researcher has examined the relationship between firm's performances with its non-financial stakeholders. They have measured the corporate financial performance using both the return on assets and Tobin's Q. The researchers even used first order auto regressive models to examine the tenacity of firm profitability.

Jang, Hu, & Bai, (2006), the author has conducted an extensive study to conduct the relationship between e-marketing and financial performance among the hotel industry. They have selected 39 top hotel companies for the purpose of study. The researcher has tried to relate the usage of e-marketing by the hotel company with the profitability of the concerned hotel. According to the author net income from operation is one of the most used variables to measure the profitability of any firm as the net income from operation is directly related with the size of the operation and it is important to control the size when measuring the profitability. So, they have divided net income from operation by the total assets of the firm also known as return on assets or (ROA). In order to check the marketing success, they have used sales revenue as a variable. Again, the sales revenue is affected by the size of the operation, so asset turnover ratio was calculated after adjusting the size of the company. Pearson's correlations and canonical correlations were used by the researchers to attain the objective of their research. They have used the descriptive statistics in their study.

Fairfield, Ramnath, & Yohn, (2009), According to the researchers there are many articles written arguing on whether the firm's financial performance is related to overall industry economy performance. The researchers in this article have tried to find whether the firm's performance is related with the performance of an industry as a whole or with the economy as a whole. The firm's performance has been described by the variables such as firm profitability and growth. They have used residual income valuation model to measure the profitability and growth in book value to measure the growth. They have used parsimonious first-order autoregressive forecasting model for growth and profitability. They found that industry specific models are more efficient in predicting growth of the firm than the profitability of the firm. They have used growth in book value (GBV), growth in net operating asset (GNOA) and growth in sales to measure the growth and have used return on equity (ROE) and return on net operating assets to measure the profitability.

Gentry & Shen, (2010), the measurement of firm's financial performance can be shown either by accounting measure or market measure. There are multiple articles based on it and support both type of measure to evaluate the firm's performance. There are also many articles based on the relationship between accounting measure and market measure. The debate is related to check whether both the measures can be used interchangeably to measure the firm's performance. The researchers have conducted the extensive study to understand the relationship between the two types of measure and see whether both the measures can be used interchangeably to measure the firm's financial performance. The researcher has not conducted meta-analysis due to some of the limitations of this type of research and has rather used the data of various industries from COMPUSTAT data base from 1961 to 2008 and conducted cross industry analysis. The findings of this study is that both the measures has a covariance of less than 10% due to which it is found to have no evidence for convergence.

Maes, Sels, & Roodhooft, (2007), the researchers tried to study the relationship between the owner-manager and company's management and practices on its financial performance. The findings of the study were that whether financial performance is affected by owner-manager, company characteristics and management practices and whether a model approach is necessary for this. They developed a structural model to conduct the study. The researcher has used significant variables to construct the model such as variables at the level of owner-manager, company characteristics and management practices or internal factors. The main objective to develop this model was to identify the relationship of these three selected variables and firm's financial performance. The various ratios that are used as the measure for financial performance were as follows – acid test and current ratio, profitability of total assets and cash flow over equity ratio, degree of self-financing and solvency ratio. They have calculated the share of the personal cost to the value added and also checked how much value has been added by the employee. The above-mentioned ratios were used to determine the liquidity, solvency, profitability and value added in the small firms. They have conducted bivariate correlation analysis to divulge several significant connotations among the variables. The findings of the study were that as compared to company characteristics and owner manager, internal factors or general management practices has stronger effect on the company's financial performance.

Zeller, Kostolansky, & Bozoudis, (2019), the researcher has used various ratios based on IFRS (International Financial Reporting System) to check its efficiency in representing the financial performance of any firm. As the European Union compulsorily adopted IFRS. They have used 50 sets of ratios for asset relationship, asset turnover, expense insight, capital structure, inventory turnover, fixed asset usage, liquidity profitability margin and performance return. They have tried to find the attributes captured by IFRS based ratios, which goes well beyond the traditional ratios of solvency, liquidity and profitability. They have found the evidence which suggested nine stable financial attributes. This will help the future researchers and analysts to help them select the financial ratios. The stable factors related to various ratios are –

Asset relationship: according to their findings this factor is being driven by three ratios, asset intensity, total current to total assets and asset structure.

Asset turnover: this factor is being driven by total asset turnover, current asset turnover and capital turnover. Higher efficiency of business is considered when turnover ratio is high.

Capital structure: the factors which drive the capital structure are total liability to total equity (gearing) and non-current asset to total stockholder’s equity.

Expense insight: amortization to total operating expense and cost of sales to total operating expenses are the two ratios that drive this factor. The increased efficiency in the usage of assets will be shown by the decrease in depreciation and amortization.

Fixed asset usage: Fixed asset turnover and depreciation rate are the two ratios that drive this factor. Depreciation is the rate related to the fixed assets and the efficiency of the usage of the fixed assets are shown by the fixed asset turnover ratio.

Inventory turnover: Inventory turnover and sales to turnover, this two ratio drive this factor. The strong relationship will be depicted by the sales to inventory and cost of sales to inventory ratio.

Liquidity: The three important ratio which represent liquidity position are as follows – current ratio, quick ratio and account receivables to current liabilities.

Profitability margin: The profitability margin is best shown by these two ratios, EBIT to sales and EBITDA to sales. In their study it was found that these two ratios were the most reliable ratios in measuring the profitability.

Return Performance: return on total capital, return on investment and return on average assets are the most reliable ratios in measuring the performance based on the return.

They have found that cash flow margin ratio is not a reliable measure of the cash content of the sales. Their findings have highlighted that the IFRS statement of cash flow does not show the intended information too.

They also have questioned, are measures used in balance sheet more stable as compared to profit and loss account? As profit and loss account are mostly affected by the different business cycles.

The different financial attributes as found efficient by the researcher were as follows – asset turnover, asset relationship, capital structure, expense insight, inventory turnover, fixed asset usage, profitability margin, performance return and liquidity.

Chatfield, Koehler, Ord, & Snyder, (2001), The main objective of this paper was to study different forecasting models with respect to formal statistical framework. It has been found that exponential smoothing forecasting models are widely used by the companies in forecasting. The conclusion of this paper states that there is no single forecasting procedure which is appropriate in all situations but different models have to be tested inorder to understand its effeciency in different situations.

McKenzie, (1986), The researcher has focused on the importance of normalization of the primary estimates of the seasonal factors. It has been a universal practice of normalizing and renormalizing the seasonal factors. The findings were that in case of additive model, there is no need of normalizing the seasonal factor in every observation.

Winters & R., (1960), According to the researcher, with the advent of computers and technology the data has been flooded and the importance of forecasting has increased a lot. At the same time the forescasting model should be simple, effective and time saving. The researcher has conducted comparative analysis among various exponential forecasting models. The conclusion of this paper is that exponential forecasting model is efficient as compared to conventional forecasting models..

Makridakis, Hibon, & Moser, (1979) The investigators have investigated 111 data time series, to test the accuracy of various time series models. The main objective of this paper is to show why different time series models give different results and what factors make them efficient. The findings of this paper were that the simpler model performed better for 111 data point time series as compared to more complicated time series methods such as ARMA model.

Chatfield C., (1977), The critical assesment of recent developments in time series including the seasonality and trend, adaptive filtering, Bayesian forecasting, spectral analysis, the Box–Zenkins forecasting procedure, autoregressive spectrum estimation, use of the fast Fourier Transform and the identification of various liner systems have been conducted by the researcher.

Chatfield & Yar, Holt–Winters Forecasting: Some Practical Issues, (1988), Holt–Winters model is a very reliable time series forecasting method in making forecast within a short span of time. This is a part of the exponential forecasting model. It has been widely accepted because of its simplicity and effeciency. One of the important findings of this paper is that, irrespective of the simplicity and wide acceptance of the Holt–Winters model, further research has to be conducted in investigating the damping of the trend.

Groff, (1973), The author has conducted simulation study of the forecasting techniques for short range of exponentially method and selected Box–Jenkins methods for sixty three monthly sales data. Winters three parameter model and a single parameter model developed by the author have been selected as seasonal factor models. The findings of the paper was that four exponentially smoothed models give more or less same results for all selected data series.

Jr & McKenzie, (1989), The main objective of this paper is to check the application of trend damping to the Winters exponential smoothing systems. The findings of this paper states that the accuracy in ex-ante forecast in seasonal data can be improved by trend damping.

Wagle, (1965), The main conclusion of this paper makes a very important statement, the quantitative and mathematical forecasting techniques can give a very good judgement but it will be more efficient if it can be mixed with personal and experiential judgement. Also, the aim of mathematical model is not to supersede the experiential and personal judgement but to increase the efficiency in coming up with good results for complex problems.

Bermúdez, Segura & Vercher, (2006), The researchers have focused on the problem of forecasting real time series analysis using a proportion of values such as zero and also using the variability among the non zero values. They have selected the generalized Holt–Winters formulation so that it can also adapt the local components of base level, trend and seasonality as decision making variables. They have used the spread sheet model in solving the problems of optimization in a very efficient manner.

Mesquita & Martins, (2011), They have conducted a very good study related to the financial performance. The researchers have analyzed the financial performance of retail industry. They also have studied the relationship between the financial performance and seasonality in sales in the retail industry. The work related with the comparative anlaysis among the companies in the retail industry. It was found that the supermarket had a very stable seasonal sales pattern as compared to the furniture and household appliances, clothing and footware and textile. They found the presence of a high seasonal variations, irrespective of which the ratios like return on equity and cash ratio were found to be in a better position as compared to that with the ratios like debt ratio and asset turnover ratio which were found to have no statistically significant differences.

Pongdatu & Putra, (2018), The researchers have conducted as comparative analysis between the two very famous models SARIMA and Holt–Winter's exponential smoothing model. They too had conducted the study in the retail sector. Their main objective of the study was to check and verify the effeciency between the two models. The actual data was compared with the actual data in order to check the accuracy of the model in forecasting.. They used mean absolute deviation (MAD) as a tool to check the deviation of the forecasted data from the actual data.The findings of the study was that the SARIMA gave more accurate forecasted data.

Valakevicius & Brazenas (2015), This article has nicely explored the foreign exchange market in terms of the dynamics of the hourly change in the currency values. They chose two currencies the Euro (EUR) and US dollar (USD) to conduct the study. The researchers have used both the Holt–Winters additive model and the Holt–Winters multiplpicative mode. According to the concept mentioned in the paper both the selected methods are appropriate if the data was found to have seasonal variations and a linear trend. In this research paper they have used mean absolute error (MAE) and also root mean squarred error (RMSE) to test which model is appropriate for the selected field of the study. It was found that the Holt–Winters multiplicative model (simplified version) gave more accurate results as compared to that with the Holt–Winters additive model.

Rahman, Salma, Hossain, & Khan, (2016), They applied goodness of fit before selecting the appropriate forecasting model. Their area of study was related to prediction of revenue for Bangabandhu Multipurpose Bridge. Using the goodness of fit they selected Holt–Winter model (both the additive and multiplicative model). The findings of the study was that the Holt–Winters additive model gave more efficient and accurate forecasting results as compared to that with the Holt–Winters multiplicative model.

McKenzie, (1986), The researcher has highlighted that there is a practice to normalize the initial estimates of the seasonal factors in the Winter's model which is used for forecasting. He observed that the normalisation of seasonal factors get lost after the forecasting process begins. He has suggested after the observation that it is important to renormalize the factors continuously or seasonally. The researcher also have suggested that this renormalizaton process can be encouraged with every observation. The finding of this paper is that the renormalization is not required in the case of the Holt–Winters additive model.

Abraham & Ledolter, (1986), According to the researchers ARIMA (autoregressive integrated moving average) model which is used for the forecasting gave the same result as compared to that with the Winters addictive model and multiplicative model. The article focused to check different forecasting methods and how it updates its coeffecients in the forecast functions. It is also found that when the ARIMA has a simplifying operator of $(1-B^{12})^2$ it gives the same result as the Winters multiplicative forecasting model. It has been found that the Winters method uses three smoothing constants in which the updating of the coeffecients depends, whereas, 24 moving average parameters in the case of ARIMA model. They have suggested that forecaster can transform the observation and can consider addictive models and vice versa, if the nature of the error are multiplicative in nature.

Newbold & Granger (1974), The main objective of this paper was to conduct a comparative analysis between the Holt–Winters and stepwise autoregression and Box–Jenkins method. They combined all the three techniques to produce an overall forecast. It was found that combining all the efficient forecasting models can give a very lucrative forecast.

Davey & Flores, (1993), The researchers have focused in the importance of finding the presence of pattern in the sample data set. The presence of pattern or the continuity in data points signifies the presence of the seasonality in the time series plots of the data set.

Cherrie, Nichols, & Fleming, (2018), seasonality in the data series means the presence of periodic pattern with an increasing or decreasing observations within a particular time frame say quarter, week or month.

Nwogu, Iwueze, & Nlebedim, (2016), They have worked in finding some of the tests to determine seasonality in the data set considering both of the nature of trending curve and model structure. In order to detect the seasonality the researchers have recommended Student *t*-test and Wilcoxon Signed-Rank tests.

Taheri & Hesamian, (2013), the authors have used the Wilcoxon signed rank test in the case when the observations are indefinite quantities but not crisp. The significance level is given by fuzzy numbers, in addition to which the critical value is also generalized.

Rey & Neuhauser, (2014), The Wilcoxon signed rank test was a concept propounded by Frank Wilcoxon in the year 1945. It is a non parametric test which is normally used for the one sample location problem. This type of test is applied to compare the locations of the two samples which are dependent. This test also assumes the mutually independent differences, continous distribution and the median being symmetric. This tests is used in place of the paired sample t test if the data set sample is non parametric.

Li, (2019), One of the most effective way to find the presence of seasonality in the data series is by using the cycle plot or the seasonal subseries plot. This methodology has been very famous and widely used by many in the similar field of detecting the presence of seasonality and forecasting.

NIST SEMATECH, (2013), Cycle plot or the subseries plot is an effective tool in detecting the presence of seasonality in the data set. If the period of the seasonality is already known in advance than this is one of of the most appropriate method to detect the presence of pattern or seasonality in the data set.

Cox, (2006), The framing of graph is very important when trying to find the presence of seasonality in the data set. Among the various types of plottings , cylce or subseries plottings is one of the most effective method in showing the presence of seasonality in the data set. The researcher has recommended in using the cycle or subseries plot rather than using the regular or simple time series plots.

Chand, Kamal, & Ali, (2012) The researchers have used GARCH model to analyse the share price volatility. Their main motive in selecting the GARCH model by the researchers is that, it has two advantage over OLS methodology. The main problem of autocorrelation in error terms are effectively handelled by the GARCH type model.

Dissanayake & Wickramasinghe, (2016), Investors take investment decissions and share price volatility acts as one of the most important catalyst that affect the investment decissions. It is also very important to understand the phycology of the investors which is possible by understanding the volatility of the share price. The other way round is that the investors shoould try to understand the various factors that affect the share price volatiltiy. The findings of the study is that, the researchers found there exists the relationship between the fluctuations in the earnings and the volatility in the share price.

Fundamental Analysis and Equity Volatility, (2013) the researchers in this study has examined whether financial statement information can be used in predicting the realized volatility incremental to the Black–Scholes model calculated implied volatility. The finding of this study was that accounting information could not be processed by the Black–Scholes model fully.

Li, Nguyen, Pham, & Wei, (2011) the study was conducted in 31 emerging markets by the researchers to study the impact of large foreign ownership on stock return. Negative relationship was found between large foreign ownership and volatility.

Nazir, Nawaj, Anwar, & Ahmed, (2010) the main objective of this study was to see the impact of corporate dividend policy in determining the share price volatility in Karachi stock exchange. The findings of the study show a significant impact of dividend on the volatility of share price in Karachi stock exchange.

Karmakar, (2006) the long-term stock price volatility has been examined using the GARCH (1, 1) and TARCH (1, 1) model. The results using the GARCH (1, 1) model in India was existence of time varying volatility and results using TARCH (1, 1) model found asymmetry in volatility.

Gabaix, Gopikrishnan, Plerou, & Stanley, (2006) this paper supports the theory of excess stock market volatility due to trades by a very large institutional investor. The trades by this institution generates spikes in returns and volume, even when the news relating to important financial variables are missing.

Pal, (2005) the finding of the study was that the impact of investment made by FIIs was significant with that of share price volatility in BSE. The paper stated that the number of companies in BSE having the investors as FIIs in the non-promoter's group was highest and this is one of the reasons why the FIIs can affect the share price volatility in India.

Pryymachenko, (2003) this paper focuses on the factors influencing the share price volatility in Ukraine. The finding of the study was that both the fundamental and non-fundamental factors influence the share price volatility. GDP was one of the important fundamental factors and rational bubble; fads were among the non-fundamental factors affecting the share price volatility in Ukraine.

Bushee & Noe, (2000) the works of the two researchers support the impact on the share price volatility is due to the corporate disclosure practices on the composition of a firm's institutional investor base.

Kane, Marcus, & Jaesun, (1996 ) According to the study market multiple is highly sensitive to volatility and one percentage point increase in market volatility can change market multiple by 1.8.

Alford & Boatsman, (1995) this paper focuses in studying the predictability of long-term stock return volatility. The finding of the study was that the returns should be measured using a week or a month's data when predicting five year's monthly volatility. Comparable firms should be selected on the basis of industry and firm size when making a forecast based model solely based on the historical data.

Scott, (1991) Excessive volatility has made the researchers to re-validate the theory of efficient market hypothesis. According to this study the researcher has found that various new methodologies has been tried out to test the volatility. The study also highlights the questions whether the regulation relating to the fundamentals are necessary in the market, if not than only the important fundamentals effecting the share price can be focused when changing the regulation in the capital market.

Cohen, Ness, Okuda, Schwartz, & Whitcomb, (1976) the major finding of this study is that the main factors affecting the share price volatility are share price and floating supply of a firm's share.

# CHAPTER III

## Financial performance analysis of power generating companies in India

### 3.1 Data analysis and interpretation

The main objective of this chapter is to conduct financial performance analysis for the power generating companies in India listed in the Bombay Stock Exchange (BSE). The financial information has been extracted from the annual reports of the company. Different important ratios are calculated, some of the ratios are modified according to the nature of the power generating sector. Inference has been drawn from the different analytical methods and approaches. The research analysis is segregated into:

1) Financial performance analysis of the power generating companies and comparison among the power generating companies in India.
2) Comparative financial performance analysis of the power generating companies in India on the basis of ownership.

## 3.2 Ratio analysis

3.2.1 Liquidity ratio

Table 3.a.

Current Asset (CA) & Current Liabilities (CL), Rs. (Cr).

| Company | FM | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | CA | 9865.8 | 8674.94 | 14459.51 | 15232.02 | 13405.12 | 14286.16 | 12326.21 | 8328.63 | 7349.16 |
| | CL | 4734.71 | 6072.08 | 8073.56 | 7663.87 | 7292.77 | 7112.17 | 5906.29 | 5569.76 | 6,061.25 |
| NTPC | CA | 33,216 | 38,045.32 | 42,805.39 | 44,818.67 | 44,386.43 | 41,791.62 | 34,556.57 | 30,009.75 | 39,248.60 |
| | CL | 12,908 | 15,274.43 | 20802.07 | 26,702.39 | 29659.91 | 35946.33 | 40090.17 | 38,554.26 | 45649.86 |
| SJVN | CA | 2490.32 | 3033.18 | 3561.31 | 3364.61 | 3561.62 | 4666.55 | 5397.40 | 5411.22 | 4401.02 |
| | CL | 1254.09 | 1320.29 | 1802.57 | 1197.94 | 1358.38 | 1002.54 | 917.18 | 799.21 | 817.95 |
| RPOWER | CA | 337.70 | 3952.81 | 5699.04 | 8834.07 | 6355.94 | 8150.33 | 10761.71 | 9121.10 | 9432.53 |
| | CL | 692.92 | 1723.06 | 3552.54 | 6178.24 | 7442.28 | 10076.03 | 10637.84 | 11929.70 | 12336.57 |
| RTN POWER | CA | 2183.92 | 1768.05 | 1284.45 | 1223.55 | 1293.09 | 1471.77 | 2824.08 | 2368.62 | 2,825.95 |
| | CL | 29.22 | 1315.51 | 3124.36 | 3557.62 | 1507.46 | 2584.68 | 3138.18 | 4197.60 | 6801.80 |
| GIPCL | CA | 291.44 | 372.65 | 413.24 | 612.58 | 704.47 | 686.43 | 665.61 | 428.83 | 539.32 |
| | CL | 426.55 | 418.49 | 707.53 | 540.31 | 522.47 | 502.91 | 455.71 | 505.47 | 523.48 |

Source: Annual reports.

*Note: FM means financial metrics.*

The values in the above Table 3.a have been extracted from the annual reports uploaded in the Bombay Stock Exchange. The values representing current assets and current liabilities have been mentioned in terms of rupees in crores. Current ratio has been calculated to get a clear understanding about the trend in the different years.

Table 3.b

Current Ratio [Current Asset (Ca)/Current Liabilities (Cl)], Ratio

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 2.08 | 2.57 | 1.98 | 0.48 | 74.74 | 0.68 |
| 2010–11 | 1.42 | 2.49 | 2.29 | 2.29 | 1.34 | 0.89 |
| 2011–12 | 1.79 | 2.05 | 1.97 | 1.60 | 0.41 | 0.58 |
| 2012–13 | 1.98 | 1.67 | 2.80 | 1.42 | 0.34 | 1.13 |
| 2013–14 | 1.83 | 1.49 | 2.62 | 0.85 | 0.85 | 1.34 |
| 2014–15 | 2.00 | 1.16 | 4.65 | 0.80 | 0.56 | 1.36 |
| 2015–16 | 2.08 | 0.86 | 5.88 | 1.01 | 0.89 | 1.46 |
| 2016–17 | 1.49 | 0.77 | 6.77 | 0.76 | 0.56 | 0.84 |
| 2017–18 | 1.21 | 1.21 | 5.38 | 0.76 | 0.41 | 1.03 |
| Average | 1.77 | 1.59 | 3.82 | 1.11 | 8.90 | 1.03 |

Source: Computed by the researcher.

From the above Table 3.b, it is detected that NHPC has current ratio lower than the ideal ratio of 2:1 but it has a current ratio very proximate to the ideal ratio in the year 2009–10 (2.0837), 2014–15 (2.0087) and 2015–16 (2.0870). The average current ratio of NHPC is 1.7703 which is lower than the ideal ratio of 2:1. NTPC has a current ratio proximate to the ideal ratio in the year 2009–10 (2.5732), 2010–11 (2.4908) and 2011–12 (2.0577). The current ratio of NTPC has been decreasing continuously from 2009–10 (2.5732) to 2016–2017 (0.7784). The average current ratio of NTPC (1.5902) is lower than the ideal ratio of 2:1. SJVN has a current ratio above ideal ratio in most of the years except 2009–10 (1.9858), 2011–12 (1.9757). The average current ratio (3.82) of SJVN is higher than the ideal ratio of 2:1. RPOWER has a current ratio of 2.2941 in the year 2010–11 which is higher than the ideal ratio of 2:1. RPOWER has a current ratio lower than the ideal ratio in all the other years except 2010–11. RTNPOWER has a very high current ratio in the year 2009–10 (74.7480) as compared to other years, this is because of high cash balance and a very low current liability (29.22Cr.) as compared to the other years. All the other years have a current ratio lower than the ideal ratio of 2:1. The average current ratio (8.9060) is higher than the ideal current ratio because of a very high current ratio in the year 2009–10. Hence, a very high average current ratio of RTNPOWER is just the reflection of a very high current ratio in just one year. GIPCL has a current ratio lower than the ideal ratio of 2:1 in all the years from 2009–10 till 2017–18. The average current ratio (1.0382) is also lower than the ideal ratio.

The current ratio alone does not justify the liquidity position of any organisation, so to check the liquidity position from another angle, quick ratio has been calculated. Current asset has many components which can be converted into cash in a short span of time but inventory is such which takes time to get converted into cash. In power generation sector, the power generating companies have specialized in using different sources of energy like water, coal, fuel (petrol, diesel), wind power etc. Some of these sources has a price but some of the sources do not have prices to be paid. Stores and spare parts are also included as a part of the inventory by the power generating companies which are used in generating electricity. So inventory includes such items which cannot be easily converted into cash. The quick ratio or the acid test ratio excludes inventory from the current assets and compares it with the current liabilities. The ideal ratio considered is 1:1 for the acid test ratio or quick ratio in general. The acid test ratio above 1 is ideally considered good as this means the organisations can easily make payments for the current obligations.

Table 3.c

[Current Asset (CA) – Inventory (Invt)] & Current Liabilities (Cl), Rs. (Cr)

| Company | FM | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | CA-Invt | 9817.46 | 8635.73 | 14409.91 | 15167.80 | 13325.28 | 14195.52 | 12231.71 | 8227.83 | 7244.48 |
| | CL | 4734.71 | 6072.08 | 8073.56 | 7663.87 | 7292.77 | 7112.17 | 5906.29 | 5569.76 | 6,061.25 |
| NTPC | CA-Invt | 29682.5 | 34134 | 38627.48 | 40242.89 | 38397.95 | 33819.16 | 26597.41 | 23423.62 | 33108.31 |
| | CL | 12,908 | 15,274.43 | 20802.07 | 26,702.39 | 29659.91 | 35946.33 | 40090.17 | 38,554.26 | 45649.86 |
| SJVN | CA-Invt | 2431.65 | 3009.5 | 3532.84 | 3334.10 | 3527.78 | 4629.77 | 5358.75 | 5371.66 | 4350.52 |
| | CL | 1254.09 | 1320.29 | 1802.57 | 1197.94 | 1358.38 | 1002.54 | 917.18 | 799.21 | 817.95 |
| RPOWER | CA-Invt | 289.04 | 3899.16 | 5538.35 | 8298.52 | 5733.17 | 7102.86 | 9638.02 | 8092.44 | 8703.55 |
| | CL | 692.92 | 1723.06 | 3552.54 | 6178.24 | 7442.28 | 10076.03 | 10637.84 | 11929.70 | 12336.57 |
| RTN POWER | CA-Invt | 2183.92 | 1941.61 | 1284.45 | 969.11 | 1280.01 | 1396.18 | 2554.43 | 2285.24 | 2672.95 |
| | CL | 29.22 | 1315.51 | 3124.36 | 3557.62 | 1507.46 | 2584.68 | 3138.18 | 4197.60 | 6801.80 |
| GIPCL | CA-Invt | 187.88 | 269.13 | 287.58 | 491.78 | 584.36 | 538.57 | 514.92 | 269.03 | 387.72 |
| | CL | 426.55 | 418.49 | 707.53 | 540.31 | 522.47 | 502.91 | 455.71 | 505.47 | 523.48 |

Source: Annual reports.

*Note: FM means financial metrics, CA means current asset and Invt means inventory.*

The values in the above table have been taken from the annual reports published by the concerned power generating companies and uploaded in the Bombay Stock Exchange. Inventories from the current assets are being deducted to check the liquidity position. RTNPOWER does not have inventory in the following years, 2009–10, 2010–11 and 2011–12. RTNPOWER have inventories only from the year 2012–13. All the power generating companies have inventories in their current asset account from 2009–10 to 2017–18. In order to get more precise picture, acid test or quick ratio has been calculated in the table next page.

Table 3.d

Quick ratio [Current Asset (CA) – Inventory (Invt)] / Current Liabilities (Cl), Ratio

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 2.07 | 2.30 | 1.94 | 0.42 | 74.75 | 0.44 |
| 2010–11 | 1.42 | 2.23 | 2.28 | 2.26 | 1.48 | 0.64 |
| 2011–12 | 1.78 | 1.86 | 1.96 | 1.56 | 0.41 | 0.41 |
| 2012–13 | 1.98 | 1.51 | 2.78 | 1.34 | 0.27 | 0.91 |
| 2013–14 | 1.83 | 1.29 | 2.60 | 0.77 | 0.85 | 1.12 |
| 2014–15 | 2.00 | 0.94 | 4.62 | 0.70 | 0.54 | 1.07 |
| 2015–16 | 2.07 | 0.66 | 5.84 | 0.91 | 0.81 | 1.13 |
| 2016–17 | 1.48 | 0.61 | 6.72 | 0.68 | 0.54 | 0.53 |
| 2017–18 | 1.20 | 0.73 | 5.32 | 0.71 | 0.39 | 0.74 |
| Average | 1.76 | 1.35 | 3.78 | 1.04 | 8.89 | .78 |

Source: Computed by the researcher.

From the above Table 3.d, it is noted that, NHPC has an average quick ratio of 1.76 which is higher than the ideal ratio of 1:1. NHPC has a quick ratio higher than the ideal ratio of 1:1 in all the years from 2009–10 till 2017–18. NTPC too has an average ratio of 1.35 higher than the ideal ratio but the quick ratio of NTPC has been decreasing continuously since 2009–2010 to 2016–17. It may be due to the nature of the company, NTPC uses coal to produce electricity due to which the current liabilities are normally higher as compared to other power generating companies which rely on the renewable sources of energy like water. SJVN has an average quick ratio of 3.78 which is higher than the ideal ratio of 1:1 and in each year from 2009–10 to 2017–18, it has a quick ratio higher than the ideal ratio. RPOWER has a slightly higher average quick ratio of 1.04 as compared to the ideal ratio of 1. RPOWER had a very low quick ratio in the year 2009–10 (0.42), it increased in the year 2010–11, the main reason was that the debtors, cash balance, other current assets and loans and advances had increased sharply in the year 2010–11 as compared in the previous year 2009–10. But there was only slight increase in the value of inventory. RPOWER has a declining quick ratio from the year 2010–11 to 2014–15, it is due to the decrease in the cash balance. RTNPOWER has an average quick ratio (8.89) more than the ideal ratio of 1 which is because of the high quick ratio of 74.75 in just one-year 2009–10 but RTNPOWER has a quick ratio lower than 1 from 2011–12 to 2017–18. This means one cannot rely on the average quick ratio of RTNPOWER. GIPCL has the lowest average quick ratio of .78 which is lower than the ideal ratio of 1 as compared to other selected power generating companies. Except in the years 2013–14, 2014–15 and 2015–16, RTNPOWER has a lower quick ratio than 1.

The inference from the above discussion is that RTNPOWER has a weak quick ratio, even though it has a high average quick ratio of 8.89. After RTNPOWER, GIPCL has the lowest quick ratio.

In contrast SJVN has the high quick ratio as compared to the other selected power generating companies. SJVN has the increasing trend of quick ratio and has a ratio higher than the ideal ratio of 1 in all the years of study. After SJVN, NHPC also has a good and high quick ratio.

NTPC and RPOWER has a quick ratio better than the RTNPOWER and GIPCL. The quick ratio of NTPC and RPOWER is also not so weak.

RTNPOWER and GIPCL should focus in improving their liquidity position. RTNPOWER has a declining cash balance and an increasing current liability. This is one of the main reasons for RTNPOWER in having a very weak quick ratio. In order to improve the liquidity, position the RTNPOWER should improve on the cash and bank balance and try to reduce the current liabilities.

3.2.2 Profitability ratio

Table 3.e

Earnings before Interest and Tax (EBIT) and Sales value, Rs. in (Cr).

| Company | FM | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | EBIT | 2842.32 | 2391.04 | 3,714.31 | 3105.07 | 2,177.80 | 3,633.34 | 3552.85 | 1,940.58 | 4710.32 |
| | Sales | 5229.56 | 4378.32 | 6,927.40 | 6487.4 | 7,243.44 | 8,352.25 | 8749.17 | 7,214.00 | 6,520.90 |
| NTPC | EBIT | 8804.1 | 11154.19 | 10,831.97 | 14,757.60 | 20737.52 | 11,032.22 | 11954.25 | 14,515.78 | 6304.85 |
| | Sales | 47,667.10 | 57,106.99 | 64,840.13 | 67,996.09 | 78,618.65 | 79,818.95 | 77,700.94 | 80,823.10 | 79,298.08 |
| SJVN | EBIT | 978.23 | 1047.23 | 1111.23 | 1049.65 | 1096.81 | 2149.7 | 1349.61 | 1664.66 | 1278.21 |
| | Sales | 1719.42 | 1715.38 | 1820.95 | 1729.62 | 1841.33 | 2825.42 | 2509.4 | 2436.86 | 2158.71 |
| RPOWER | EBIT | -78.41 | 87.27 | 425.52 | 1400.73 | 1461.14 | 1977.82 | 5912.15 | 2267.15 | 2348.71 |
| | Sales | 20.72 | 1023.68 | 1958.39 | 4924.88 | 5111.88 | 6850.65 | 10658.58 | 9059.63 | 8635.87 |
| RTN POWER | EBIT | -37.19 | -37.18 | -39.97 | -168.27 | -25.13 | -169.61 | -187.8 | -360.51 | -1683.52 |
| | Sales | * | * | * | * | 338.78 | 617.32 | 2774.98 | 587.1 | 1402.22 |
| GIPCL | EBIT | 124.43 | 1163.82 | 234.36 | 551.97 | 299.51 | 268.78 | 260.32 | 275.19 | 304.6 |
| | Sales | 939.12 | 1077.95 | 1,290.99 | 1,407.01 | 1,371.04 | 1,209.06 | 1,345.76 | 1,303.81 | 1358.19 |

Source: Annual reports.

*Note: FM means financial metrics.*

The above Table 3.e represents the value of earnings before interest and tax (EBIT) and sales. Earnings before interest and tax has been computed by the researcher using the data mentioned in the annual reports of the selected power generating companies. Earnings have been considered relating to the main business of the power generating companies, i.e., power generation and sale. So, the earnings before interest and tax has been calculated after adjusting the other incomes and expenditures not related with the power generation. Revenues from contract, project management and consultancy work and other income have not been considered as the main earnings of the power generating companies. Expenditure relating to contract, project management and consultancy work is also not considered in calculating the EBIT. The sale of power is only considered as the sales, in order to understand the real efficiency of the power generating companies. The interest has been calculated after deducting the interest capitalized from the total interest. In order to check the stability in the sales growth and the earnings growth rate, the growth rate table has been prepared for both the EBIT and the sales for the selected power generating companies.

Table 3.f

(EBIT and Sales) growth rate (%)

| Year | NHPC | | NTPC | | SJVN | | RPOWER | | RTNPOWER | | GIPCL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EBIT | Sales | EBIT | Sales | EBIT | Sales | EBIT | Sales | EBIT | Sales | EBIT | Sales |
| 2010–11 | -16 | -16 | 27 | 20 | 7 | -0.23 | 211 | 4840.54 | -0.02 | 0 | 835.32 | 14.78 |
| 2011–12 | 55 | 58 | -3 | 14 | 6 | 6.15 | 388 | 91.31 | 7.504 | 0 | -79.86 | 19.76 |
| 2012–13 | -16 | -6 | 36 | 5 | -6 | -5.02 | 229 | 151.48 | 320.99 | 0 | 135.52 | 8.99 |
| 2013–14 | -30 | 12 | 41 | 16 | 4 | 6.46 | 4 | 3.80 | -85.06 | 0 | -45.74 | -2.56 |
| 2014–15 | 67 | 15 | -47 | 2 | 96 | 53.44 | 35 | 34.01 | 574.93 | 82 | -10.26 | -11.81 |
| 2015–16 | -2 | 5 | 8 | -3 | -37 | -11.18 | 199 | 55.58 | 10.72 | 350 | -3.15 | 11.31 |
| 2016–17 | -45 | -18 | 21 | 4 | 23 | -2.89 | -62 | -15.00 | 91.96 | -79 | 5.71 | -3.12 |
| 2017–18 | 143 | -10 | -57 | -2 | -23 | -11.41 | 4 | -4.68 | 366.98 | 139 | 10.69 | 4.17 |
| Average | 19.50 | 5.00 | 3.25 | 7.00 | 8.75 | 4.42 | 126.00 | 644.63 | 161.00 | 61.50 | 106.03 | 5.19 |
| Stdev | 63.6 | 24.71 | 37.0 | 8.60 | 39.9 | 20.94 | 153 | 1696 | 231.9 | 133.3 | 301.1 | 10.52 |

Source: Computed by the researcher.

*Note: Stdev means standard deviation.*

The growth rate for both the EBIT and sales has been calculated in the above Table 3.f, in order to have an idea about the average growth rate and the stability in the growth rate. The unstable growth rate is not considered good and is considered risky and uncertain. An ideal company is one which has a stable and high average EBIT and sales growth rate. RPOWER has an average sales growth rate of 644.63%, but it has a standard deviation of 1693.31, which is not preferable. The high standard deviation of RPOWER depicts instability in its earnings irrespective of a very high average. RTNPOWER has an average sales growth of 61.50% but it too has a high standard deviation of 133.38 which is still not preferable. NTPC has a third highest average sales growth rate of 7% and a lowest standard deviation, so NTPC has a favourable and stable sales growth as compared to the other selected power generating companies.

RTNPOWER has a highest average EBIT growth rate of 161% but it also has a very high standard deviation of 231.99, so the growth rate is unstable and not so favourable. RPOWER also has a higher EBIT growth rate of 126%, but it too has a very high standard deviation of 163.62 which is again not favourable. NTPC has a lowest standard deviation of 37.02 but it also has a lowest EBIT growth rate of 3.25%, which is quite low. NHPC has a higher EBIT growth rate of 19.50% and a standard deviation of 63.65 comparatively lower as compared to the other power generating companies except SJVN and NTPC. SJVN has an EBIT growth rate of 8.75% which is quite good comparatively with a standard deviation of 39.94.

The inference from the above observation is that, NTPC has a stable EBIT and sales growth rate even though its average EBIT and sales growth is comparatively less.

NHPC and SJVN too have a low standard deviation but higher than NTPC but the EBIT and sales growth rate is also higher than the NTPC.

RPOWER, RTNPOWER, GIPCL have a very high standard deviation even though they have a very high average EBIT and sales growth rate. The growth rate of EBIT and sales for RPOWER, RTNPOWER and GIPCL is not stable and is quite risky and uncertain.

Table 3.g

EBIT / Sales Ratio (%)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 54 | 18 | 57 | -378 | 0 | 13 |
| 2010–11 | 55 | 20 | 61 | 9 | 0 | 108 |
| 2011–12 | 54 | 17 | 61 | 22 | 0 | 18 |
| 2012–13 | 48 | 22 | 61 | 28 | 0 | 39 |
| 2013–14 | 30 | 26 | 60 | 29 | -7 | 22 |
| 2014–15 | 44 | 14 | 76 | 29 | -27 | 22 |
| 2015–16 | 41 | 15 | 54 | 55 | -7 | 19 |
| 2016–17 | 27 | 1 | 68 | 25 | -32 | 21 |
| 2017–18 | 72 | 8 | 59 | 27 | -120 | 22 |
| Average | 47 | 18 | 62 | -17 | -22 | 32 |
| Stdev | 0.14 | 0.05 | 0.07 | 1.36 | 0.39 | 0.29 |

Source: Computed by the researcher.

Earnings before interest and tax (EBIT) has been compared with the sales, as the EBIT is related with the sales. The EBIT and sales have been calculated specifically related with the sales of the power by the selected power generating companies. All the income from other sources not related with the sale and generation of power has not been taken into consideration. The main aim in calculating EBIT and sales in such a manner is to showcase the real financial performance of the selected power generating companies as the main operation of the power generating companies is to generate electricity and sell the same.

The industry average EBIT by sales ratio is 20%, when calculated from the year 2009–10 to 2017–18 considering the ratios of all the selected power generating companies.

From the above Table 3.g, it is noted that the SJVN has the highest average EBIT by sales ratio of 62% which is more than the industry average ratio of 20%, with the second lowest standard deviation of 0.07. SJVN has the highest profitability ratio and it is maintaining the stability of the ratio too, which indicates a very stable and good financial position.

In the other hand NHPC and NTPC too have a very less standard deviation of 0.14 and 0.05, with an average profitability ratio of 47% and 18%. The NHPC and NTPC also have a high and stable profitability ratio. NHPC has the profitability ratio above the industry average ratio of 20% as compared to that with the NTPC.

GIPCL too has an average profitability ratio of 32% higher than the industry average, which is good, but it has the high standard deviation of 0.29.

RPOWER and RTNPOWER have a negative average profitability ratio of -17% and -22% lower than the industry average of 20%, with a high standard deviation of 1.36 and 0.36. RPOWER and RTNPOWER has the weakest profitability ratio among the selected power generating companies.

EBIT has a direct relationship with the sales but EBIT does not show the net earnings for the shareholders or the equity owners. The earnings potentials of the power generating companies for the shareholders or the owners can be shown by the profit after tax or net income after tax. Net income after tax has been calculated for the selected power generating companies by excluding the other incomes which is not related with the actual operation of the power generating companies. The net income after tax are compiled and calculated by using the data from the annual reports in the table next page.

Table 3.h

Net Income after tax (NI) and other income (OI), Rs. (Cr).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | NI | 2090.5 | 2316.16 | 3403.59 | 2900.6 | 1218.75 | 2491.36 | 2688.26 | 2761.54 | 2774.7 |
| | OI | 647.3 | 807.09 | 1231.92 | 1215.15 | 1322.09 | 913.2 | 949.44 | 1503.78 | 1101.36 |
| NTPC | NI | 8837.7 | 9348.23 | 9814.66 | 4024.73 | 11403.4 | 9992.37 | 10162.43 | 10713.94 | 10501.5 |
| | OI | 2879.2 | 2517.17 | 2938 | 3163.97 | 2777.44 | 2078.91 | 1234.06 | 966.82 | 1558.28 |
| SJVN | NI | 972.74 | 912.13 | 1068.68 | 1052.34 | 1114.5 | 1676.65 | 1402.15 | 1547.18 | 1224.61 |
| | OI | 138.99 | 143.15 | 209.29 | 234.52 | 237.18 | 443.59 | 409.93 | 651.31 | 355.45 |
| RPOWER | NI | 683.89 | 760.44 | 866.78 | 1011.46 | 1026.67 | 1028.32 | 1361.94 | 1104.16 | 1034.81 |
| | OI | 8226.59 | 894.35 | 747.57 | 357.18 | 371.16 | 298.58 | 368.37 | 496.3 | 283.08 |
| RTNPOWER | NI | 37.72 | 9.66 | 86.98 | -26.28 | -72.82 | -339.83 | -190.91 | -630.57 | -1663.48 |
| | OI | 84.08 | 44.18 | 167.84 | 67.58 | 58.83 | 61.31 | 80.81 | 155.32 | 149.24 |
| GIPCL | NI | 106.78 | 162.95 | 118.36 | 218.88 | 185.88 | 126.31 | 188.41 | 229.24 | 244.5 |
| | OI | 13.86 | 15.53 | 5.68 | 14.27 | 30.81 | 43.24 | 35.22 | 71.05 | 51.26 |

Source: Annual reports.

*Note: FM means financial metrics.*

The data in the above Table 3.h reflects the value of net income after tax and other income. The calculation of net income after tax does not exclude other income. Since the other income is not directly related with the main operation of the power generating companies, the value for the net income after tax will not give the real financial performance of the power generating companies related with the selling of the power. Hence, the net income after tax for the selected power generating companies will be calculated after deducting the other income. This adjusted net income after tax will give the real performance of the power generating companies. Hence, adjusted net income after tax (ADJ NI) has been calculated by deducting the other income from the net income after tax.

Table 3.i

Adjusted Net Income after tax (ADJ NI) and Sales, Rs. (Cr).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | ADJ NI | 1443.2 | 1509.07 | 2171.67 | 1685.45 | -103.34 | 1578.16 | 1738.82 | 1257.76 | 1673.34 |
| | Sales | 5229.56 | 4378.32 | 6,927.40 | 6487.4 | 7,243.44 | 8,352.25 | 8749.17 | 7,214.00 | 6,520.90 |
| NTPC | ADJ NI | 5958.5 | 6831.06 | 6876.66 | 860.76 | 8625.96 | 7913.46 | 8928.37 | 9747.12 | 8943.22 |
| | Sales | 47,667.10 | 57,106.99 | 64,840.13 | 67,996.09 | 78,618.65 | 79,818.95 | 77,700.94 | 80,823.10 | 79,298.08 |
| SJVN | ADJ NI | 833.75 | 768.98 | 859.39 | 817.82 | 877.32 | 1233.06 | 992.22 | 895.87 | 869.16 |
| | Sales | 1719.42 | 1715.38 | 1820.95 | 1729.62 | 1841.33 | 2825.42 | 2509.4 | 2436.86 | 2158.71 |
| RPOWER | ADJ NI | -7542.7 | -133.91 | 119.21 | 654.28 | 655.51 | 729.74 | 993.57 | 607.86 | 751.73 |
| | Sales | 20.72 | 1023.68 | 1958.39 | 4924.88 | 5111.88 | 6850.65 | 10658.58 | 9059.63 | 8635.87 |
| RTN POWER | ADJ NI | -46.36 | -34.51 | -80.86 | -93.87 | -131.65 | -401.14 | -271.72 | -785.89 | -1812.72 |
| | Sales | * | * | * | * | 338.78 | 617.32 | 2774.98 | 587.1 | 1402.22 |
| GIPCL | ADJ NI | 92.93 | 147.42 | 112.68 | 204.61 | 155.07 | 83.07 | 153.19 | 158.19 | 193.24 |
| | Sales | 939.12 | 1077.95 | 1,290.99 | 1,407.01 | 1,371.04 | 1,209.06 | 1,345.76 | 1,303.81 | 1358.19 |

Source: Computed by the researcher.

*Note: FM means financial metrics.*

In the above Table 3.i, the adjusted net income after tax has been calculated by deducting other income from the net income after tax to get a real view of the return performance on sales of the selected power generating companies. The adjusted net income after tax has been compared with the sales in the table below to get the overview on how the sales of a particular power generating company is capable of earning adjusted net income after tax.

Table 3.j

Adjusted Net Income after tax (ADJ NI) / Sales ratio, (%)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 28 | 13 | 48 | -36397 | 0 | 10 |
| 2010–11 | 34 | 12 | 45 | -13 | 0 | 14 |
| 2011–12 | 31 | 11 | 47 | 6 | 0 | 9 |
| 2012–13 | 26 | 1 | 47 | 13 | 0 | 15 |
| 2013–14 | -1 | 11 | 48 | 13 | -39 | 11 |
| 2014–15 | 19 | 10 | 44 | 11 | -65 | 7 |
| 2015–16 | 20 | 11 | 40 | 9 | -10 | 11 |
| 2016–17 | 17 | 12 | 37 | 7 | -134 | 12 |
| 2017–18 | 26 | 11 | 40 | 9 | -129 | 14 |
| Average | 22 | 10 | 44 | -4038 | -42 | 11 |
| Stdev | 0.11 | 0.03 | 0.04 | 121.34 | 0.56 | 0.03 |

Source: Computed by the researcher.

It is worth noting in the above Table 3.j the ratio expressed in percentage for the two variables adjusted net income after tax by sales. NHPC has an average adjusted net income after tax (ADJ NI) / sales ratio of 22%, it is noted that in the year 2013–14 the ratio was negative 1%, this was because the other income was quite high, 1322.09Cr. as compared to net income after tax, 1218.75Cr. NTPC has an average adjusted net income after tax (ADJ NI) / sales ratio of 10%, but the ratio was only 1% in the year 2012–13, because of the high other income of Rs 3163.97Cr as compared to the net income after tax of Rs 4024.73Cr. SJVN has an average adjusted net income after tax (ADJ NI) / sales ratio of 44% and it does not have a drastic change of ratio in any of the years from 2009–10 to 2017–18. RPOWER has an average adjusted net income after tax (ADJ NI) / sales ratio of -4038%, the high negative ratio is due to the high negative ratio of -36397% in the year 2009–2010, this is mainly due to the very high other income of Rs 8226.59Cr. as compared to that with the net income after tax of only Rs 683.89Cr. RTNPOWER has an average adjusted net income after tax (ADJ NI) / sales ratio of -42%, this is due to the higher other income as compared to the net income after tax in all the years selected for study. This also means RTNPOWER is able to earn positive net income after tax just because of the higher other income. GIPCL has an average adjusted net income after tax (ADJ NI) / sales ratio of 11%, it has a stable ratio all over the selected years of study.

The inference from the above observation is that the SJVN has the highest adjusted net income after tax (ADJ NI) / sales ratio of 44% with least fluctuations. This has been proved by the recording the standard deviation of just 0.04.

NHPC has the second highest adjusted net income after tax (ADJ NI) / sales ratio of 22%, but it has the high standard deviation of 0.11, as compared to that with the NTPC (0.03) and GIPCL (0.03). NTPC and GIPCL also has an average ratio of 10% and 11%.

SJVN has the best ratios whereas the RPOWER and the RTNPOWER has the worst ratios. NTPC and GIPCL has same standard deviation and ratios, their performance is better as compared to that with the RPOWER and the RTNPOWER. NHPC has the second highest ratio, but it has little higher standard deviation comparatively.

Table 3.k

Ratio of return on Total Capital Earnings before Interest & Tax (EBIT) and Total Debt (TD) + Total Equity (TE), Rs. (Cr)

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | EBIT | 2842.32 | 2391.04 | 3714.31 | 3105.07 | 2177.8 | 3633.34 | 3552.85 | 1940.58 | 4710.32 |
| | TD+TE | 28652.26 | 29072.35 | 30213.36 | 31106.64 | 30379.71 | 29795.15 | 29487.36 | 27504.96 | 26987.52 |
| NTPC | EBIT | 8,804 | 11154.19 | 10831.97 | 14757.6 | 20737.52 | 11032.22 | 11954.25 | 14515.78 | 6304.85 |
| | TD+TE | 52394 | 59000.29 | 63097.4 | 72833.18 | 83787.76 | 101608.38 | 110483.74 | 112316.75 | 125021.27 |
| SJVN | EBIT | 978.23 | 1047.23 | 1111.23 | 1049.65 | 1096.81 | 2149.7 | 1349.61 | 1664.66 | 1278.21 |
| | TD+TE | 5790.69 | 5890.55 | 5637.97 | 6012.9 | 6350.14 | 6617.61 | 6640.17 | 6366.1 | 5965.14 |
| RPOWER | EBIT | -78.41 | 87.27 | 425.52 | 1400.73 | 1461.14 | 1977.82 | 5912.15 | 2267.15 | 2348.71 |
| | TD+TE | 4637.41 | 10139.95 | 17067.84 | 27019.7 | 29050.14 | 31025.68 | 31964.51 | 29095.15 | 27006.33 |
| RTN POWER | EBIT | -37.18 | -37.17 | -39.97 | -168.2 | -25.12 | -169.61 | -187.8 | -360.5 | -1683 |
| | TD+TE | 2221. | 3057.18 | 4189.94 | 8326.21 | 12739.60 | 13554.38 | 14996.03 | 14980.77 | 14027.44 |
| GIPCL | EBIT | 124.42 | 1163.81 | 234.36 | 551.96 | 299.50 | 268.78 | 260.3 | 275.1 | 304.6 |
| | TD+TE | 1215.3 | 1264.79 | 898.32 | 793.19 | 688.07 | 582.95 | 477.83 | 422.716 | 512.53 |

Source: Annual reports.

*Note: FM means financial metrics.*

The above Table 3.k depicts the data related to the earnings before interest and tax and the total capital employed by the power generating companies from 2009–10 to 2017–18. It is observed that the total capital employed (total debt plus total equity) for NHPC has been increasing continuously from 2009–10 to 2012–13 at the rate of 1.47%, 3.92% and 2.96%, but it has been decreasing since 2013–14 to 2017–18 at the average rate of -2.78%. Total capital employed in NTPC has been increasing at an average rate of 12% from 2009–10 to 2017–18. SJVN has an increasing total capital employed from 2011–12 to 2015–16 but it started to decrease from the year 2015–16 to 2017–18. RPOWER too has an increasing total capital employed from 2009–10 to 2015–16 but it has a decreasing total capital employed since 2015–16 to 2017–18. RTNPOWER too has the increasing total capital employed from 2009–10 to 2016–17. GIPCL in the other hand has the decreasing total capital employed. The increase or decrease in total capital employed cannot tell the whole story, so the total capital employed will be compared with the earnings by the power generating companies. This comparison will give the efficiency level of each selected power generating companies in India. In the next table ratio of earnings before interest and tax (EBIT) and total capital employed has been calculated.

Table 3.l

Ratio of return on Total Capital

EBIT/Total Debt (TD) + Total Equity (TE) ratio, (%)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 9.92% | 16.80% | 16.89% | -1.69% | -1.67% | 10.24% |
| 2010–11 | 8.22% | 18.91% | 17.78% | 0.86% | -1.22% | 92.02% |
| 2011–12 | 12.29% | 17.17% | 19.71% | 2.49% | -0.95% | 26.09% |
| 2012–13 | 9.98% | 20.26% | 17.46% | 5.18% | -2.02% | 69.59% |
| 2013–14 | 7.17% | 24.75% | 17.27% | 5.03% | -0.20% | 43.53% |
| 2014–15 | 12.19% | 10.86% | 32.48% | 6.37% | -1.25% | 46.11% |
| 2015–16 | 12.05% | 10.82% | 20.32% | 18.50% | -1.25% | 54.48% |
| 2016–17 | 7.06% | 12.92% | 26.15% | 7.79% | -2.41% | 65.10% |
| 2017–18 | 17.45% | 5.04% | 21.43% | 8.70% | -12.00% | 59.43% |
| Average | 10.70% | 15.28% | 21.06% | 5.92% | -2.55% | 51.84% |
| Stdev | 0.033 | 0.060 | 0.052 | 0.058 | 0.036 | 0.241 |

Source: Computed by the researcher.

The ratio in the above Table 3.l as depicted is dependent on the value of both the numerator (EBIT) and the denominator (TD + TE). The NHPC has an increasing ratio, in 2009–10 the ratio was 9.92% but in the year 2017–18 it was 17.45%, which is 1.75 times increase. The average ratio for NHPC is 10.70% with a standard deviation of

0.033. NHPC has the lowest standard deviation among the other selected power generating companies. NTPC had a ratio of 16.80% in the year 2009–10, which was highest in that year among the other selected power generating companies, but in the year 2017–18 it had the ratio of just 5.04%. This is due to the increase in total capital employed. The average ratio for the NTPC is 15.28% with a standard deviation of 0.060 which is a little higher than the NHPC. SJVN has one of the best ratios as compared to the other selected power generating companies, it has an average ratio of 21.06% with a standard deviation of 0.052 which is lower than that of the NTPC. GIPCL too has a high ratio of 51.84% but it also has a high standard deviation of 0.241 as compared to other selected power generating companies. RTNPOWER has the lowest ratio in negative. It has an average ratio of negative 2.55% with a standard deviation of 0.036. Even though 10–15% ratio is considered good, the average ratio for the power generating companies is 17.04%.

SJVN has the best ratio of return on capital employed, as it has the average ratio of 21.06%, which is higher than the industry average of 17.04% as well as the ideal ratio of 10%–15%, and it also has a lower standard deviation of just 0.052.

NHPC and NTPC have a ratio lower than the industry average of 17.04%. In the other hand GIPCL has a higher average ratio of 51.84% but has a higher standard deviation of 0.241.

RTNPOWER is one of the worst performing power generating company in terms of the return on capital employed ratio. It has a ratio in negative.

The inference from the above discussion can be taken out as, SJVN has one of the best operational strategies and shows the expertise on decision taking capacity regarding the company’s finance. In the other hand RTNPOWER need to improvise on the efficient decision-making mechanism before deciding to take any finance, also the company need to focus in increasing the operational efficiencies.

### 3.2.3 Activity/performance ratios

Table 3.m

Sales and Total Assets Invested (TA), Rs. (Cr).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | Sales | 5229.56 | 4378.32 | 6,927.40 | 6487.4 | 7,243.44 | 8,352.25 | 8,749.17 | 7,214.00 | 6520.9 |
| | TA | 44840.2 | 46822.53 | 60288.66 | 62336.1 | 61401.13 | 63267.9 | 61950.04 | 57266.71 | 60387.63 |
| NTPC | Sales | 47667.1 | 57,106.99 | 64,840.13 | 67,996.09 | 78,618.65 | 79,818.95 | 77,700.94 | 80,823.10 | 79,298.08 |
| | TA | 108957 | 121306.2 | 155262 | 178710.58 | 200039.93 | 219576.15 | 240449.05 | 248497.36 | 274368.06 |
| SJVN | Sales | 1719.42 | 1715.38 | 1820.95 | 1729.62 | 1841.33 | 2825.42 | 2509.4 | 2436.86 | 2158.71 |
| | TA | 9184.99 | 9808.79 | 12116.73 | 12489.34 | 13560.6 | 14632.17 | 15432.29 | 15390.8 | 14390.45 |
| RPOWER | Sales | 20.72 | 1023.68 | 1958.39 | 4924.88 | 5111.88 | 6850.65 | 10658.58 | 9059.63 | 8635.87 |
| | TA | 16703.66 | 24168.27 | 39258.94 | 51933.86 | 56020.94 | 62025.87 | 63003.41 | 64165.17 | 63473.46 |
| RTN POWER | Sales | *[1] | * | * | * | 338.78 | 617.32 | 2774.98 | 587.1 | 1,402.22 |
| | TA | 3920.74 | 4829.13 | 11071.44 | 10528.54 | 11526.64 | 12774.49 | 20720.72 | 21207.39 | 21369.97 |
| GIPCL | Sales | 939.12 | 1077.94 | 1290.99 | 1,407.01 | 1,371.04 | 1,209.06 | 1,345.76 | 1,303.81 | 1,358.19 |
| | TA | 2386.51 | 2525.15 | 2963.75 | 2946.94 | 2992.32 | 3011.83 | 3057.53 | 3414.19 | 3785.78 |

Source: Annual reports.

*Note: FM means financial metrics.*

The measure of operational efficiency is truly depicted by the level of sales generated by the firm utilizing its assets power. The Table 3.m represents the value of the sales generated by the selected power generating companies in India and the total assets accumulated. It can be best interpreted by comparing the sales and the total assets ratio

[1] RTNPOWER has no record of sales in that particular year.

among the power generating companies. Higher the ratio better it is, even though the industry average ratio is calculated for comparison purpose. RTNPOWER had no sales in record in the years, 2009–10, 2010–11, 2011–12 and 2012–13. RPOWER has a sudden increase (49 times) in the year 2010–11.

Table 3.n

Sales/Total Assets Investment (TA) ratio, (%)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 11.66% | 43.75% | 18.72% | 0.12% | **[2] | 39.35% |
| 2010–11 | 9.35% | 47.08% | 17.49% | 4.24% | ** | 42.69% |
| 2011–12 | 11.49% | 41.76% | 15.03% | 4.99% | ** | 43.56% |
| 2012–13 | 10.41% | 38.05% | 13.85% | 9.48% | ** | 47.74% |
| 2013–14 | 11.80% | 39.30% | 13.58% | 9.12% | 2.94% | 45.82% |
| 2014–15 | 13.20% | 36.35% | 19.31% | 11.04% | 4.83% | 40.14% |
| 2015–16 | 14.12% | 32.31% | 16.26% | 16.92% | 13.39% | 44.01% |
| 2016–17 | 12.60% | 32.52% | 15.83% | 14.12% | 0.03% | 38.19% |
| 2017–18 | 10.80% | 28.90% | 15.00% | 13.61% | 6.56% | 35.88% |
| Average | 12% | 38% | 16% | 9% | 3% | 42% |
| Stdev | 0.01 | 0.06 | 0.02 | 0.05 | 0.05 | 0.04 |

Source: Computed by the researcher.

It is noted from the above Table 3.n, GIPCL has the highest average sales by total assets investment ratio of 42% with a standard deviation of 0.04. RTNPOWER has the lowest average ratio of 3%, due to no sales in the period 2009–10 to 2012–13. NTPC has the second highest ratio of 38% followed by NTPC (38%), SJVN (16%), NHPC (12%) and RPOWER (9%). The industry average ratio as calculated is 20%. Only GIPCL and NTPC has the ratio which is above the industry average of 20%. According to the sales by the total asset's investment ratio, GIPCL and NTPC have the best performance and

[2] ** Ratio could not be calculated as the sales record was zero in that particular year.

supports the operational efficiency in utilizing the invested assets. The work will be incomplete if this ratio is left in isolation, as this ratio alone cannot prove the efficiency of the management. In order to support the inference other related ratios like annual sales by total stock holder's equity, net income by total assets, net income by average assets has been calculated to confirm the operational efficiency of the selected power generating companies.

Table 3.o

Sales and Total Stock Holder’s Equity (TSE), Rs (Cr)

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | Sales | 5229.56 | 4378.32 | 6,927.40 | 6487.4 | 7,243.44 | 8,352.25 | 8,749.17 | 7,214.00 | 6520.9 |
| | TSE | 12300.74 | 12300.74 | 12300.74 | 12300.74 | 11,070.67 | 11,070.67 | 11,070.67 | 10,259.32 | 10,259.32 |
| NTPC | Sales | 47667.1 | 57,106.99 | 64,840.13 | 67,996.09 | 78,618.65 | 79,818.95 | 77,700.94 | 80,823.10 | 79,298.08 |
| | TSE | 8245.5 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 |
| SJVN | Sales | 1719.42 | 1715.38 | 1820.95 | 1729.62 | 1841.33 | 2825.42 | 2509.4 | 2436.86 | 2158.71 |
| | TSE | 4108.81 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 3929.8 |
| RPOWER | Sales | 20.72 | 1023.68 | 1958.39 | 4924.88 | 5111.88 | 6850.65 | 10658.58 | 9059.63 | 8635.87 |
| | TSE | 2396.8 | 2805.13 | 2805.13 | 2805.13 | 2796.63 | 2805.13 | 2805.13 | 2805.13 | 2805.13 |
| RTNPOWER | Sales | * | * | * | * | 338.78 | 617.32 | 2774.98 | 587.1 | 1,402.22 |
| | TSE | 2,021.30 | 2022.93 | 2227.32 | 2642.73 | 2642.73 | 2952.93 | 2952.93 | 2,845.43 | 2945.43 |
| GIPCL | Sales | 939.12 | 1077.94 | 1290.99 | 1,407.01 | 1,371.04 | 1,209.06 | 1,345.76 | 1,303.81 | 1,358.19 |
| | TSE | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 |

Source: Annual reports.

*Note: FM means financial metrics,* refer pg. 69 (foot note)*

The values for the sales and the total stock holder’s equity are presented in Table 3.o. The ratio of the total stock holder’s equity by sales is calculated to check the efficiency of management in generating the sales in proportion to the shares. Higher the ratio better it is, even though the industry average is calculated and other related ratio too will give a complete picture about the performance efficiency of the selected power generating companies.

Table 3.p

Sales/ Total Stock Holder's Equity (TSE) ratio, (times)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 0.43 | 5.78 | 0.42 | 0.01 | 0.00 | 6.21 |
| 2010–11 | 0.36 | 6.93 | 0.41 | 0.36 | 0.00 | 7.13 |
| 2011–12 | 0.56 | 7.86 | 0.44 | 0.70 | 0.00 | 8.54 |
| 2012–13 | 0.53 | 8.25 | 0.42 | 1.76 | 0.00 | 9.30 |
| 2013–14 | 0.65 | 9.53 | 0.45 | 1.83 | 0.13 | 9.06 |
| 2014–15 | 0.75 | 9.68 | 0.68 | 2.44 | 0.21 | 7.99 |
| 2015–16 | 0.79 | 9.42 | 0.61 | 3.80 | 0.94 | 8.90 |
| 2016–17 | 0.70 | 9.80 | 0.59 | 3.23 | 0.21 | 8.62 |
| 2017–18 | 0.64 | 9.62 | 0.55 | 3.08 | 0.48 | 8.98 |
| Average | 0.60 | 8.54 | 0.51 | 1.91 | 0.22 | 8.30 |
| Stdev | 0.15 | 1.44 | 0.10 | 1.34 | 0.31 | 1.03 |

Source: Computed by the researcher.

Observing the data in the above Table 3.p, it is noted that the NTPC has the highest ratio of 8.54 with a standard deviation of 1.44. GIPCL is in the second position recording a ratio of 8.30 with a standard deviation of 1.03 followed by RPOWER 1.91 (Stdev 1.34), NHPC .60 (Stdev 0.15) and RTNPOWER 0.22 (Stdev 0.31). The inference is that NTPC is the best performer in terms of generating sales in proportion to the total stock holder's equity shares as compared to its peers. RTNPOWER has the worst performance as it has the lowest ratio of just 0.22 which is lowest among the selected power generating companies. The industry average ratio for sales by the total stock holder's shares as calculated is 3.35. NTPC and GIPCL have the ratio higher than the industry average ratio, except all other power generating companies has average ratio lower than the industry average.

Table 3.q

Ratio of return on Investment

Net Income after tax (NI) and Total Assets Invested (TA), Rs. (Cr.).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | NI | 2090.5 | 2316.16 | 3403.59 | 2900.6 | 1218.75 | 2491.36 | 2688.26 | 2761.54 | 2774.7 |
| | TA | 44840.2 | 46822.53 | 60288.66 | 62336.1 | 61401.13 | 63267.9 | 61950.04 | 57266.71 | 60387.63 |
| NTPC | NI | 8837.7 | 9348.23 | 9814.66 | 4024.73 | 11403.4 | 9992.37 | 10162.43 | 10713.94 | 10501.5 |
| | TA | 108957 | 121306.2 | 155262 | 178710.58 | 200039.93 | 219576.15 | 240449.05 | 248497.36 | 274368.06 |
| SJVN | NI | 972.74 | 912.13 | 1068.68 | 1052.34 | 1114.5 | 1676.65 | 1402.15 | 1547.18 | 1224.61 |
| | TA | 9184.99 | 9808.79 | 12116.73 | 12489.34 | 13560.6 | 14632.17 | 15432.29 | 15390.8 | 14390.45 |
| RPOWER | NI | 683.89 | 760.44 | 866.78 | 1011.46 | 1026.67 | 1028.32 | 1361.94 | 1104.16 | 1034.81 |
| | TA | 16703.66 | 24168.27 | 39258.94 | 51933.86 | 56020.94 | 62025.87 | 63003.41 | 64165.17 | 63473.46 |
| RTN POWER | NI | 37.72 | 9.66 | 86.98 | -26.28 | -72.82 | -339.8 | -190.9 | -630.5 | -1663 |
| | TA | 3920.74 | 4829.13 | 11071.44 | 10528.54 | 11526.64 | 12774.49 | 20720.72 | 21207.39 | 21369.97 |
| GIPCL | NI | 106.78 | 162.95 | 118.36 | 218.88 | 185.88 | 126.31 | 188.41 | 229.24 | 244.5 |
| | TA | 2386.51 | 2525.15 | 2963.75 | 2946.94 | 2992.32 | 3011.83 | 3057.53 | 3414.19 | 3785.78 |

Source: Annual reports.

*Note: FM means financial metrics.*

The Table 3.q above represents the data relating to the net income and the total assets invested by the selected power generating companies in India. The main objective of every firm in investing in the assets is to earn good return. It is no different for the power generating companies in India. So, it will give a clear picture when the net income is compared with the total assets in the firm. After observing the data in the above table, it is noted that the RTNPOWER has the highest average total assets investment growth rate of 29% within the period of study, with a standard deviation of 0.46 (highest among the other selected power generating companies). It means that the total assets investments were increasing but mostly concentrated to one or few periods.

From the above observation, RTNPOWER has recorded the highest total assets investment growth in the year 2011–12 (129 times growth from the previous year) and in the year 2015–16 (62 times growth from the previous year). So, RTNPOWER has a high average total assets investment growth mostly concentrate in these two periods 2011–12 and 2015–16. RPOWER has recorded the second highest average total assets investment growth rate of 20.04% within the selected period of study with a standard deviation of 0.24 which is the second highest standard deviation among the other selected power generating companies. It is noted that RPOWER has highest growth rate of 44.69%, 62.44% and 32.39% in the years 2010–11, 2011–12 and 2012–13. So, for RTPOWER too, the growth rate has been concentrated mostly in within these three years. NHPC has the lowest average total assets investment growth rate of 4.24% with a low standard deviation of 0.11 followed by SJVN (average total assets investment growth rate 6.07%, standard deviation 0.09) and GIPCL (average total assets investment growth rate 6.11%, standard deviation 0.07). NTPC has recorded the second highest average total assets investment growth rate of 12.42%, with a low standard deviation of 0.07. The growth in total assets investment is good only if the management can generate high return from the assets invested, in order to get a clear picture net income by total assets invested ratio has been calculated and presented in the table next page.

Table 3.r

Ratio of return on Total assets investment

Net Income (NI)/Total Assets Investment (TA) ratio, (%)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 4.66% | 8.11% | 10.59% | 4.09% | 0.96% | 4.47% |
| 2010–11 | 4.95% | 7.71% | 9.30% | 3.15% | 0.20% | 6.45% |
| 2011–12 | 5.65% | 6.32% | 8.82% | 2.21% | 0.79% | 3.99% |
| 2012–13 | 4.65% | 2.25% | 8.43% | 1.95% | -0.25% | 7.43% |
| 2013–14 | 1.98% | 5.70% | 8.22% | 1.83% | -0.63% | 6.21% |
| 2014–15 | 3.94% | 4.55% | 11.46% | 1.66% | -2.66% | 4.19% |
| 2015–16 | 4.34% | 4.23% | 9.09% | 2.16% | -0.92% | 6.16% |
| 2016–17 | 4.82% | 4.31% | 10.05% | 1.72% | -2.97% | 6.71% |
| 2017–18 | 4.59% | 3.83% | 8.51% | 1.63% | -7.78% | 6.46% |
| Average | 4.40% | 5.22% | 9.38% | 2.27% | -1.47% | 5.79% |
| Stdev | 0.01 | 0.02 | 0.01 | 0.01 | 0.03 | 0.01 |

Source: Computed by the researcher.

The above Table 3.r is presented with the ratio of net income by total assets investment in order to check the operational efficiency of the power generating companies in terms of net income generation as compared to the total assets invested. It is noted from the above table that the SJVN has the highest ratio of 9.38% (higher than the industry average of 4.26%) with a low standard deviation of 0.01. GIPCL, NTPC and NHPC too have a good ratio of 5.79%, 5.22% and 4.40% (higher than the industry average of 4.26%) with a low standard deviation of 0.01, 0.02 and 0.01. It is also noted that the RPOWER and RTNPOWER have recorded a poor ratio of 2.27% and negative 1.47% (lower than the industry average of 4.26%), with a lower standard deviation of 0.01 and 0.03.

The inference from the above observation is that SJVN has the best net income by total assets investment ratio followed by the GIPCL, NTPC and NHPC. RPOWER and

RTNPOWER have the lowest ratio. RPOWER and RTNPOWER should focus in increasing the operational efficiency.

Net income sometimes can be deceiving backed by the face of other income, which may not be related with the firm's main operation. In order to achieve efficient result, adjusted net income (ADJ NI) has been calculated by excluding the other income. Adjusted net income has been compared with the total assets invested to measure the real efficiency in terms of their main operations.

Table 3.s

Adjusted Net Income (ADJ NI)/Total Assets Investment (TA) ratio, (%)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 3.22% | 5.47% | 9.08% | -45.16% | -1.18% | 3.89% |
| 2010–11 | 3.22% | 5.63% | 7.84% | -0.55% | -0.71% | 5.84% |
| 2011–12 | 3.60% | 4.43% | 7.09% | 0.30% | -0.73% | 3.80% |
| 2012–13 | 2.70% | 0.48% | 6.55% | 1.26% | -0.89% | 6.94% |
| 2013–14 | -0.17% | 4.31% | 6.47% | 1.17% | -1.14% | 5.18% |
| 2014–15 | 2.49% | 3.60% | 8.43% | 1.18% | -3.14% | 2.76% |
| 2015–16 | 2.81% | 3.71% | 6.43% | 1.58% | -1.31% | 5.01% |
| 2016–17 | 2.20% | 3.92% | 5.82% | 0.95% | -3.71% | 4.63% |
| 2017–18 | 2.77% | 3.26% | 6.04% | 1.18% | -8.48% | 5.10% |
| Average | 2.54% | 3.87% | 7.08% | -4.23% | -2.37% | 4.80% |
| Stdev | 0.01 | 0.02 | 0.01 | 0.15 | 0.03 | 0.01 |

Source: Computed by the researcher.

It is noted from the above Table 3.s that SJVN still is the best performer in terms of the ratio (Adjusted Net Income (ADJ NI) / Total Assets Investment (TA). It has an average adjusted net income by total assets investment of 7.08% (above industry average of (1.95%). GIPCL has the second highest ratio (4.80%) followed by NTPC (3.87%) and NHPC (2.54%) with a standard deviation of 0.01, 0.02 and 0.01.

The important point noted after calculating adjusted net income is that RPOWER recorded a negative average ratio (-4.23%), earlier without excluding the other income it had a positive average ratio of 2.27%. RPOWER has a lowest ratio, lower than that of RTNPOWER (-2.37%). It can be inferred that the ratio of almost all power generating companies reduced after excluding the other income while calculating the net income.

To confirm the inferences as discussed above, similar ratio, a comparison of net income with the average assets has been calculated in the table below.

Table 3.t

Ratio of return on Average Assets

Net Income after tax (NI) and Average Assets (AA), Rs. (Cr).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | NI | 2090.5 | 2316.16 | 3403.59 | 2900.6 | 1218.75 | 2491.36 | 2688.26 | 2761.54 | 2774.7 |
| | AA | 41228.9 | 42770.24 | 53555.59 | 61312.38 | 61868.61 | 62334.51 | 62608.97 | 59608.37 | 58827.17 |
| NTPC | NI | 8837.7 | 9348.23 | 9814.66 | 4024.73 | 11403.4 | 9992.37 | 10162.43 | 10713.94 | 10501.5 |
| | AA | 103975. | 115131.6 | 138284.1 | 1,66,986. | 1,89,375. | 2,09,808. | 2,30,012. | 2,44,473. | 261432.7 |
| SJVN | NI | 972.74 | 912.13 | 1068.68 | 1052.34 | 1114.5 | 1676.65 | 1402.15 | 1547.18 | 1224.61 |
| | AA | 9112.06 | 9496.89 | 10962.76 | 12303.03 | 13024.97 | 14096.38 | 15032.23 | 15411.54 | 14890.62 |
| RPOWER | NI | 683.89 | 760.44 | 866.78 | 1011.46 | 1026.67 | 1028.32 | 1361.94 | 1104.16 | 1034.81 |
| | AA | 13929.4 | 20435.96 | 31713.6 | 45596.4 | 53977.4 | 59023.40 | 62,514.6 | 63584.29 | 63819.31 |
| RTNPOWER | NI | 37.72 | 9.66 | 86.98 | -26.28 | -72.82 | -339.83 | -190.91 | -630.57 | -1663.48 |
| | AA | 3113.48 | 4374.93 | 7950.281 | 10799.98 | 11027.58 | 12150.56 | 16747.60 | 1070730. | 1071054. |
| GIPCL | NI | 106.78 | 162.95 | 118.36 | 218.88 | 185.88 | 126.31 | 188.41 | 229.24 | 244.5 |
| | AA | 2244.85 | 2455.83 | 2744.45 | 2955.34 | 2969.62 | 3002.07 | 3034.68 | 3235.85 | 3599.98 |

Source: Annual reports.

*Note: FM means financial metrics.*

The data in the Table 3.t represents the value for average assets and the net income. The average assets for the power generating companies has been calculated considering the present year's assets and the previous year's assets. The average assets alone cannot give any meaningful interpretation, the ratio has been calculated in the table below, comparing the net income of the power generating companies with its average assets. Higher the ratio better it is, even though the industry average ratio has been calculated as a bench mark.

Table 3.u

Net Income (NI)/ Average Assets (AA) ratio, (%)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 5.07% | 8.50% | 10.68% | 4.91% | 1.21% | 4.76% |
| 2010–11 | 5.42% | 8.12% | 9.60% | 3.72% | 0.22% | 6.64% |
| 2011–12 | 6.36% | 7.10% | 9.75% | 2.73% | 1.09% | 4.31% |
| 2012–13 | 4.73% | 2.41% | 8.55% | 2.22% | -0.24% | 7.41% |
| 2013–14 | 1.97% | 6.02% | 8.56% | 1.90% | -0.66% | 6.26% |
| 2014–15 | 4.00% | 4.76% | 11.89% | 1.74% | -2.80% | 4.21% |
| 2015–16 | 4.29% | 4.42% | 9.33% | 2.18% | -1.14% | 6.21% |
| 2016–17 | 4.63% | 4.38% | 10.04% | 1.74% | -0.06% | 7.08% |
| 2017–18 | 4.72% | 4.02% | 8.22% | 1.62% | -0.16% | 6.79% |
| Average | 4.58% | 5.53% | 9.62% | 2.53% | -0.28% | 5.96% |
| Stdev | 0.012 | 0.020 | 0.012 | 0.011 | 0.012 | 0.012 |

Source: Computed by the researcher.

It is noted from the above Table 3.u that SJVN has the best ratio of 9.62% which is higher than the industry average of 4.66% with a lower standard deviation of 0.012. This signifies the stability of ratio throughout the period of the study from 2009–10 to 2017–18. GIPCL has the second highest average ratio of 5.96% followed by NTPC (5.53%) and NHPC (4.58%) all higher than the industry average of 4.66%. RPOWER and RTNPOWER has the lowest average ratio of 2.53% and negative 0.28%.

The inference that can be drawn from the discussion is that SJVN has the most efficient operational efficacies in managing its assets as well as the investments. This power generating company is able to generate higher returns in relation to the assets and the investments as compared to the other selected peer companies. GIPCL, NTPC and NHPC also have good ratios as compared to the RPOWER and the RTNPOWER.

### 3.2.4 Leverage ratio

Table 3.v

Debt And Total Stock Holder's Equity (TSE), Rs. (Cr).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | Debt | 16351.52 | 16771.61 | 17912.62 | 18805.9 | 19309.04 | 18724.48 | 18416.69 | 17245.64 | 16728.2 |
| | TSE | 12300.74 | 12300.74 | 12300.74 | 12300.74 | 11,070.67 | 11,070.67 | 11,070.67 | 10,259.32 | 10,259.32 |
| NTPC | Debt | 44148.5 | 50754.83 | 54851.94 | 64587.72 | 75542.3 | 93362.92 | 102238.28 | 104071.29 | 116775.81 |
| | TSE | 8245.5 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 |
| SJVN | Debt | 1681.88 | 1753.92 | 1501.34 | 1876.27 | 2213.51 | 2480.98 | 2503.54 | 2229.47 | 2035.34 |
| | TSE | 4108.81 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 3929.8 |
| RPOWER | Debt | 2240.61 | 7334.83 | 14262.71 | 24214.57 | 26253.51 | 28220.55 | 29159.38 | 26290.02 | 24201.2 |
| | TSE | 2396.8 | 2805.13 | 2805.13 | 2805.13 | 2796.63 | 2805.13 | 2805.13 | 2805.13 | 2805.13 |
| RTN POWER | Debt | 200.64 | 1034.25 | 1962.62 | 5683.49 | 10096.88 | 10601.45 | 12043.11 | 12135.34 | 11082.01 |
| | TSE | 2,021.30 | 2022.93 | 2227.32 | 2642.73 | 2642.73 | 2952.93 | 2952.93 | 2,845.43 | 2945.43 |
| GIPCL | Debt | 1064.07 | 1113.54 | 747.07 | 641.95 | 536.83 | 431.71 | 326.59 | 271.46 | 361.29 |
| | TSE | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 |

Source: Annual reports.

*Note: FM means financial metrics.*

The Table 3.v represents the valuation of total debt and total equity shares as recorded by the selected power generating companies in India. It is very much important to compare total debt with the total equity share or the owner's investment. Higher debt represents the high leverage in any company. Higher leverage in the other hand determines the risk of insolvency. The power generating companies are high capital-intensive business. The ideal leverage ratio is 1.0 but the power sector being a capital-intensive industry, leverage ratio of 2.5 is considered.

Table 3.w

Debt/Total Stock Holder's Equity (TSE), ratio, (times)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 1.33 | 5.35 | 0.41 | 0.93 | 0.10 | 7.04 |
| 2010–11 | 1.36 | 6.16 | 0.42 | 2.61 | 0.51 | 7.36 |
| 2011–12 | 1.46 | 6.65 | 0.36 | 5.08 | 0.88 | 4.94 |
| 2012–13 | 1.53 | 7.83 | 0.45 | 8.63 | 2.15 | 4.24 |
| 2013–14 | 1.74 | 9.16 | 0.54 | 9.39 | 3.82 | 3.55 |
| 2014–15 | 1.69 | 11.32 | 0.60 | 10.06 | 3.59 | 3.59 |
| 2015–16 | 1.66 | 12.40 | 0.61 | 10.40 | 4.08 | 2.16 |
| 2016–17 | 1.68 | 12.62 | 0.54 | 9.37 | 4.26 | 1.79 |
| 2017–18 | 1.63 | 14.16 | 0.52 | 8.63 | 3.76 | 2.39 |
| Average | 1.57 | 9.52 | 0.49 | 7.23 | 2.57 | 4.12 |
| Stdev | 0.15 | 3.21 | 0.09 | 3.48 | 1.68 | 2.02 |

Source: Computed by the researcher.

It is clear from the above Table 3.w that SJVN has the lowest average leverage ratio of 0.49 which is lower than the ideal ratio of 1.0 with a standard deviation of just 0.09. Among the selected power generating companies, NTPC is one of the powers generating company having the highest leverage ratio of 9.52 which is much higher than the ideal ratio of 2.5 (ratio considered for the capital-intensive industry). Even NHPC has a low leverage ratio of 1.57 which is much lower than the ideal ratio of 2.5 considered for the capital-intensive industry. RTNPOWER has a ratio of 2.57 which is little lower than the ideal ratio of 2.5 as considered for the capital-intensive industry. It is to be noted that even though the ratio is quite lower but it has a high standard deviation of 1.68. RPOWER has the highest ratio of 7.23 and considered high risk to insolvency. The calculated industry average leverage ratio is 4.25 which is higher than the ideal ratio of 2.5. This depicts the nature of a sector which is mostly dependent on the debt capital for its operation. The overall sector itself is over leveraged. Among the selected power generating companies only SJVN, NHPC and RTNPOWER have the average leverage ratio lower than the ideal ratio of 2.5.

Table 3.x

Total Liability (TL) and Total Stock Holder's Equity (TSE), Rs. (Cr.)

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | TL | 32539.46 | 34521.79 | 47987.92 | 50035.36 | 50330.46 | 52197.23 | 50879.37 | 49917.81 | 50128.31 |
| | TSE | 12300.74 | 12300.74 | 12300.74 | 12300.74 | 11,070.67 | 11,070.67 | 11,070.67 | 10,259.32 | 10,259.32 |
| NTPC | TL | 100711.5 | 113060.74 | 147016.54 | 170465.12 | 191794.47 | 211330.69 | 232203.59 | 240251.9 | 266122.6 |
| | TSE | 8245.5 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 | 8,245.46 |
| SJVN | TL | 5076.18 | 5672.16 | 7980.12 | 8352.71 | 9423.97 | 10495.54 | 11295.66 | 11254.17 | 10460.65 |
| | TSE | 4108.81 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 4136.63 | 3929.8 |
| RPOWER | TL | 14306.86 | 21363.14 | 36453.81 | 49128.73 | 53224.31 | 28389.11 | 60198.28 | 61360.04 | 60668.33 |
| | TSE | 2396.8 | 2805.13 | 2805.13 | 2805.13 | 2796.63 | 2805.13 | 2805.13 | 2805.13 | 2805.13 |
| RTNPOWER | TL | 2069.43 | 3234.4 | 8844.11 | 7885.81 | 8883.91 | 9821.56 | 17767.78 | 18361.96 | 8136.58 |
| | TSE | 2,021.30 | 2022.93 | 2227.32 | 2642.73 | 2642.73 | 2952.93 | 2952.93 | 2,845.43 | 2945.43 |
| GIPCL | TL | 2235.26 | 2373.9 | 2812.5 | 2795.69 | 2841.06 | 2860.58 | 2906.28 | 3262.93 | 3634.52 |
| | TSE | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 | 151.25 |

Source: Annual reports.

*Note: FM means financial metrics.*

Total liability is also considered as all the liabilities are future obligations of the company to pay. Time may differ but the liabilities has to be paid by the power generating companies. Considering this fact, total liabilities are also being considered as recorded in the above table 3.x. This total liability is compared with the owner's fund or the equity share. It is very much important to segregate these two types of capitals. After considering the debt equity ratio, another ratio total liability by equity share has been calculated. This will add a clearer frame to a given picture.

Table 3.y

Total liability/Total Stock Holder's Equity (TSE), ratio, (times)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 2.65 | 12.21 | 1.24 | 5.97 | 1.02 | 14.78 |
| 2010–11 | 2.81 | 13.71 | 1.37 | 7.62 | 1.60 | 15.70 |
| 2011–12 | 3.90 | 17.83 | 1.93 | 13.00 | 3.97 | 18.59 |
| 2012–13 | 4.07 | 20.67 | 2.02 | 17.51 | 2.98 | 18.48 |
| 2013–14 | 4.55 | 23.26 | 2.28 | 19.03 | 3.36 | 18.78 |
| 2014–15 | 4.71 | 25.63 | 2.54 | 10.12 | 3.33 | 18.91 |
| 2015–16 | 4.60 | 28.16 | 2.73 | 21.46 | 6.02 | 19.21 |
| 2016–17 | 4.87 | 29.14 | 2.72 | 21.87 | 6.45 | 21.57 |
| 2017–18 | 4.89 | 32.28 | 2.66 | 21.63 | 2.76 | 24.03 |
| Average | 4.12 | 22.54 | 2.17 | 15.36 | 3.50 | 18.89 |
| Stdev | 0.86 | 6.99 | 0.57 | 6.31 | 1.80 | 2.76 |

Source: Computed by the researcher.

It is noted from the above Table 3.y that still SJVN has a lowest average ratio of 2.17 with a standard deviation of 0.57. In the second position is RTNPOWER (3.50) followed by NHPC (4.12). The other three power generating companies namely NTPC (22.54), GIPCL (18.89) and RPOWER (15.36) has very high ratios. Higher the ratio riskier it is as this will increase the chance of insolvency. The industry average ratio as calculated came to 11.10 which is quite high. NTPC, GIPCL and RPOWER have a ratio higher than the industry average of 11.10 which means these companies have lots of future obligation to pay the dues. In order to have a clearer view on the probability of insolvency among the selected power generating companies, coverage ratios and change in debt ratios are being calculated.

### 3.2.5 Coverage ratios

Table 3.aa

Earnings before Interest & Tax (EBIT) and Interest, Rs (Cr).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | EBIT | 2842.32 | 2391.04 | 3714.31 | 3105.07 | 2177.8 | 3633.34 | 3552.85 | 1940.58 | 4710.32 |
| | Interest | 650.82 | 582.99 | 536.78 | 552.03 | 1143.84 | 1241.96 | 1082.76 | 1038.84 | 886.3 |
| NTPC | EBIT | 8,804 | 11154.19 | 10831.97 | 14757.6 | 20737.52 | 11032.22 | 11954.25 | 14515.78 | 6304.85 |
| | Interest | 1291.4 | 1663.05 | 1685.83 | 2691.35 | 3048.52 | 3458.01 | 4089.33 | 3604.48 | 4119.09 |
| SJVN | EBIT | 978.23 | 1047.23 | 1111.23 | 1049.65 | 1096.81 | 2149.7 | 1349.61 | 1664.66 | 1278.21 |
| | Interest | 150.07 | 131.47 | 81.18 | 52.07 | 28.01 | 37.98 | 51.2 | 15.22 | 55.35 |
| RPOWER | EBIT | -78.41 | 87.27 | 425.52 | 1400.73 | 1461.14 | 1977.82 | 5912.15 | 2267.15 | 2348.71 |
| | Interest | 0 | 209.62 | 281.52 | 560.01 | 656.36 | 1042.81 | 4726.52 | 2673.78 | 2604.4 |
| RTNPOWER | EBIT | -37.18 | -37.17 | -39.97 | -168.26 | -25.12 | -169.61 | -187.80 | -360.51 | -1683.52 |
| | Interest | 2.98 | 1.26 | 4.07 | 5.84 | 130.22 | 531.83 | 1158.6 | 1222.15 | 1933.8 |
| GIPCL | EBIT | 124.42 | 1163.81 | 234.36 | 551.96 | 299.50 | 268.78 | 260.32 | 275.19 | 304.60 |
| | Interest | 9.91 | 972.4 | 107.72 | 93.28 | 78.64 | 68.19 | 51.94 | 52 | 44.12 |

Source: Annual reports.

*Note: FM means financial metrics.*

The power generation companies belong to a very high capital-intensive industry due to which it is natural for the power generating companies to take high leverage. This increases the probability for insolvency, therefore, it is very important to check the interest coverage ratio. Interest on the debt capital is an obligation to pay by the power generating companies. The power generating companies can pay its interest only if it is able to earn enough earnings before interest and tax to cover the interests to be paid.

The above Table 3.aa keeps in record the interest that has to be paid by the power generating companies in a particular year. The calculation of interest has been calculated by deducting interest capitalized to expenditure during construction (EDC) from the total interest. The earnings before interest and tax has been divided by the interest in order to get the coverage ratio in the table below. Higher the interest coverage ratio better it is for the power generating companies and lesser is the risk of insolvency.

Table 3.ba

Earnings before Interest & Tax (EBIT) and Interest

Ratio, (times)

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 4.37 | 6.82 | 6.52 | #[3] | -12.48 | 12.55 |
| 2010–11 | 4.10 | 6.71 | 7.97 | 0.42 | -29.55 | 1.20 |
| 2011–12 | 6.92 | 6.43 | 13.69 | 1.51 | -9.81 | 2.18 |
| 2012–13 | 5.62 | 5.48 | 20.16 | 2.50 | -28.81 | 5.92 |
| 2013–14 | 1.90 | 6.80 | 39.16 | 2.23 | -0.19 | 3.81 |
| 2014–15 | 2.93 | 3.19 | 56.60 | 1.90 | -0.32 | 3.94 |
| 2015–16 | 3.28 | 2.92 | 26.36 | 1.25 | -0.16 | 5.01 |
| 2016–17 | 1.87 | 4.03 | 109.37 | 0.85 | -0.29 | 5.29 |
| 2017–18 | 5.31 | 1.53 | 23.09 | 0.90 | -0.87 | 6.90 |
| Average | 4.03 | 4.88 | 33.66 | 1.45 | -9.16 | 5.20 |
| Stdev | 1.72 | 2.01 | 32.46 | 0.73 | 12.25 | 3.28 |

Source: Computed by the researcher.

It is clear from the Table 3.ba, that SJVN has the highest interest coverage ratio of 33.66 with a standard deviation of 32.46 which is quite high. After SJVN, GIPCL has the second highest interest coverage ratio of 5.20 (Stdev 3.28) followed by NTPC 4.88 (Stdev 2.01), NHPC 4.03 (Stdev 1.72). RPOWER and RTNPOWER have a very low interest coverage ratio of 1.45 and negative 9.16 with a standard deviation of 0.73 and

[3] # Interest was zero.

12.25. The calculated industry average interest coverage ratio is 6.68. Only SJVN has the average interest coverage ratio which is higher than the industry average interest coverage ratio of 6.68. All the other selected power generating companies have the average interest coverage ratio lower than the industry average interest coverage ratio.

The inference that can be drawn from the observation is that SJVN has a very less chance of insolvency as compared to the other peer companies. GIPCL, NTPC and NHPC also have a least chance of insolvency as compared to RPOWER and RTNPOWER.

3.2.6 Change in total debt

Table 3.ca

Present Debt (Pres D) & Previous Debt (Prev D), Rs. (Cr.)

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | Pres D | 16351.52 | 16771.61 | 17,912.62 | 18,805.90 | 19,309.04 | 18,724.48 | 18,416.69 | 17,245.64 | 16728.2 |
| | Prev D | 12234.03 | 16351.52 | 16,771.61 | 17,912.62 | 18,805.90 | 19,309.04 | 18,724.48 | 18,416.69 | 17,245.64 |
| NTPC | Pres D | 44148.5 | 50754.83 | 54851.94 | 64587.72 | 75542.3 | 93362.92 | 102238.28 | 104071.29 | 116775.81 |
| | Prev D | 38822.6 | 44148.5 | 50754.83 | 54851.94 | 64587.72 | 75542.3 | 93362.92 | 102238.28 | 104071.29 |
| SJVN | Pres D | 1681.88 | 1753.92 | 1501.34 | 1876.27 | 2213.51 | 2480.98 | 2503.54 | 2229.47 | 2035.34 |
| | Prev D | 2142.44 | 1681.88 | 1753.92 | 1501.34 | 1876.27 | 2213.51 | 2480.98 | 2503.54 | 2229.47 |
| RPOWER | Pres D | 2240.61 | 7334.83 | 14262.71 | 24214.57 | 26253.51 | 28220.55 | 29159.38 | 26290.02 | 24201.2 |
| | Prev D | 15111.64 | 2240.61 | 7334.83 | 14262.71 | 24214.57 | 26253.51 | 28220.55 | 29159.38 | 26290.02 |
| RTN POWER | Pres D | 200.64 | 1034.25 | 1962.62 | 5683.49 | 10096.88 | 10601.45 | 12043.11 | 12135.34 | 11082.01 |
| | Prev D | * | 200.64 | 1034.25 | 1962.62 | 5683.49 | 10096.88 | 10601.45 | 12043.11 | 12135.34 |
| GIPCL | Pres D | 1064.07 | 1113.54 | 747.07 | 641.95 | 536.83 | 431.71 | 326.59 | 271.46 | 361.29 |
| | Prev D | 2023.58 | 1064.07 | 1113.54 | 747.07 | 641.95 | 536.83 | 431.71 | 326.59 | 271.46 |

Source: Annual reports.

*Note: FM means financial metrics.*

The values of present year debt and the previous year debt are being presented in the Table 3.ca. The interest coverage ratio is a very powerful ratio to check whether the particular firm is earning enough income to cover the interest expenditure. The interest coverage ratio compares earnings before interest and tax with the interest, but this ratio in isolation cannot always give a complete picture. The present debt by the previous debt ratio is a unique way of understanding how the particular firms are relying in the debt capital. This comparison between the present debt and the previous debt will also give an idea about whether the firm is able to reduce the debt capital or not. Lesser the present debt by the previous debt ratio better it is, as this depicts the potential of the firm in reducing its debt capital.

Table 3.da

Present Debt (Pres D) / Previous Debt (Prev D), Ratio

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 1.34 | 1.14 | 0.79 | 0.15 | 0.00 | 0.53 |
| 2010–11 | 1.03 | 1.15 | 1.04 | 3.27 | 5.15 | 1.05 |
| 2011–12 | 1.07 | 1.08 | 0.86 | 1.94 | 1.90 | 0.67 |
| 2012–13 | 1.05 | 1.18 | 1.25 | 1.70 | 2.90 | 0.86 |
| 2013–14 | 1.03 | 1.17 | 1.18 | 1.08 | 1.78 | 0.84 |
| 2014–15 | 0.97 | 1.24 | 1.12 | 1.07 | 1.05 | 0.80 |
| 2015–16 | 0.98 | 1.10 | 1.01 | 1.03 | 1.14 | 0.76 |
| 2016–17 | 0.94 | 1.02 | 0.89 | 0.90 | 1.01 | 0.83 |
| 2017–18 | 0.97 | 1.12 | 0.91 | 0.92 | 0.91 | 1.33 |
| Average | 1.04 | 1.13 | 1.01 | 1.34 | 1.76 | 0.85 |
| Stdev | 0.12 | 0.06 | 0.16 | 0.88 | 1.50 | 0.23 |

Source: Computed by the researcher.

It is observed from the above Table 3.da that the GIPCL has the lowest present debt by the previous debt ratio of 0.85 with a standard deviation of 0.23. SJVN has the second lowest present debt by previous debt ratio of 1.01 followed by the following power generating companies NHPC (1.04) and NTPC (1.13) with a standard deviation of 0.12 and 1.13. RTNPOWER has the highest ratio of 1.76 with a standard ratio of 1.50 followed by RPOWER (ratio 1.34, Stdev 0.88). The calculated industry present debt by the previous debt ratio is 1.19. GIPCL, SJVN, NHPC and NTPC has the ratio lower than the industry average ratio of 1.19, whereas, RTNPOWER and RPOWER have the ratio higher than the industry average ratio of 1.19. It can be inferred that GIPCL and SJVN have been able to reduce the principal amount from the previous years in a larger scale as compared to the other selected power generating companies.

3.2.7 Expense insight

Table 3.ea

Generation expenses (GE) and total expenditure (TE), Rs. (Cr.)

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | GE | 357.59 | 585.15 | 1009.57 | 1177.61 | 1,900.07 | 1,803.10 | 2,261.90 | 2,101.65 | 721.18 |
| | TE | 3,119.32 | 3349.99 | 3832.62 | 3938.45 | 5,712.24 | 6,015.84 | 6,316.80 | 6,315.00 | 5,951.14 |
| NTPC | GE | 32,524 | 39,343.25 | 47,193.33 | 47,364.53 | 54,855.01 | 58,902.63 | 54,950.19 | 56,171.16 | 60,870.88 |
| | TE | 40,214 | 49,277.98 | 55,693.99 | 57,498.13 | 67,213.34 | 72,244.74 | 69,847.01 | 70,246.02 | 77,557.37 |
| SJVN | GE | 178.1 | 201.63 | 137.37 | 122 | 145 | 176 | 231 | 235.96 | 276.29 |
| | TE | 783.02 | 804.2 | 778.17 | 732 | 773 | 1,082 | 1,339 | 1215.2 | 989.99 |
| RPOWER | GE | 85 | 725 | 1,297 | 3,126 | 3,163 | 4,252 | 5,673 | 5,889 | 5,020 |
| | TE | 141 | 1,146 | 1,814 | 4,084 | 4,307 | 5,916 | 9,473 | 9,466 | 8,892 |
| RTN POWER | GE | 10 | 10 | 8 | 131 | 266 | 508 | 1,548 | 532.36 | 1,372.88 |
| | TE | 40 | 38 | 44 | 174 | 494 | 1335.320648 | 3,081 | 2,169.77 | 3,853.35 |
| GIPCL | GE | 692.89 | 726.37 | 816.93 | 814.9 | 843.68 | 717.65 | 886.79 | 801.58 | 780.35 |
| | TE | 824.6 | 972.4 | 1,155.79 | 1,136.98 | 1,150.17 | 989.96 | 1,137.38 | 1,080.62 | 1,097.71 |

Source: Annual reports.

*Note: FM means financial metrics.*

In the above Table 3.ea, generation expenditure and the total expenditure are recorded. Expenditure plays a vital role for the power generating companies in earning higher profit. The expenditure is related with the nature of the power generating companies and many other important factors. The most important factor being the decisions of the power generating companies in choosing different portfolios of energy sources to generate electricity. Generation expenses are recorded in the income and expense statement of the power generating companies, some of the power generating companies have to purchase fuel and electricity too. The main objective of analysing the ratio of generation expenditure to total expenditure is to see which power generating companies have high generation expenditure. Higher the generation expenditure lowers the chances of earning higher profits for the power generating companies. It is good for the power generating companies to have lower ratio from profit point of view.

Table 3.fa

Generation expenses (GE) / total expenditure (TE), Ratio

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 0.11 | 0.81 | 0.23 | 0.60 | 0.25 | 0.84 |
| 2010–11 | 0.17 | 0.80 | 0.25 | 0.63 | 0.26 | 0.75 |
| 2011–12 | 0.26 | 0.85 | 0.18 | 0.71 | 0.18 | 0.71 |
| 2012–13 | 0.30 | 0.82 | 0.17 | 0.77 | 0.76 | 0.72 |
| 2013–14 | 0.33 | 0.82 | 0.19 | 0.73 | 0.54 | 0.73 |
| 2014–15 | 0.30 | 0.82 | 0.16 | 0.72 | 0.38 | 0.72 |
| 2015–16 | 0.36 | 0.79 | 0.17 | 0.60 | 0.50 | 0.78 |
| 2016–17 | 0.33 | 0.80 | 0.19 | 0.62 | 0.25 | 0.74 |
| 2017–18 | 0.12 | 0.78 | 0.28 | 0.56 | 0.36 | 0.71 |
| Average | 0.25 | 0.81 | 0.20 | 0.66 | 0.39 | 0.74 |
| Stdev | 0.10 | 0.02 | 0.04 | 0.07 | 0.18 | 0.04 |

Source: Computed by the researcher.

It is noted from the above Table 3.fa, NHPC and SJVN have the lowest generation to total expenditure ratio of just 0.225 and 0.20. SJVN has the lowest average generation to total expenditure ratio of 0.20 lower than the calculated industry average ratio of 0.51 among the selected power generating companies in India. NTPC in the other hand has the highest average ratio of generation to total expenditure. NTPC has a ratio of 0.81 followed by GIPCL (0.74), RPOWER (0.66) which is higher than the industry average ratio of 0.51. RTNPOWER also has a ratio of 0.39 which is on the higher side of the calculated industry average ratio.

The inference from the above discussion is that SJVN and NHPC are in the advantage side as these two powers generating companies does not have to purchase additional electricity and fuel like the other selected power generating companies. Due to this reason the generation expenditure is very less. SJVN and NHPC mostly rely on the hydro power unlike other power generating companies. Due to this reason these two companies are able to maintain profitability too. The other power generating companies can focus on developing energy source portfolio by adding cheaper energy sources in order to improve the generation to total expenditure ratio.

SJVN and NHPC both have lower generation to total expenditure ratio but SJVN has lower ratio more consistent as compared to NHPC. This can be proved by the value of standard deviation, SJVN has a standard deviation of 0.04 and NHPC has a standard deviation of 0.10.

Table 3.ga

Cost of Energy Source (COES) and Inventory (INVT), Rs. (Cr.)

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | COES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | INVT | 48.34 | 39.21 | 49.6 | 64.22 | 72.29 | 90.64 | 94.5 | 100.8 | 104.68 |
| NTPC | COES | 1,471 | 1,723.10 | 1,745.18 | 4,027.38 | 2,792.08 | 4,582.84 | 4,331.41 | 3,126.68 | 2,671.28 |
| | INVT | 3,584 | 3,910.83 | 4,177.91 | 4,575.78 | 5,988.48 | 7,972.46 | 7,959.16 | 6,586.13 | 6,140.29 |
| SJVN | COES | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | INVT | 58.67 | 23.68 | 28.47 | 31 | 34 | 37 | 39 | 39.56 | 50.5 |
| RPOWER | COES | 26 | 26 | 113 | 340 | 398 | 656 | 642 | 381 | 84 |
| | INVT | 49 | 54 | 161 | 536 | 623 | 1,047 | 1,124 | 1,029 | 729 |
| RTN POWER | COES | 0 | 0 | 0 | 15 | 21 | 75 | 262 | 83.25 | 152.63 |
| | INVT | 0 | 0 | 0 | 15 | 22 | 75.59 | 263 | 83.38 | 153 |
| GIPCL | COES | 19.55 | 15.54 | 36.84 | 25.87 | 20.29 | 39.41 | 41.75 | 54.96 | 43.71 |
| | INVT | 103.55 | 103.51 | 125.66 | 120.8 | 120.11 | 147.86 | 150.7 | 159.8 | 151.6 |

Source: Annual reports.

*Note: FM means financial metrics.*

The above Table 3.ga represents the cost of energy source and the inventory. Energy source is the main ingredient to produce electricity or energy source means the source which the power generating companies uses to generate electricity and cost means the payment which the power generating companies pay to use the energy source. Different power generating companies uses different types of energy sources. NHPC's main source of energy to produce electricity is water. Cost of water is not included by the NHPC as the component of the inventory. So, the cost of energy source for NHPC is zero. The same is for the power generating company SJVN, therefore, the cost of energy source is zero for SJVN too. NTPC's main source of energy to produce electricity is coal but it has mentioned other items also as the components of the inventory like fuel oil, Naphtha, chemicals and consumables. RTNPOWER does not have any inventory in 2009–10, 2010–11 and 2011–12 so it does not have any cost of source of energy. From 2013 onwards, the company has mentioned inventory in the balance sheet and the items in the inventory are as follows; inventory coal, inventory light diesel oil and other consumables. As hundred percent inventory includes the cost of source of energy for RTNPOWER all inventory costs are included as cost of energy source. It is very important to understand the nature of each power generating companies and about the cost of different sources of energy used in producing the electricity as this will ultimately affect the profitability. The comparison of cost of energy source with the inventory thus becomes very important, the power generating company will be in the advantageous position if it has the lower cost of energy source to inventory ratio.

Table 3.ha

Cost of Energy Source (COES) / Inventory (INVT), Ratio

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 0 | 0.41 | 0 | 0.53 | 0 | 0.19 |
| 2010–11 | 0 | 0.44 | 0 | 0.48 | 0 | 0.15 |
| 2011–12 | 0 | 0.42 | 0 | 0.71 | 0 | 0.29 |
| 2012–13 | 0 | 0.88 | 0 | 0.64 | 1.00 | 0.21 |
| 2013–14 | 0 | 0.47 | 0 | 0.64 | 0.95 | 0.17 |
| 2014–15 | 0 | 0.57 | 0 | 0.63 | 0.99 | 0.27 |
| 2015–16 | 0 | 0.54 | 0 | 0.57 | 1.00 | 0.28 |
| 2016–17 | 0 | 0.47 | 0 | 0.37 | 1.00 | 0.34 |
| 2017–18 | 0 | 0.44 | 0 | 0.11 | 1.00 | 0.29 |
| Average | 0 | 0.52 | 0.00 | 0.52 | 0.66 | 0.24 |
| Stdev | 0 | 0.15 | 0.00 | 0.18 | 0.50 | 0.07 |

Source: Computed by the researcher.

The ratios in the above Table 3.ha clearly show that the NHPC and SJVN have a ratio of zero. NHPC and SJVN does not have any cost of energy sources in the record. Both the NHPC and SJVN are in the advantageous position as compared to other peers, especially RTNPOWER, RPOWER and NTPC. These three powers generating companies have a very high cost of energy source. GIPCL also has a ratio of 0.24 which is comparatively not so high. The calculated industry average ratio of cost of energy source (COES) by inventory (INVT) ratio is 0.32. NHPC, SJVN and GIPCL have a ratio which is lower than the industry average, while RTNPOWER, RPOWER and NTPC have a ratio higher than the industry average ratio of 0.32.

The inference from the above discussion is that SJVN and NHPC have the cost advantage as compared to other peers.

### 3.2.8 Debtors velocity

Table 3.ia

Account Receivables (AR) and Sales value, Rs. (Cr).

| Company | FM | 2009–10 | 2010–11 | 2011–12 | 2012–13 | 2013–14 | 2014–15 | 2015–16 | 2016–17 | 2017–18 |
|---|---|---|---|---|---|---|---|---|---|---|
| NHPC | AR | 1140.21 | 2216.6 | 2247.09 | 2240.05 | 2422.43 | 2905.18 | 2388.64 | 1854.01 | 306.57 |
| | Sales | 5229.56 | 4378.32 | 6,927.40 | 6487.4 | 7,243.44 | 8,352.25 | 8749.17 | 7,214.00 | 6,520.90 |
| NTPC | AR | 7080.8 | 8399.87 | 6681.02 | 6096.64 | 6725.66 | 9249.92 | 10173.98 | 8963.89 | 8812.19 |
| | Sales | 47,667.10 | 57,106.99 | 64,840.13 | 67,996.09 | 78,618.65 | 79,818.95 | 77,700.94 | 80,823.10 | 79,298.08 |
| SJVN | AR | 189.29 | 264.5 | 579.51 | 358.64 | 374.47 | 1507.08 | 1132.42 | 613.01 | 288.99 |
| | Sales | 1719.42 | 1715.38 | 1820.95 | 1729.62 | 1841.33 | 2825.42 | 2509.4 | 2436.86 | 2158.71 |
| RPOWER | AR | 28.81 | 1641.74 | 655.17 | 1329.9 | 1079.76 | 2910.67 | 3524.96 | 2988.03 | 3715.41 |
| | Sales | 20.72 | 1023.68 | 1958.39 | 4924.88 | 5111.88 | 6850.65 | 10658.58 | 9059.63 | 8635.87 |
| RTN POWER | AR | 0.1 | 0 | 0 | 0 | 123.03 | 206.07 | 856.99 | 791.59 | 1327.15 |
| | Sales | * | * | * | * | 338.78 | 617.32 | 2774.98 | 587.1 | 1402.22 |
| GIPCL | AR | 137.26 | 200.18 | 210.06 | 171.46 | 222.63 | 128.44 | 265.5 | 248.02 | 259.98 |
| | Sales | 939.12 | 1077.95 | 1,290.99 | 1,407.01 | 1,371.04 | 1,209.06 | 1,345.76 | 1,303.81 | 1358.19 |

Source: Annual reports.

*Note: FM means financial metrics.*

The figures in the Table 3.ia represent the value of account receivables and sales as reported by the selected power generating companies in India. The comparison between the account receivables and the sales is very important as it will help to confirm the quality of sales. The cash sales are important, there is a very old quote "cash is king" but it is not possible to sell only in cash, there are many factors which encourage the firms to sell in credit. The data as mentioned in the above table will help in understanding the proportion of credit sells as compared to the total sales. This will give a clear picture as to the probability of company facing the risk of insolvency.

Table 3.ja

Account Receivables (AR) / Sales, Ratio

| Year | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|
| 2009–10 | 0.22 | 0.15 | 0.11 | 1.39 | 0.00 | 0.15 |
| 2010–11 | 0.51 | 0.15 | 0.15 | 1.60 | 0.00 | 0.19 |
| 2011–12 | 0.32 | 0.10 | 0.32 | 0.33 | 0.00 | 0.16 |
| 2012–13 | 0.35 | 0.09 | 0.21 | 0.27 | 0.00 | 0.12 |
| 2013–14 | 0.33 | 0.09 | 0.20 | 0.21 | 0.36 | 0.16 |
| 2014–15 | 0.35 | 0.12 | 0.53 | 0.42 | 0.33 | 0.11 |
| 2015–16 | 0.27 | 0.13 | 0.45 | 0.33 | 0.31 | 0.20 |
| 2016–17 | 0.26 | 0.11 | 0.25 | 0.33 | 1.35 | 0.19 |
| 2017–18 | 0.05 | 0.11 | 0.13 | 0.43 | 0.95 | 0.19 |
| Average | 0.29 | 0.12 | 0.26 | 0.59 | 0.37 | 0.16 |
| Stdev | 0.12 | 0.02 | 0.15 | 0.52 | 0.48 | 0.03 |

Source: Computed by the researcher.

As noted in the above Table 3.ja, NTPC has the lowest average account receivables to sales ratio of 0.12 with a standard deviation of 0.02. This means NTPC is able to generate high proportion of cash on its sales as compared to the other selected power generating companies in India. The industry average for account receivables to sales ratio is 0.30. NTPC has a ratio lower than the industry average ratio of 0.30 followed by SJVN and NHPC. RPOWER has the highest ratio of 0.59 which is higher than the industry average of 0.30. This means RPOWER has the higher ratio of credit sales as compared to its peers in the industry followed by RTNPOWER. Both RPOWER and RTNPOWER have the average ratio higher than the industry average of 0.30. This may encourage the risk of insolvency over a period of time.

The inference developed from the above discussion is that NTPC has a lesser credit sale as compared to all the other selected power generating companies in India. GIPCL, SJVN and NTPC also has a ratio which is lower than the industry average. RPOWER and RTNPOWER have a sale which has more credit sales than the cash sales. These two companies should focus more in cash sales to discourage future liquidity situation.

3.3 Average financial ratios

Table 3.ka

Average Financial Ratios of Selected Power Generating Companies. (Inclusive Performance)

| | | Power generating companies | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sl . no | **RATIOS** | NHPC | NTPC | SJVN | RPOWER | RTN POWER | GIPCL | Industry average ratio |
| 1. | **Liquidity ratio (times)** | | | | | | | |
| a. | Current asset / current liabilities | 1.77 | 1.59 | 3.82 | 1.11 | 8.90 | 1.03 | 3.03 |
| b. | (Current asset-inventory)/current liabilities | 1.76 | 1.35 | 3.78 | 1.04 | 8.89 | .78 | 2.93 |
| 2. | **Profitability ratio (%)** | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| a. | EBIT/sales (%) | 47 | 18 | 62 | -17 | -22 | 32 | 20 |
| b. | Adjusted net income / sales (%) | 22 | 10 | 44 | -4038 | -42 | 11 | -665.5 |
| c. | EBIT/ total debt total equity (%) | 10.70 | 15.28 | 21.06 | 5.92 | -2.55 | 51.84 | 17.04 |
| 3. | **Performance ratio** | | | | | | | |
| a. | Sales/ total assets (%) | 12 | 38 | 16 | 9 | 3 | 42 | 20 |
| b. | Sales/ total share holders equity (times) | 0.60 | 8.54 | 0.51 | 1.91 | 0.22 | 8.30 | 3.35 |
| c. | Net income / total assets (%) | 4.40 | 5.22 | 9.38 | 2.27 | -1.47 | 5.79 | 4.26 |
| d. | Adjusted net income/ total assets (%) | 2.54 | 3.87 | 7.08 | -4.23 | -2.37 | 4.80 | 1.95 |
| e. | Net income/ average assets (%) | 4.58 | 5.53 | 9.62 | 2.53 | -0.28 | 5.96 | 4.66 |
| 4. | **Leverage ratio** | | | | | | | |
| a. | Debt/total stock holders' equity (times) | 1.57 | 9.52 | 0.49 | 7.23 | 2.57 | 4.12 | 4.25 |
| b. | Total liability / total stock holders' equity (times) | 4.12 | 22.54 | 2.17 | 15.36 | 3.50 | 18.89 | 11.10 |
| 5. | **Coverage ratio** | | | | | | | |
| a. | EBIT/interest (times) | 4.03 | 4.88 | 33.66 | 1.45 | -9.16 | 5.20 | 6.68 |
| 6. | **Change in total debt** | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| a. | Present debt / previous debt (times) | 1.04 | 1.13 | 1.01 | 1.34 | 1.76 | 0.85 | 1.19 |
| 7. | **Expense insight** | | | | | | | |
| a. | Generation expenditure/ total expenditure (times) | 0.25 | 0.81 | 0.20 | 0.66 | 0.39 | 0.74 | .51 |
| 8. b. | Cost of energy source/ inventory (times) | 0 | 0.52 | 0.00 | 0.52 | 0.66 | 0.24 | .32 |
| 9 | **Debtors velocity** | | | | | | | |
| b | Account receivables (AR) / sales (times) | 0.29 | 0.12 | 0.26 | 0.59 | 0.37 | 0.16 | .30 |

Source: Computed by the researcher.

All the important ratios to determine the financial performance of the selected power generating companies are presented in the above Table 3.ka. The following ratios are calculated, liquidity ratio, profitability ratio, performance ratio, leverage ratio, coverage ratio, change in total debt ratio, expense insight ratio and debtor's velocity ratio. Each ratio will be observed and a careful analysis will be conducted to segregate the performance among the selected power generating companies for the purpose of study. Important financial ratios are selected that can specifically represent the important financial aspects of the selected power generating companies. Liquidity ratio is calculated in order to check the liquidity position of the power generating companies. This will showcase the position of the power generating companies in respect to solvency and working capital capacity and management. The liquidity ratios are calculated from the period 2009–10 to 2017–18. The average of liquidity ratios for each of the power generating companies is calculated and compared with the industry average ratio. The performance of each power generating companies is selected on the basis of each ratios. The ranks ranging from 1 to 6 will be assigned to each six power generating companies and a total score will be calculated. The power generating company scoring the lesser score will be assigned rank one. Smaller number denoting the rank will represent the efficiency of the power generating company in financial performance. The same process will be followed for the other ratios too.

3.4 Ranks assigned on the basis of various financial ratios

Table 3.la

Ranks assigned to each power generating companies on the basis of financial performance.

| Sl.no | RATIOS | NHPC | NTPC | SJVN | RPOWER | RTNPOWER | GIPCL |
|---|---|---|---|---|---|---|---|
| 1. | **Liquidity ratio (times)** | | | | | | |
| a. | Current asset / current liabilities | 3 | 4 | 1 | 5 | 2 | 6 |
| b. | (Current asset-inventory)/current liabilities | 3 | 4 | 1 | 5 | 2 | 6 |
| | 1.total | 6 | 8 | 2 | 10 | 4 | 12 |
| 2. | **Profitability ratio (%)** | | | | | | |
| a. | EBIT/sales (%) | 2 | 4 | 1 | 5 | 6 | 3 |
| b. | Adjusted net income / sales (%) | 2 | 4 | 1 | 6 | 5 | 3 |
| c. | EBIT/ total debt total equity (%) | 4 | 3 | 2 | 5 | 6 | 1 |
| | 2.total | 8 | 11 | 4 | 16 | 17 | 7 |
| 3. | **Performance ratio** | | | | | | |
| a. | Sales/ total assets (%) | 4 | 2 | 3 | 5 | 6 | 1 |
| b. | Sales/ total share holders equity | 4 | 1 | 5 | 3 | 6 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | (times) | | | | | | |
| c. | Net income / total assets (%) | 4 | 3 | 1 | 5 | 6 | 2 |
| d. | Adjusted net income/ total assets (%) | 4 | 3 | 1 | 6 | 5 | 2 |
| e. | Net income/ average assets (%) | 4 | 2 | 1 | 5 | 6 | 3 |
| | 3.total | 20 | 11 | 11 | 24 | 29 | 10 |
| 4. | **Leverage ratio** | | | | | | |
| a. | Debt/total stock holders' equity (times) | 2 | 6 | 1 | 5 | 3 | 4 |
| b. | Total liability / total stock holders' equity (times) | 3 | 6 | 1 | 5 | 2 | 4 |
| | 4.total | 5 | 12 | 2 | 10 | 5 | 8 |
| 5. | **Coverage ratio** | | | | | | |
| a. | EBIT/interest (times) | 4 | 3 | 1 | 5 | 6 | 2 |
| | 5.total | 4 | 3 | 1 | 5 | 6 | 2 |
| 6. | **Change in total debt** | | | | | | |
| a. | Present debt / previous debt (times) | 3 | 4 | 2 | 6 | 5 | 1 |
| | 6.total | 3 | 4 | 2 | 6 | 5 | 1 |
| 7. | **Expense insight** | | | | | | |
| a. | Generation expenditure/ total expenditure (times) | 2 | 6 | 1 | 4 | 3 | 5 |
| | 7.total | 2 | 6 | 1 | 4 | 3 | 5 |
| 8.b. | Cost of energy source/ inventory (times) | 1 | 3 | 1 | 3 | 4 | 2 |
| 9 | 8.Debtors velocity | | | | | | |
| b. | Account receivables (AR) / sales (times) | 4 | 1 | 3 | 6 | 5 | 2 |
| | 9.total | 4 | 1 | 3 | 6 | 5 | 2 |
| | Grand total score (1+2+3+4+5+6+7+8+9) | 53 | 59 | 27 | 84 | 78 | 49 |

Source: Computed by the researcher.

Scores ranging from 1 to 6 has been assigned to each ratio for the selected power generating companies in India. In the above Table 3.la, scores are given to each power generating companies in India. Considering the liquidity ratio score in 1. total, SJVN has the lowest total score of 2. GIPCL has the highest score of 12. The inference is that SJVN has the best liquidity ratio among the selected other power generating companies and GIPCL has the weak liquidity ratio among its peers. The scores as observed in the above Table 3.la, 2. total, SJVN has the lowest total score of 4 for the profitability ratio. In the other hand, RTNPOWER has the highest total score of 17 for the profitability ratio. SJVN is the most profitable power generating company as compared to the other selected power generating companies in India. RTNPOWER is the lowest profit earning power generating company as compared to its peers 3. Total score for the performance ratios is such that GIPCL has the lowest score of 10 followed by the SJVN and NHPC having the total score of 11 each. There is only a difference of 1 between the GIPCL and SJVN & NHPC. In the other hand RTNPOWER has the highest score of 29. This means GIPCL, SJVN & NHPC manages the assets efficiently in generating high returns while RTNPOWER is the poor performer and does not has the efficiency in managing the assets and does not have operational management quality strategies. According to the score in 4. total in the above table, SJVN has the lowest score of 2 for leverage ratio and NTPC has the highest score of 12. This means SJVN has the lowest debts as compared to its peers and NTPC has huge debts among the selected power generating companies in India. SJVN has the lowest score of 1 for the interest coverage ratio while RTNPOWER has the highest score of 6. SJVN has a very less chance of insolvency as compared to that with RTNPOWER. GIPCL has the lowest score of 1 for the change in debt ratio this means GIPCL is reducing the debt capital in a faster rate as considered to the other selected power generating companies. RPOWER has the highest score of

6, this means the pace of RPOWER is slowest in reducing the debt capital among the selected power generating companies in India. SJVN has the lowest score of 1, scored for the expense insight ratio, this means SJVN has the lowest generation expenses among its peers. NTPC has the highest generation expenditure among its peers as it is proved by the highest score of 6. SJVN and NHPC has the lowest cost of energy source as both the power generating company has lowest score of just 1, in the other hand RTNPOWER has the highest cost of energy source as proved by its score of 4, highest among the other selected power generating companies. SJVN has the lesser credit sales as compared to the other peers as it has the lowest score of 1 while RPOWER has the highest credit sales as it has the highest score of 6 as compared to the other selected power generating companies in India. The grand total of all the scores has been calculated to segregate the financial performance of the selected power generating companies in India to suffice the very purpose of the study.

Table 3.ma

Grand Total Score and Rank

| Power generating companies | Grand total score | Rank |
|---|---|---|
| SJVN | 27 | 1 |
| GIPCL | 49 | 2 |
| NHPC | 53 | 3 |
| NTPC | 59 | 4 |
| RTNPOWER | 78 | 5 |
| RPOWER | 84 | 6 |

Source: Computed by the researcher.

In the above Table 3.ma, grand total score has been calculated by summing up all the scores by the particular power generating companies in each financial ratio. The best performing ratio is given 1 and then in the ascending order till 6 as there are six power generating companies selected for the purpose of the study.

According to the score, SJVN is the power generating company having the best financial performance, followed by GIPCL, NHPC and NTPC etc. SJVN has a score of 27 which is quite small as compared to the other selected power generating companies. This is the supporting evidence that SJVN is the best performer. GIPCL, NHPC and NTPC has the score which is quite equal to each other i.e., 49, 53 and 59. The differences in the score among this three-power generating are not much. According to the score RPOWER has the highest score of 84, this means RPOWER is the weak performer among the selected power generating companies. RPOWER has the worst financial performance as compared to all the other selected power generating companies in India. RTNPOWER also has the high score of 78 which is quite near to RPOWER.

**3.5. Comparative analysis**

This part of chapter III deals with comparative analysis. The main objective is to segregate the financial performance on the basis of ownership Out of six power generating companies selected for the purpose of study, two are related with the private ownership and the other four are related with the government ownership (both state and central government). This study is related with chapter three as the financial ratio being used are same. Two power generating companies are controlled by the private owners namely, RPOWER and RTNPOWER. The other three companies namely NHPC, NTPC and the SJVN are under the ownership of central government and one company GIPCL is under the ownership of State Government of Gujarat. The findings of the previous chapter are that SJVN has the best financial performance followed by NHPC, NTPC and GIPCL, whereas RPOWER and the RTNPOWER are the worst performers on the basis of the financial performance. Rough idea could be generated from these findings too, that the government owned power generating company’s financial performance is better as compared to that with the privately-owned power generating companies. This idea is developed by observing that the top four performing companies (SJVN, NHPC, NTPC & GIPCL) are controlled and owned by the government both central and state. This chapter III.b will conduct in-depth analysis between the privately owned and government owned power generating companies. The average financial ratios for each privately-owned power generating companies and government owned power generating companies will be calculated and compared with the industry average. Ranks will be assigned on each financial ratio for both the private and government owned power generating companies. Ultimately the score of each rank will be totalled and a final rank will be given on the basis of the score for both the private and government owned power generating companies in India.

Table 3.na.

Comparative financial performance analysis between Government and privately-owned power generating companies.

| | Inclusive performance | Central government ownership | | | | Private ownership | | | State government ownership | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sl. no | **RATIOS** | NHPC | NTPC | SJVN | avg | R POWER | RTN POWER | avg | GIPCL | Industry average ratio |
| 1. | **Liquidity ratio (times)** | | | | | | | | | |
| a. | Current asset / current liabilities | 1.77 | 1.59 | 3.82 | 2.39 | 1.11 | 8.90 | 10.01 | 1.03 | 3.03 |
| b. | (Current asset-inventory)/current liabilities | 1.76 | 1.35 | 3.78 | 2.29 | 1.04 | 8.89 | 4.96 | .78 | 2.93 |
| 2. | **Profitability ratio (%)** | | | | | | | | | |
| | | 47 | 18 | 62 | | -17 | -22 | -19.5 | 32 | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| a. | EBIT/sales (%) | | | | 42.33 | | | | | 20 |
| b. | Adjusted net income / sales (%) | 22 | 10 | 44 | 25.33 | -4038 | -42 | -2040 | 11 | -665.5 |
| c. | EBIT/ total debt + total equity (%) | 10.70 | 15.28 | 21.06 | 15.68 | 5.92 | -2.55 | 1.68 | 51.84 | 17.04 |
| 3. | **Performance ratio** | | | | | | | | | |
| a. | Sales/ total assets (%) | 12 | 38 | 16 | 22.00 | 9 | 3 | 6 | 42 | 20 |
| b. | Sales/ total share holders equity (times) | 0.60 | 8.54 | 0.51 | 3.21 | 1.91 | 0.22 | 1.06 | 8.30 | 3.35 |
| c. | Net income / total assets (%) | 4.40 | 5.22 | 9.38 | 6.33 | 2.27 | -1.47 | 0.8 | 5.79 | 4.26 |
| d. | Adjusted net income/ total assets (%) | 2.54 | 3.87 | 7.08 | 4.49 | -4.23 | -2.37 | -3.3 | 4.80 | 1.95 |
| e. | Net income/ average assets (%) | 4.58 | 5.53 | 9.62 | 6.57 | 2.53 | -0.28 | 2.25 | 5.96 | 4.66 |
| 4. | **Leverage ratio** | | | | | | | | | |
| a. | Debt/total stock holders' equity (times) | 1.57 | 9.52 | 0.49 | 3.86 | 7.23 | 2.57 | 4.9 | 4.12 | 4.25 |
| b. | Total liability / total stock holders' equity (times) | 4.12 | 22.54 | 2.17 | 9.61 | 15.36 | 3.50 | 9.43 | 18.89 | 11.10 |
| 5. | **Coverage ratio** | | | | | | | | | |
| a. | EBIT/interest (times) | 4.03 | 4.88 | 33.66 | 14.19 | 1.45 | -9.16 | -3.85 | 5.20 | 6.68 |
| 6. | **Change in total debt** | | | | | | | | | |
| a. | Present debt / previous debt (times) | 1.04 | 1.13 | 1.01 | 1.06 | 1.34 | 1.76 | 1.55 | 0.85 | 1.19 |
| 7. | **Expense insight** | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| a. | Generation expenditure/ total expenditure (times) | 0.25 | 0.81 | 0.20 | 0.420 | 0.66 | 0.39 | .52 | 0.74 | .51 |
| 8.b. | Cost of energy source/ inventory (times) | 0 | 0.52 | 0.00 | 0.173 | 0.52 | 0.66 | .59 | 0.24 | .32 |
| 9 | **Debtors velocity** | | | | | | | | | |
| b | Account receivables (AR) / sales (times) | 0.29 | 0.12 | 0.26 | 0.223 | 0.59 | 0.37 | .48 | 0.16 | .30 |

Source: Computed by the researcher.

The above table is segregated between three segments, one segment represents the performance of central government owned power generating companies and the other segments represents the performance of the privately-owned power generating companies and state-owned power generating company. The two ratios are calculated under the heading liquidity. First one is the relationship between the current assets and the current liabilities. These two financial metrics shows the relation between the short-term credit and debit entries. The average current assets to current liabilities ratio for the Central government owned power generating companies is 2.39 and for the privately-owned power generating companies is 10.01 while GIPCL which is a state government owned power generating company has a ratio of 1.03. The ideal ratio is 2.5 and the calculated industry average ratio is 3.03. The privately-owned power generating companies have higher current assets in relation to current liabilities as compared to the government owned power generating companies. Privately owned power generating companies have higher quick ratio of 4.96 as compared to that of the government owned power generating companies (ratio 2.29 for central government owned power generating companies and ratio of .78 for state government owned power generating company). Central government owned power generating companies have a better quick ratio as compared to that with the state-owned power generating company.

The inference taken out from the discussion is that privately owned power generating companies have more advantage over the government owned power generating companies in terms of the current ratio and the quick or acid test ratio.

3.5.1 Profitability ratio

Three ratios are calculated under the heading profitability ratio namely, EBIT by sales ratio, adjusted net income by sales ratio and EBIT by total debt plus total equity ratio. Focusing in the first ratio EBIT by sales ratio, the central government owned power generating companies have a higher ratio of 42.33% as compared to that of privately-owned power generating companies which have a ratio of negative 19.5%, whereas the state-owned power generating company has a ratio of 32%. The industry average EBIT by sales ratio as calculated is 20%. Government (both central & state) owned power generating companies have a ratio higher than that of the industry average of 20%. Privately owned power generating companies have a negative ratio. Government owned power generating companies have advantage over privately owned power generating companies in adjusted net income by sales ratio too. Both the central and state Government owned power generating companies have an average ratio of 25.33% and 11%, in the other hand the privately-owned power generating companies have a ratio of negative 2040%. The other ratio under the head profitability ratio is EBIT by total debt plus total equity. Central Government owned power generating companies have a ratio of 15.68% & state-owned power generating company has a ratio of 51.84% while the privately-owned power generating companies have a ratio of 1.68%. State Government owned power generating companies have a high edge over the central government owned power generating companies in this ratio, but still the ratio of just 1.68% for the privately-owned power generating company is very less as compared to both the central and state-owned power generating companies.

The industry average EBIT by total debt plus total equity ratio is 17.04%.

The inference drawn from the discussion is that the central government owned power generating company's performance is better as compared to that with the state-owned power generating company and privately-owned power generating companies in terms of the two ratio EBIT by sales ratio and adjusted net income by sales ratio. But the performance of state-owned power generating companies is better as compared to the central government owned power generating companies and privately-owned power generating companies in terms of EBIT by total debt plus total equity ratio. Earnings before interest and tax in terms of sales is better for the central Government owned power generating companies, this means the central Government owned power generating companies are able to keep high margin in sales as compared to that with the state-owned power generating company and privately-owned power generating companies. Since the tariff rate is fixed by the electricity regulatory authority and the electricity is sold by the electricity distribution companies and the power generating companies and the power distribution companies are different entities, the private owned power generating companies should focus in reducing the generation expenses in order to increase the profit margin. In the other hand state owned power generating companies have an edge over central government owned power generating companies in terms of EBIT by total debt plus total equity ratio. This means central government owned power generating companies have employed more capital as compared to that with the state Government owned power generating companies & privately-owned power generating companies. The earnings before interest and tax is generated more in terms of the capital invested by the state-owned power generating companies as compared to that with the central government owned power generating companies and privately-owned power generating companies. The central Government owned power generating companies and privately-owned power generating companies should focus in increasing EBIT as compared to its total investment. The central Government owned power generating companies and privately-owned power generating companies should focus in more efficient utilization of the invested capital in generating more earnings before interest and tax.

### 3.5.2 Performance ratio

Five ratios are calculated relating to the performance ratio, namely sales by total assets, sales by total shareholders' equity, net income by total assets, adjusted net income by total assets and net income by average assets. These five ratios can reflect the operational efficiency of the power generating companies both private and government owned.

The state Government owned power generating companies have higher sales by total assets ratio of 42% as compared to that with the central Government owned power generating with a ratio of 22% and privately-owned power generating companies which have a ratio of just 6%. The state government owned power generating companies have a sale by total assets ratio higher by the margin of 20% as compared to the central government owned power generating companies. The calculated industry average ratio is 20, government (central & state) owned power generating companies have a ratio higher than the industry average whereas the privately-owned power generating companies have a ratio lower than the industry average. The government (central & state) owned power generating companies are able to generate more sale as compared to its total assets than the privately-owned power generating companies.

The next ratio is a comparison of sales with the total shareholders' equity, State owned power generating company has an edge over the central government owned power generating companies. The state-owned power generation companies have a ratio of 8.30 and the central government owned power generating companies and privately-owned power generating companies have a ratio of 3.21 and 1.06. As, compared to the government owned power generation companies both central and state, the ratio of privately-owned power generating companies is very low. The industry average ratio for sales by total shareholder's equity ratio is 3.35. The privately-owned power generating companies have to improve the performance in terms of this ratio in order to attract shareholders.

The comparison of net income with total assets is very important, because the sales alone cannot depict the real income. So, the ratio comparing the net income by total assets have been calculated for both the government owned power generating companies and the privately-owned power generating companies. The performance of government owned power generating companies are better as compared to that with the privately-owned power generating companies. Power generating companies under the control of central government have a ratio of 6.33% and the ratio under the state government is 5.79 while the power generating companies controlled by the private owners have a ratio of only 0.8%. Private owned power generating companies need to focus in improving its net income.

The other ratio is calculated by deducting the other income from the net income and comparing it with the total assets, this is done with the motive of finding the actual performance of power generating companies considering only the income from operation. Power generating companies controlled by the state government have a little higher ratio of 4.80% as compared to the power generating companies which have a ratio of 4.49 controlled by central government but which is far better as compared to that with the power generating companies controlled by the private owners. The privately-owned power generating companies have a ratio in negative, i.e., negative 3.3%. The industry average ratio for the adjusted net income by total assets is 1.95. Privately owned power generating companies need to improve income from operation.

The performance of government owned power generating companies is better considering net income by average assets ratio as compared to that with the privately-owned power generating companies. The ratio of power generating companies under the control of central government is 6.57% and under the state government is 5.96% while the ratio of privately-owned power generating companies is only 2.25%.

The inference that could be drawn from the above discussion is that, the government owned power generating companies have better performance ratios as compared to that with the privately-owned power generating companies.

### 3.5.3 Leverage ratio

Two ratios are calculated to represent the leverage ratio i.e., debt by total stock holder's equity ratio and total liability by total stock holder's equity ratio. The privately-owned power generating companies have a high leverage ratio (debt by total stock holder's equity ratio) of 4.90 as compared to that with the government owned power generating companies (central & state) which have a ratio of 3.86 and 4.12. The industry average debt by total stock holder's equity ratio is 4.25 and all power generating companies (central, state & private) have a leverage ratio lower than that of the industry average. The privately-owned power generating companies need to focus in reducing the debt capital and increasing the performance ratios too.

Central government owned power generating company's performance is better considering the other leverage ratio too i.e., total liability by total stock holder's equity ratio. The privately-owned power generating companies have a ratio of 9.43 while the state government owned power generating companies have a ratio of 18.89, which is quite higher than the industry average ratio of 11.10.

It is inferred from the above discussion that the central government owned power generating companies have a lower debt by total shareholder's equity ratio as compared to the state-owned power generating company and the privately-owned power generating companies, while the privately-owned power generating companies have a lesser total liability compared to total shareholder's equity than the government owned power generating companies (central & state). State owned power generating company need to focus in reducing the leverage ratio as it is higher than the industry average ratio too.

### 3.5.4 Coverage ratio

The calculation of this ratio is very important because only increasing the leverage is not considered good but the capacity to pay the future obligation or liability becomes crucial for the very existence of any firm. Power generating companies being capital intensive in nature have to take heavy leverage, so EBIT by interest ratio is calculated to check the potential of paying the future debt by the power generating companies both government owned and privately owned. Higher the EBIT than the interest better it is, as this shows the interest paying potential by the power generating companies. The central government owned power generating companies have a higher ratio of 14.19 and the state-owned power generating company has a ratio of 5.20 which is a good sign. The central government owned power generating companies have an interest coverage ratio higher than that the industry average ratio of 6.68 while the state-owned power generating company has a ratio of 5.20 which is little lesser than the industry average. The privately-owned power generating companies in the other hand have a very weak interest coverage ratio, which is in negative 9.16, that is far too lower than the industry average interest coverage ratio of 6.68. There is a high risk of insolvency for the privately-owned power generating companies if this situation continues in the future.

### 3.5.5 Change in total debt ratio

This ratio is a supplementary ratio for the interest coverage ratio, the main objective in calculating this ratio is to check whether the power generating companies are reducing the debt capital or not. The present debt capital is compared with the previous debt capital, so lesser the ratio better it is, as it means the firm is reducing the debt capital. The state government owned power generating company is reducing its debt capital in a faster rate as compared to that with the central government owned power generating companies and privately-owned power generating companies because the change in debt ratio of state government owned power generating company 0.85 and that of central government owned power generating companies and privately-owned power generating companies are 1.06 and 1.55. The calculated industry average change in debt ratios is 1.19 and it is very clear that the privately-owned power generating companies are reducing the debt capital in a slower pace than the industry average ratio. The privately-owned generating companies need to focus in taking efficient financial decisions.

### 3.5.6 Expense insight ratio

This ratio helps in giving the insight relating to the generation expenditure and expenditure relating to energy source. This ratio is important because the profitability of any firm is directly related with the expenditure. Power generating companies being capital intensive in nature need to focus in the expenditure. Power generating companies have their own portfolio of energy sources, some sources are expensive, some are cheap, some are easily available, some are not easily available, in order to use some energy source, high installation costs may be required, some are renewable in nature, some are non-renewable in nature, some energy source may attract environment hazards, geographical barriers, some source may be effected by weather conditions and climatic change, some source supply may be affected by the logistics problems, political problems, etc. There are still many factors which might affect the cost of the different energy sources. Some of the important energy sources used by the power generating companies in India are, water, wind, solar, coal, fuel (diesel & petrol), biogas, nuclear energy source etc. All this different energy source attracts different types of risks and costs. This ratio will in some extent help to show the relationship between the expenditure relating to the generation with the total expenditure. Lesser the ratio better it is, as this will help in improving the profitability ratio. Power generating companies controlled by the central government have a lesser generation to total expenditure ratio as compared to that with the privately-owned power generating companies and state-owned power generating company. The ratio for central government owned power generating companies is .42 while the ratio of the state government owned power generating company and privately-owned power generating companies are .74 and .52. The industry average ratio is .51. The inference drawn from the discussion is that the state-owned power generating companies have a higher generation expenditure than the central government owned power generating companies and privately-owned power generation companies. The state-owned power generating companies should focus in improving the portfolio of cheaper energy sources.

The other ratio calculated is cost of energy source by inventory. Power generating companies controlled by the central government has a lower ratio of .17 as compared to that with the state-owned power generating company and privately-owned power generating companies which have a ratio of .24 and .59. The industry average ratio of cost to energy source to inventory is .32. The privately-owned power generating companies have a higher cost of energy source as compared to that with the government owned power generating companies (central and state).

### 3.5.7 Debtor's velocity ratio

This ratio is related with the comparison of account receivables by the sales ratio. The importance of this ratio is that, it helps to show the percentage of credit sales in terms of the total sales. Lesser the ratio better it is as it signifies high cash sales as compared to credit sales. The state government owned power generating companies have a ratio of .16 which is lower than the central government owned power generating companies and privately-owned power generating companies having a ratio of .22 and .48. The industry calculated average debtor's velocity ratio is .30. The inference drawn from the discussion is that private power generating companies have a higher credit sale as compared to the government owned power generating companies (central and state) in India.

In order to get a clear view on the performance of both the privately owned and government (central and state) owned power generating companies, another table depicting the ranks for both the government (central and state) and privately-owned power generating companies are presented below. The ranks are given on the basis of the performance by the power generating companies. Ranks are assigned one, two and three as the comparison is between the three types of ownerships i.e., central government ownership, state government ownership and private ownership.

3.6. Comparative ranks assigned

Table 3.oa

Ranks assigned on the basis of financial ratio for both the government owned and privately-owned power generating companies to determine the level of financial performance.

| | Inclusive performance | Government ownership | | Private ownership | | State ownership | |
|---|---|---|---|---|---|---|---|
| Sl.no | Ratios | Average | Rank | Average | Rank | Average | Rank |
| 1. | **Liquidity ratio (times)** | | | | | | |
| a. | Current asset / current liabilities | 2.39 | 2 | 10.01 | 1 | 1.03 | 3 |
| b. | (Current asset-inventory) / current liabilities | 2.29 | 2 | 4.96 | 1 | .78 | 3 |
| | **Rank score** | | **4** | | **2** | | **6** |
| 2. | **Profitability ratio (%)** | | | | | | |
| a. | EBIT / sales (%) | 42.33 | 1 | -19.5 | 3 | 32 | 2 |
| b. | Adjusted net income / sales (%) | 25.33 | 1 | -2040 | 3 | 11 | 2 |
| c. | EBIT / total debt + total equity (%) | 15.68 | 2 | 1.68 | 3 | 51.84 | 1 |
| | **Rank score** | | **4** | | **9** | | **5** |
| 3. | **Performance ratio** | | | | | | |
| a. | Sales / total assets (%) | 22.00 | 2 | 6 | 3 | 42 | 1 |
| b. | sales / total shareholders' equity (times) | 3.21 | 2 | 1.06 | 3 | 8.30 | 1 |
| c. | Net income / total assets (%) | 6.33 | 1 | 0.8 | 3 | 5.79 | 2 |
| d. | Adjusted net income/ total assets (%) | 4.49 | 2 | -3.3 | 3 | 4.80 | 1 |
| e. | Net income/ average assets (%) | 6.57 | 1 | 2.25 | 3 | 5.96 | 2 |
| | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Rank score** | | **8** | | **15** | | **7** |
| 4. | **Leverage ratio** | | | | | | |
| a. | Debt / total stock holders' equity (times) | 3.86 | 1 | 4.9 | 2 | 4.12 | 3 |
| b. | Total liability / total stock holders' equity (times) | 9.61 | 3 | 9.43 | 1 | 18.89 | 2 |
| | **Rank score** | | **2** | | **3** | | **5** |
| 5. | **Coverage ratio** | | | | | | |
| a. | EBIT / interest (times) | 14.19 | 1 | -9.16 | 3 | 5.20 | 2 |
| 6. | **Change in total debt** | | | | | | |
| a. | Present debt / previous debt (times) | 1.06 | 2 | 1.55 | 3 | 0.85 | 1 |
| | **Rank score** | | **3** | | **6** | | **3** |
| 7. | **Expense insight** | | | | | | |
| a. | Generation expenditure / total expenditure (times) | 0.420 | 1 | 0.52 | 2 | .74 | 3 |
| 8.b. | Cost of energy source / inventory (times) | 0.173 | 1 | 0.59 | 3 | .24 | 2 |
| | **Rank score** | | **2** | | **5** | | **5** |
| 9 | **Debtors velocity** | | | | | | |
| b | Account receivables (AR) / sales (times) | 0.223 | 2 | 0.48 | 3 | .16 | 1 |
| | **Rank score** | | **2** | | **3** | | **1** |
| | **Grand total rank score** | | **25** | | **43** | | **32** |

Source: Computed by the researcher.

It is very clear from the above Table 3.oa that the rank score of central government owned power generating companies are much better as compared to that with the state-owned power generating company and privately-owned power generating companies. The grand total rank score of central government owned power generating companies is 25 and the grand total rank score of state government owned power generating company and privately-owned power generating companies is 32 and 43. This is a clear indication of the better financial performance by the government owned power generating companies (central & state) as compared to the privately-owned power generating companies.

### 3.7. Conclusion

The inference that is developed after a thorough discussion and analysis supported by the data is that SJVN is the best performer followed by GIPCL, NHPC and NTPC.

RPOWER and RTNPOWER has the worst financial performance among all the other selected power generating companies for the purpose of study.

SJVN is the best performer in terms of liquidity ratio (rank 1), profitability ratio (rank 1), performance ratio (rank 1), leverage ratio (rank 1), coverage ratio (rank 1), expense insight ratio (rank 1) among the selected power generating companies. SJVN does have a rank 1 only in the following two ratios, change in debt ratio (rank 2) and debtors velocity ratio (rank 3.)

RPOWER in the other hand has the worst financial performance and has a very low-quality financial ratios, the ranks in each ratio are as follows, liquidity ratio (rank 5), profitability ratio (rank 5), performance ratio (rank 5), leverage ratio (rank 5), coverage ratio (rank 5), expense insight ratio (rank 4), change in debt ratio (rank 6) and debtors velocity ratio (rank 6).

RTNPOWER is the worst performer after RPOWER and this power generating company too has a very low-quality ratios except few, i.e., liquidity ratio (rank 2), profitability ratio (rank 6), performance ratio (rank 6), leverage ratio (rank 2), coverage ratio (rank 6), expense insight ratio (rank 3), change in debt ratio (rank 5) and debtors velocity ratio (rank 5).

Among all the ratio selected to determine the financial performance, the privately-owned power generation companies are quite better only in one ratio i.e., liquidity ratio. The government owned (central & state) power generating companies have an edge over the privately-owned power generating in all the other ratios except the liquidity ratio.

# Chapter IV

## Seasonality effect on the financial performance of power generating companies listed in Bombay Stock Exchange.

### 4.1 Objective and basis of the study

The objective of this chapter is to check the presence of seasonality on the data points of few important financial metrics namely; income from operation, total expenditure, earnings before interest and tax, net profit and EPS for the selected power generating companies in India. The seasonality is the continuity of the data points over a particular period of time. The presence of seasonality in the data is tested with the help of time series analysis. The other factors are not being considered apart from time factor. The quarterly data is plotted in order to find the continuity of the data points over a period of time from 2009–10 to 2017–18. Cycle plots which were propounded by Cleveland and his fellow mates in the year 1978 is being used to study the nature of data and to check the presence of seasonality in the data. Cycle plots have an advantage over other simple charts in showing the presence of seasonality and trend in the data. Cycle plots have been selected because it helps in studying the behaviour of the seasonal time series, it also easily helps in detecting the cyclical patterns over time and each series is separated into its own section. The advantage of using cycle plots is that the individual series does not need different colours in differentiating from one series to another series. The simple multiple line charts and standard time series plot will not be able to show both the cycle and trend of the data series at the same time and space. The cycle plot also known as subseries plot has the advantage of both and weakness of none of the other two plots. The cycle plots or the subseries plot is best when the period of seasonality is known, as in this case the period of seasonality is known, and the period of seasonality is four. The quarterly data series are used, in a year there are four quarters. The period of study ranges from 2009–10 to 2017–18. Cycle plot is being selected over auto correlation function or spectral plot because these two methods give best results only when the period of seasonality is unknown. The cycle plots also help in spotting the patterns both between and within the groups. There are six power generating companies selected for the purpose of this study. The main objective of this chapter is to check the presence and impact of seasonality in the selected financial metrics. The quarterly data are being used to justify the objective of the study.

## 4.2 Data analysis and interpretation

### 4.2.1 GIPCL, Selected financial metrics

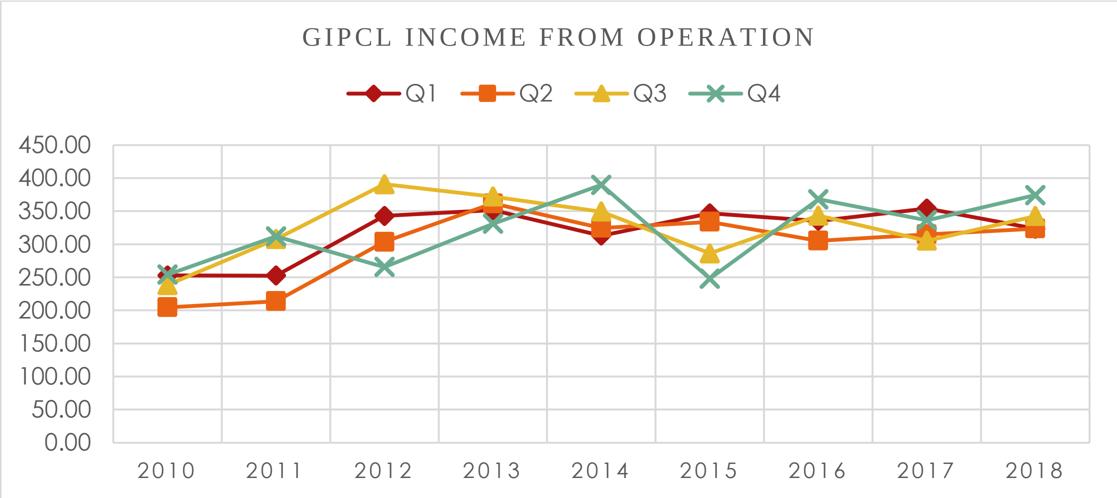
Table 4.a GIPCL, financial metrics values in (CR.)

| Sl.no | Year / quarter | Income from operation | Total expenditure | EBIT | Net profit | EPS |
|---|---|---|---|---|---|---|
| 1 | 2010 1 | 252.90 | 212.95 | 411.4 | 294 | 1.94 |
| 2 | 2010 2 | 204.62 | 181.60 | 242.8 | 124.6 | 0.82 |
| 3 | 2010 3 | 238.25 | 200.11 | 386.3 | 288.1 | 1.9 |
| 4 | 2010 4 | 254.09 | 21.60 | 243.20 | 361.1 | 0.00 |
| 5 | 2011 1 | 252.56 | 209.99 | 430.1 | 418.5 | 2.77 |
| 6 | 2011 2 | 213.95 | 197.47 | 175.4 | 155.3 | 1.03 |
| 7 | 2011 3 | 307.75 | 264.70 | 432.5 | 243.6 | 1.61 |
| 8 | 2011 4 | 311.73 | 228.64 | 888.80 | 812.1 | 53.70 |
| 9 | 2012 1 | 342.77 | 254.57 | 883.4 | 430.4 | 2.85 |
| 10 | 2012 2 | 303.52 | 250.67 | 531.1 | 277.6 | 1.84 |
| 11 | 2012 3 | 390.62 | 338.34 | 526.2 | 168.5 | 1.11 |
| 12 | 2012 4 | 265.54 | 193.28 | 749.8 | 307.1 | 2.03 |
| 13 | 2013 1 | 351.45 | 256.65 | 966.5 | 551.1 | 3.64 |
| 14 | 2013 2 | 361.74 | 272.01 | 946.7 | 320.2 | 2.12 |
| 15 | 2013 3 | 371.98 | 272.43 | 1,016.90 | 699.2 | 4.62 |
| 16 | 2013 4 | 330.86 | 230.68 | 1,055.20 | 618.2 | 4.09 |
| 17 | 2014 1 | 312.97 | 244.14 | 762.1 | 364.1 | 2.41 |
| 18 | 2014 2 | 324.64 | 267.10 | 633.3 | 312.5 | 2.07 |
| 19 | 2014 3 | 349.38 | 273.93 | 845.8 | 425.5 | 2.81 |
| 20 | 2014 4 | 389.69 | 276.69 | 1,215.10 | 756.7 | 5 |
| 21 | 2015 1 | 346.79 | 256.67 | 990.8 | 485.7 | 3.21 |
| 22 | 2015 2 | 333.81 | 259.40 | 918 | 404.4 | 2.67 |
| 23 | 2015 3 | 286.08 | 228.75 | 655.9 | 213.4 | 1.41 |
| 24 | 2015 4 | 247.98 | 167.12 | 894.8 | 159.7 | 1.06 |
| 25 | 2016 1 | 335.41 | 254.90 | 877.9 | 543.8 | 3.6 |
| 26 | 2016 2 | 305.35 | 245.38 | 676.8 | 381.2 | 2.52 |
| 27 | 2016 3 | 343.25 | 288.74 | 601.2 | 344.5 | 2.28 |
| 28 | 2016 4 | 367.85 | 286.55 | 958.9 | 614.6 | 4.06 |
| 29 | 2017 1 | 353.96 | 270.10 | 882 | 549.7 | 3.63 |
| 30 | 2017 2 | 315.04 | 250.92 | 854.1 | 505.3 | 3.34 |
| 31 | 2017 3 | 305.34 | 242.62 | 674.9 | 412.9 | 2.73 |
| 32 | 2017 4 | 336.22 | 270.13 | 1330.64 | 824.52 | 5.45 |
| 33 | 2018 1 | 323.36 | 245.09 | 942.6 | 629.18 | 4.16 |
| 34 | 2018 2 | 323.67 | 258.16 | 835.13 | 533.15 | 3.52 |
| 35 | 2018 3 | 342.58 | 283.50 | 949.98 | 591.36 | 3.91 |
| 36 | 2018 4 | 374.34 | 310.95 | 1116.65 | 691.36 | 4.57 |

Source: Quarterly reports (BSE.)

4.2.2 GIPCL, Chart Analysis (Sequential & Cycle or Subseries plot), Income from operation

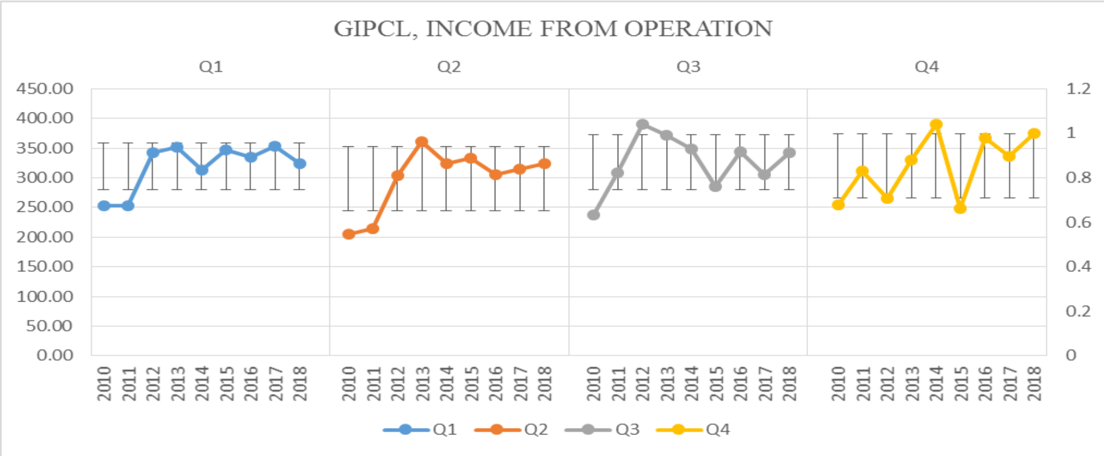
Chart 4.a Sequential Plot (GIPCL) Income from operation




Source: Created by the researcher.

The income from operation of GIPCL has been plotted in the above Chart 4.a in order to find the pattern in the data relating to income from operation from 2010 to 2018. The line chart has been drawn for a quarterly data. From the observation in the above Chart 4.a, it is clear that the movement of income from operation in different quarters is same to some extent. There is no drastic change in any of the related quarters. The data seems to be quite random in nature and does not support the presence of any particular pattern in the above time series plot. In order to get a clearer view on the presence of any regular pattern, the same data is plotted in Chart 4.b as a cycle or subseries plot.

Chart 4.b Cycle Plot (GIPCL)

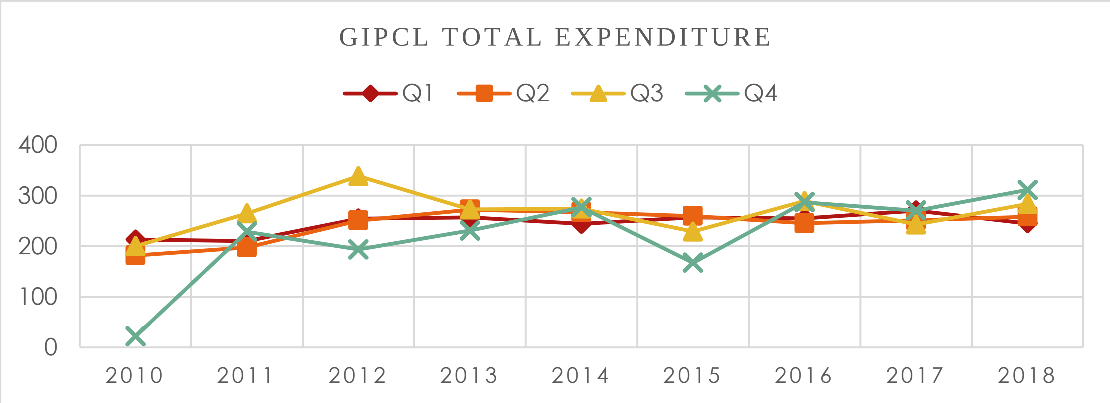



Source: Created by the researcher.

In the above Chart 4.b, the income from operation of the power generating company GIPCL has been plotted. Observing the cycle or subseries plots in the above chart there is not much effect of the seasonality on the income from operation for GIPCL. Income from operation for quarter 1 and 3 is little bit on the higher side as compared to the quarter 2 and 4. There is not much variation in any of the four quarters, to some extent, GIPCL is constantly generating the same level of income from operation. This proves the absence of seasonality relating to income from operation for GIPCL as the continuity in the pattern of the data is absent. There is only a slight variation within the group of different quarters. The pattern is same to some extent in all the four quarters. So, it can be inferred from the above observation that there is no significant effect of seasonality for GIPCL in the generation of income from operation. It is also observed that the standard deviation in quarter 1 is lesser as compared to the other quarters 2, 3 and 4. Income from operation in quarter 1 is more stable as compared to the other quarters.

4.2.3 GIPCL, Chart Analysis (Sequential & Cycle or Subseries plot), Total Expenditure

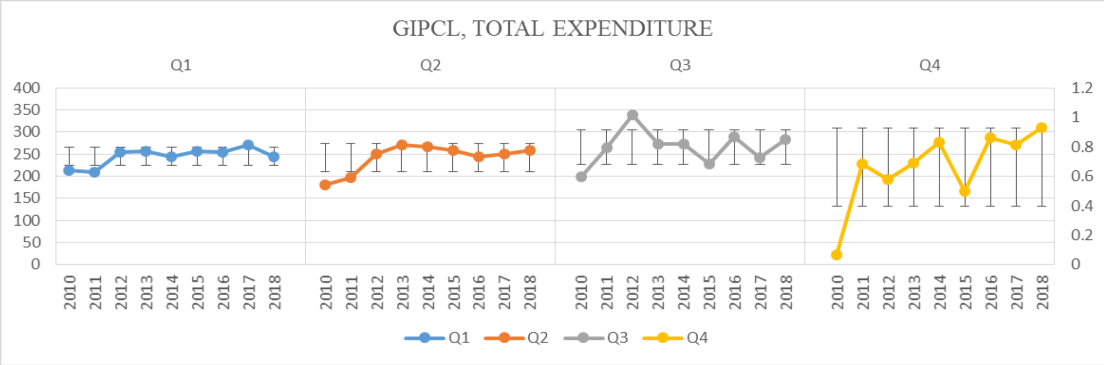
Chart 4.c Sequential Plot (GIPCL) Total Expenditure




Source: Created by the researcher.

The observation from the above plotting in Chart 4.c clearly demonstrate that the quarter 1 and 2 has more or less identical type of movement. Quarter 3 and 4 in the other hand have a movement which is quite opposite. Total expenditure from the above observation is clear that, even though the regular pattern is not present total expenditure is continuously increasing in quarter 4 from 2010 to 2018, although a minor dip is seen in the years 2012, 2015 and 2017. It is quite clear after close observation from the above Chart 4.c, there is no presence of regular pattern in the data. It seems from the Chart 4.c that the movement of the data relating to total expenditure for GIPCL is random and has no continuity in the series over a period of time. In order to confirm the inference, cycle or subseries plot has been created below in Chart 4.d to confirm whether there is a presence of seasonality.

Chart 4.d Cycle Plot (GIPCL)

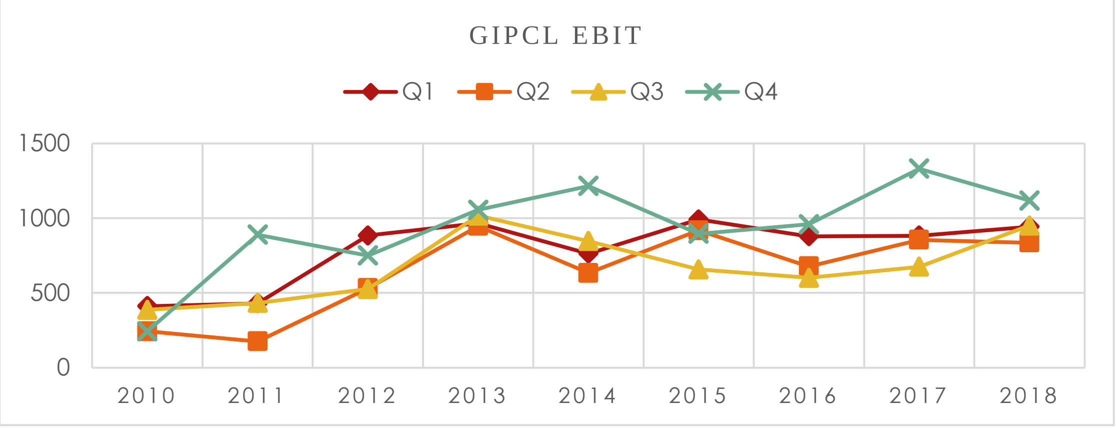



Source: Created by the researcher.

The cycle plot or the subseries plot above in the Chart 4.d too supports the randomness of the data and there is no specific pattern to confirm the presence of seasonality in the data series relating to GIPCL from 2010 to 2018. It is also clear in the above chart that the total expenditure in quarter 4 has a very high standard deviation and it is continuously increasing from 2010 to 2018 except minor three dips during 2012, 2015 and 2017. Quarter 1 and 2 have a less standard deviation comparatively but the movement for all the four quarters are same. The inference which can be drawn from the above two charts is that there is no presence of seasonality as the continuity of data points for the total expenditure in any specific quarter is not supported by both the sequential and subseries plots.

4.2.4 GIPCL, Chart Analysis (Sequential & Cycle or Subseries plot), Earnings before Interest and Tax (EBIT)

Chart 4.e Sequential Plot (GIPCL) Earnings before Interest and Tax

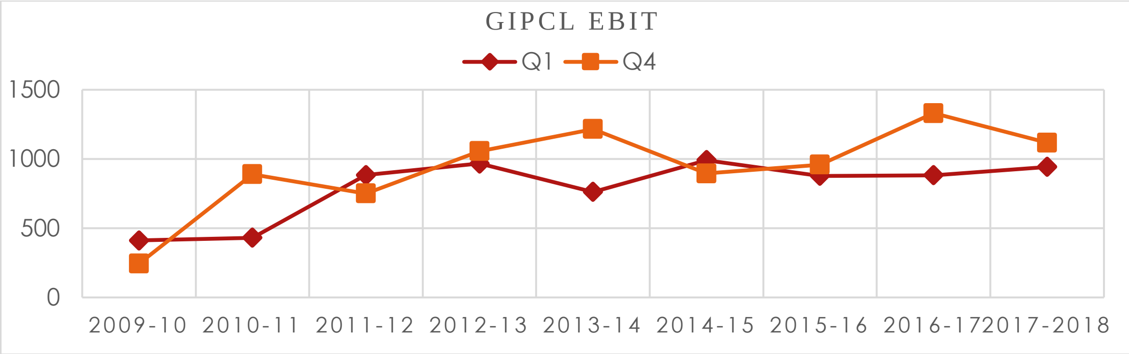



Source: Created by the researcher.

The plots in the above Chart 4.e clearly depict the higher movement of earnings before interest and tax (EBIT) in quarter 4 comparatively as compared to other three quarters. But there is no strong evidence to support the presence of any regular pattern to confirm the presence of seasonality. As in some cases quarter 1 has a higher movement than quarter 4, had the EBIT been more only in quarter 4 from 2010 to 2018, the presence of seasonality would have been confirmed. The movement of EBIT in quarter 2 and quarter 3 is also not regular. Hence, the inference that could be drawn from the discussion is that there is very less visual evidence to support the presence and impact of seasonality in EBIT for GIPCL during 2010–2018.

The trend of EBIT in quarter 4 is moving opposite to the movement of quarter 1. The same can be clearly visualized in the Chart 4.f in the next page.

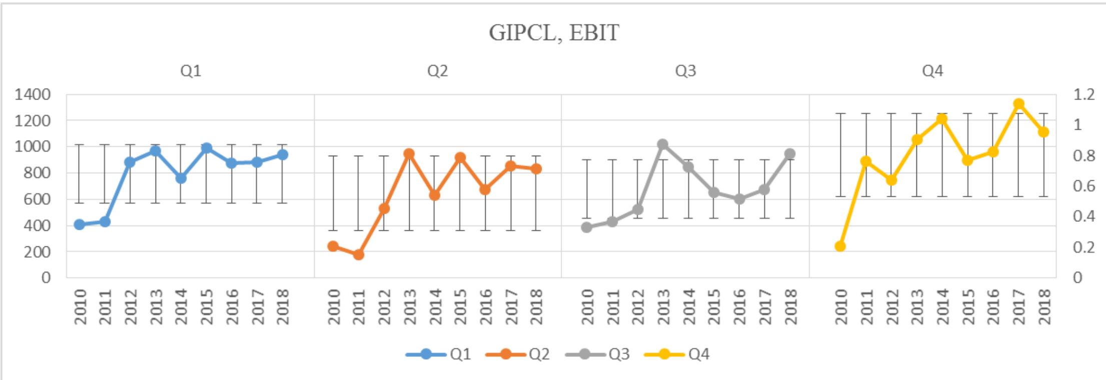
Chart 4.f. Sequential Plot (GIPCL)




Source: Created by the researcher.

When the EBIT increased in quarter 4 in 2011, the EBIT decreased in quarter 1 in the same year. Again, when the EBIT decreased in quarter 4 in 2012, there was an upward movement of EBIT in quarter 1, 2012. This pattern is same from 2010 to 2018. In order to confirm the presence of seasonality in the data series, cycle or subseries plot has been created in the chart below.

Chart 4.g Cycle Plot (GIPCL)



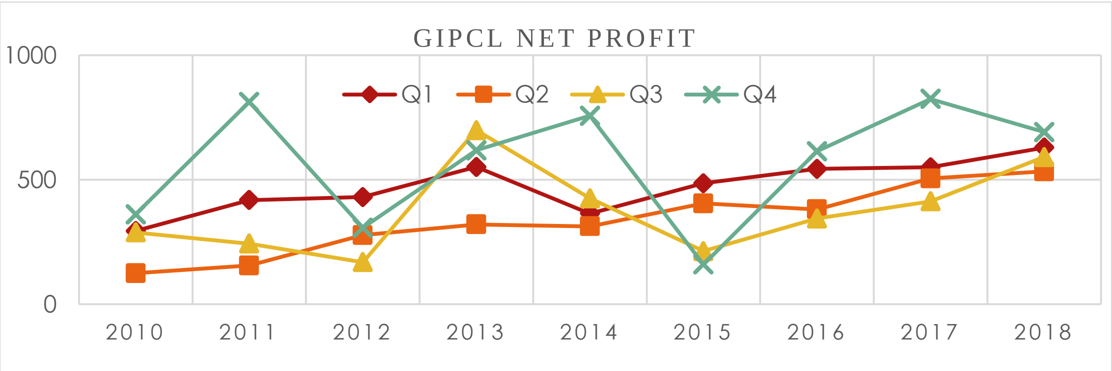

Source: Created by the researcher.

Observing the plotting in the above Chart 4.g, it is quite clear that the movement in quarter 1 and quarter 4 is quite higher comparative to quarter 2 and 3. The data series for EBIT in quarter 1 is moving opposite to quarter 4. There is no significant difference in the movement among any of the quarters. After observing the movement of the data series for EBIT in four different quarter from 2010 to 2018, it is confirmed that there are no significant patterns present to support the presence and impact of seasonality in the data of EBIT for GIPCL. It is also observed that the quarter 4 has the highest standard deviation followed by quarter 2.

Hence, it can be inferred from the above discussions as supported by both the sequential and cycle or subseries plotting that there is no repetition of data series in any particular quarters, so there is no presence of seasonality in the data series of EBIT for GIPCL. It can also be confirmed that there is hardly any impact of seasonality for GIPCL in generating earnings before interest and tax (EBIT).

4.2.5 GIPCL, Chart Analysis (Sequential & Cycle or Subseries plot), Net profit

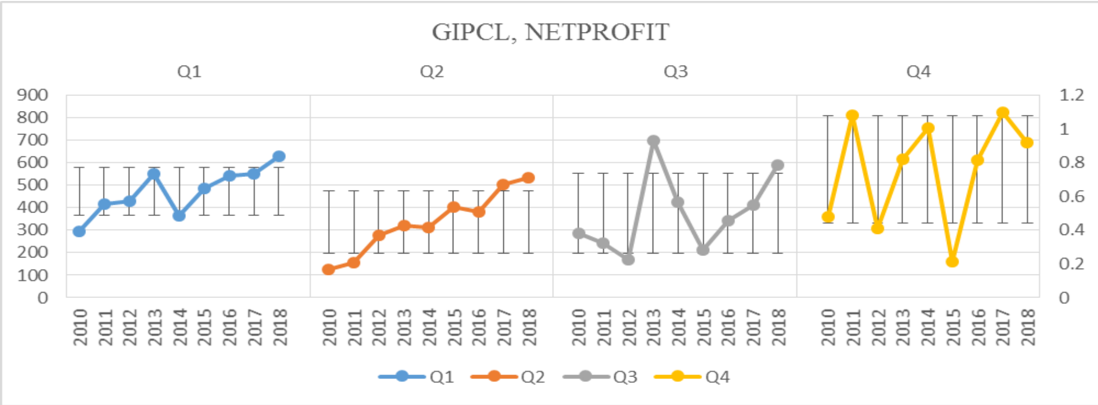
Chart 4.h Sequential Plot (GIPCL) Net profit




Source: Created by the researcher.

The net profit of GIPCL is higher in quarter 4 and 1 as compared to the other two quarters from 2010 to 2018 as observed from the sequential plotting in the above Chart 4.h. It is also quite clear that the data points are quite volatile in quarter 4 as compared to quarter 1. As these two quarters 4 and 1 have higher net profits, quarter 4 has more ups and downs as compared to that with quarter 1. Quarter 1 is more stable and has more or less same but increasing data points. In the other hand quarter 2 has less fluctuations in data points as compared to that with the quarter 3. Thus, GIPCL has higher net profits in the two quarters i.e., quarter 4 and 1, net profits in quarter 4 is much more volatile as compared to that with the quarter 1. The negligible random patterns are visible in quarter 4 and 1 but it does not have enough evidence to support the presence of seasonality. In order to verify the statement, the cycle or subseries plot is plotted in the Chart 4.b below.

Chart 4.i Cycle Plot (GIPCL)



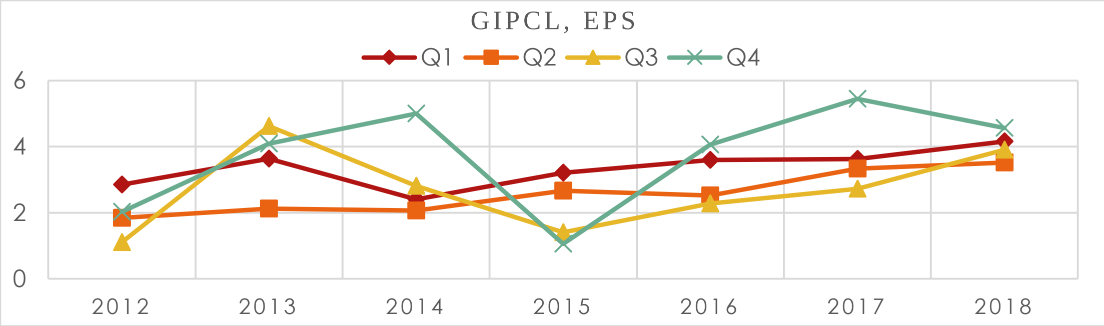

Source: Created by the researcher.

It is also clear from the above Chart 4.i that the quarter 1 and quarter 4 has higher net profit as compared to quarter 2 and quarter 3 after observing the data series from 2010 to 2018. It is also clear that the net profit in quarter 1 is continuously increasing except two dips in 2012 and 2014. The dip for quarter 1 in 2012 was minor but the dip in 2014 was major. Comparatively, quarter 4 is also higher but it is much more volatile. As observed in the above Chart 4.i quarter 4 had the highest net profit in 2017 and 2011 and one of the lowest net profits was in the year 2015 comparatively to other quarters. Even though the net profits are higher in quarter 1, net profits are increasing consistently in quarter 2. The net profit in quarter 3 is also random.

The inference from the above discussion and data points is that there is very less significant evidence to prove the presence of seasonality except in quarter 1. Hence, the impact of seasonality for GIPCL in generating net profit is more or less nil.

4.2.6 GIPCL, Chart Analysis (Sequential & Cycle or Subseries plot), EPS

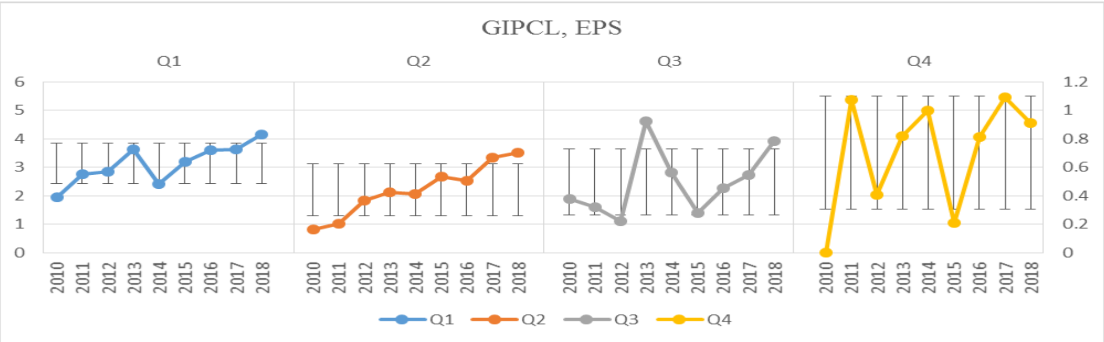
Chart 4.j Sequential Plot (GIPCL)




Source: Created by the researcher.

The data points for earnings per share (EPS) as plotted in the above Chart 4.j, to some extent is having the same pattern as compared to the net profit in the earlier Chart 4.h. EPS is higher in quarter 4 as compared to other quarters but it was lowest in the year 2015 for quarter 4. EPS in quarter 3 is lowest consistently from 2015 to 2018, while after a fall of EPS in quarter 4 in the year 2015, the EPS is continuously increasing in quarter 4 from 2015 to 2018. Still after observation there is no strong visual evidence to prove the presence of seasonality. As all the data series for EPS is mostly over lapping each other.

Chart 4.k Cycle Plot (GIPCL)




Source: Created by the researcher.

The earnings per share for GIPCL in quarter 4 and 1 is higher but the data series in quarter 4 has a higher standard deviation as compared to that with quarter 1. It is also observed that the data in the quarter 2 is consistently increasing from 2010 to 2018, except minor dips in the year 2014 and 2016.

Hence, the inference that can be drawn from the above discussion is that there is no presence of particular data points.  The data series of earnings per share for GIPCL is to some extent random and there is no presence of seasonality. Hence, it can be inferred that there is no impact of different seasons in earnings per share for GIPCL from 2010 to 2018.

4.3.1 NHPC, Selected financial metrics

Table 4.b

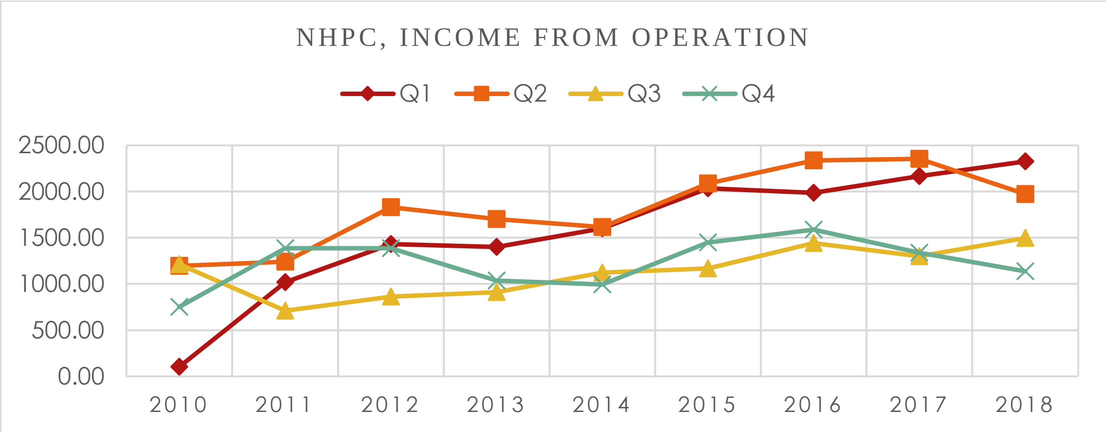
NHPC, financial metrics amount in Rs. (Cr.)

| Sl.no | Year / quarter | Income from operation | Total expenditure | EBIT | Net profit | EPS |
|---|---|---|---|---|---|---|
| 1 | 2010 1 | 101.97 | 4.38 | 7217 | 50.21 | 0 |
| 2 | 2010 2 | 1195.39 | 489.65 | 7,961.70 | 6,166.40 | 0.54 |
| 3 | 2010 3 | 1213.47 | 602.88 | 6,740.90 | 5,816.10 | 0.5 |
| 4 | 2010 4 | 750.86 | 5.40 | 1529.3 | 39.015 | 0 |
| 5 | 2011 1 | 1019.71 | 465.12 | 5,899.50 | 5,374.20 | 0.44 |
| 6 | 2011 2 | 1240.36 | 489.65 | 7,916.10 | 6,901.80 | 0.56 |
| 7 | 2011 3 | 709.02 | 726.44 | 4,141.80 | 2121.80 | 0.56 |
| 8 | 2011 4 | 1385.57 | 9.15 | 1986.1 | 63.84 | 3.37 |
| 9 | 2012 1 | 1431.41 | 740.07 | 8,204.70 | 7,910.50 | 0.64 |
| 10 | 2012 2 | 1830.65 | 9.15 | 11,927.00 | 63.84 | 0.05 |
| 11 | 2012 3 | 862.02 | 726.80 | 1,551.80 | 2,121.80 | 0.17 |
| 12 | 2012 4 | 1385.57 | 669.29 | 7,743.70 | 8,020.70 | 0.65 |
| 13 | 2013 1 | 1399.12 | 739.61 | 6,822.20 | 6,698.10 | 0.54 |
| 14 | 2013 2 | 1700.73 | 822.10 | 9,503.40 | 7,833.80 | 0.64 |
| 15 | 2013 3 | 911.57 | 636.13 | 3,742.40 | 3,117.70 | 0.25 |
| 16 | 2013 4 | 1037.71 | 748.98 | 3,504.00 | 5,832.60 | 0.47 |
| 17 | 2014 1 | 1600.51 | 824.66 | 7,947.10 | 7,199.30 | 0.59 |
| 18 | 2014 2 | 1615.21 | 913.87 | 7,361.50 | 7,075.80 | 0.58 |
| 19 | 2014 3 | 1123.38 | 815.20 | 3,294.30 | 2,593.50 | 0.21 |
| 20 | 2014 4 | 996.01 | 958.95 | -7,111.40 | 6445.1 | 0 |
| 21 | 2015 1 | 2033.88 | 1092.82 | 9,620.30 | 6,160.30 | 0.56 |
| 22 | 2015 2 | 2086.01 | 1168.19 | 9,306.00 | 6,841.00 | 0.62 |
| 23 | 2015 3 | 1166.91 | 959.63 | 2,174.10 | 1,798.30 | 0.16 |
| 24 | 2015 4 | 1449.84 | 958.95 | 5,126.20 | 6,445.10 | 0.58 |
| 25 | 2016 1 | 1986.05 | 1112.55 | 8,948.40 | 7,671.70 | 0.69 |
| 26 | 2016 2 | 2334.24 | 1108.83 | 12,371.60 | 11,808.70 | 1.07 |
| 27 | 2016 3 | 1440.90 | 1016.69 | 4,476.00 | 3,880.20 | 0.35 |
| 28 | 2016 4 | 1585.58 | 1401.64 | 4,109.10 | 1,040.80 | 0.09 |
| 29 | 2017 1 | 2166.04 | 1178.67 | 10,181.20 | 8,578.20 | 0.77 |
| 30 | 2017 2 | 2351.67 | 1185.98 | 12,173.80 | 15,546.60 | 1.41 |
| 31 | 2017 3 | 1298.35 | 1039.27 | 2,693.10 | 2,146.90 | 0.19 |
| 32 | 2017 4 | 1337.59 | 1742.00 | -1,370.10 | 1,684.20 | 0.16 |
| 33 | 2018 1 | 2325.78 | 1535.72 | 8,970.50 | 8,626.60 | 0.84 |
| 34 | 2018 2 | 1971.69 | 1442.84 | 10,482.30 | 10,186.40 | 0.99 |
| 35 | 2018 3 | 1497.93 | 1288.48 | 7,782.80 | 6,879.30 | 0.67 |
| 36 | 2018 4 | 1136.90 | 1352.07 | 3002.1 | 1,894.20 | 0.18 |

Source: Quarterly reports (BSE).

4.3.2 NHPC, Chart Analysis (Sequential & Cycle or Subseries plot), Income from operation

Chart 4.l Sequential Plot (NHPC) Income from operation

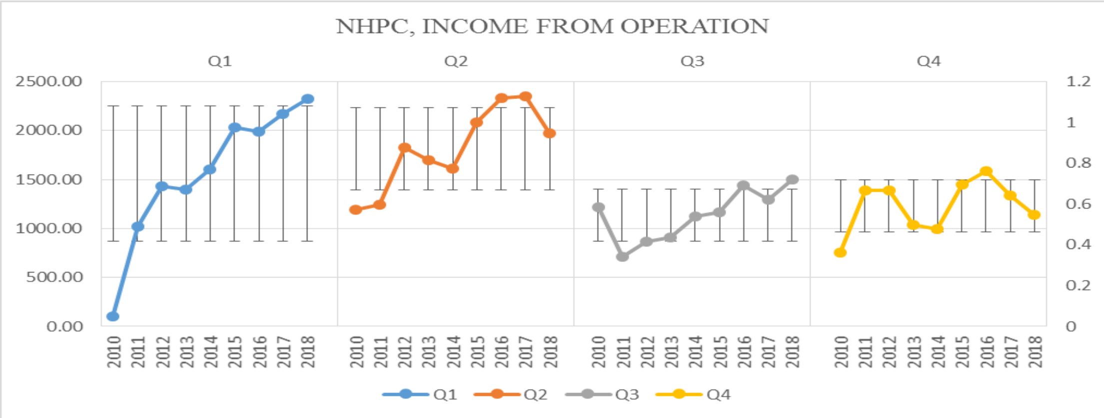



Source: Created by the researcher.

The sequential plotting of the data series relating to income from operation for NHPC in the above Chart 4.l is quite clear about the higher income from operation in quarter 2 and quarter 1. Income from operation was higher in quarter 4 only once in the year 2011. NHPC is having the lowest income from operation in quarter 3 except in the years 2010, 2014 and 2018. In 2010 NHPC had the highest income from operation as compared to all the other quarters but after 2010 the hydro power generating company is having the lowest income from operation in quarter 3, except a slight improvement in the year 2014. As noticed from the above plotting, NHPC has the increasing trend for income from operation consistently from 2010 to 2018. While there was a significant dip for income from operation in quarter 2 in the years 2014 and 2018. The inference from the above discussion is that from 2012 onwards, NHPC is generating higher income from operation in quarter 1 and 2 as compared to quarter 3 and 4. It is quite clearly depicted by the chart that NHPC has high income from operation in the months April–September as compared to the months of December–May.

In order to support the inference as stated, a cycle or a sequential plotting has been used below in the Chart 4.m.

Chart 4.m Cycle Plot (NHPC)



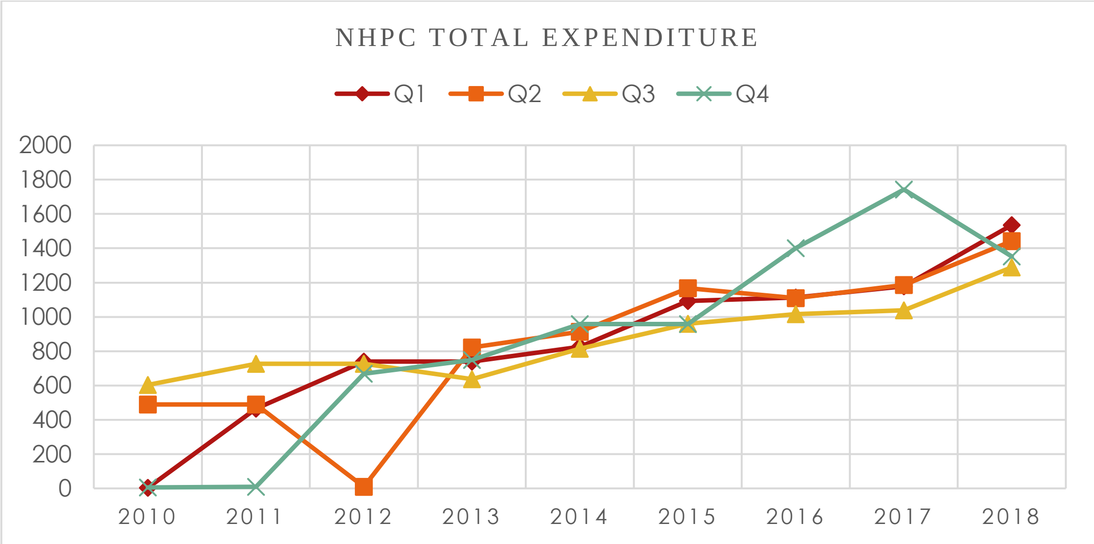

Source: Created by the researcher.

As discussed above, it is clearly depicting that quarter 1 has the consistent upper trend as compared to the other quarters. NHPC is consistently earning higher income in quarter 1. It is also visible that NHPC is generating higher income from operation in the two quarters that is, quarter 1 and quarter 2. The data series for income from operation in quarter 2 is not consistently increasing as compared to that with the quarter 1. In the other hand NHPC has low income from operation from the other two quarter that is quarter 3 and quarter 4.

Hence, it is proved that there is a pattern not within 3 months of time period but within six months of period within a year and this regular pattern is continuous from the year 2012 to 2018. NHPC is generating higher income from operation in quarter 1 and 2 as compared to quarter 3 and 4. The seasons impacting the financial metric income from operation for NHPC is April–September and October–March. During April–September NHPC is generating higher income from operation as compared to October–March when the income from operation for NHPC is lower. This particular pattern is continuing for seven years from 2012 to 2018.

4.3.3 NHPC, Chart Analysis (Sequential & Cycle or Subseries plot), Total Expenditure

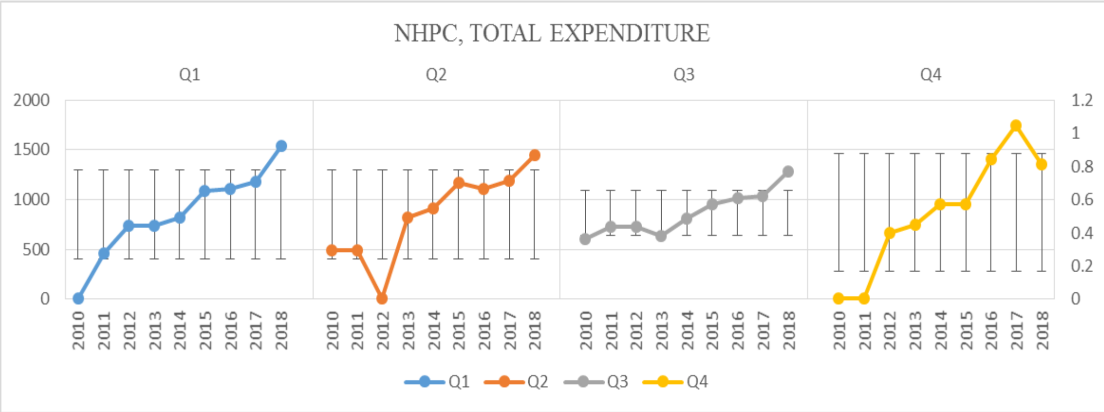
Chart 4.n Sequential Plot (NHPC) Total Expenditure




Source: Created by the researcher.

Like income from operation no clear continuing pattern is visible for the financial metric total expenditure. As observed from the sequential plotting in the above Chart 4.n, there is no clear visual evidence to support the regularity in the patterns concerned with the data series of total expenditure. There is no specific quarter in which the NHPC is having high or low expenditure continuously to support the presence of seasonality. But it is quite clear from the plotting that in all the four quarters the expenditure is having the increasing trend. The inference that can be drawn from the observation is that the NHPC's total expenditure does not have a presence of seasonality, so there is no impact of any seasons on the total expenditure, but it is quite clear that the total expenditure for all four quarters are increasing every year. In order to verify the inference a very popular method used to unlock the presence of seasonality is being used. Cycle plot or a sub series plotting of the data is frequently used in order to understand the impact of seasonality, in the next Chart 4.o a data series for total expenditure is plotted using the technique of cycle or subseries plotting.

Chart 4.o Cycle Plot (NHPC)




Source: Created by the researcher.

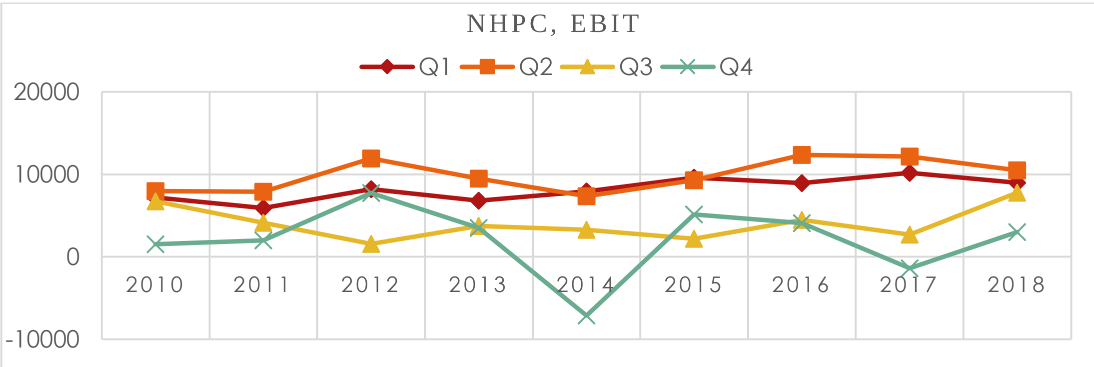
As, observed in the above table there is not much significant difference in the total expenditure as incurred by NHPC in any of the four quarters from 2010 to 2018. Even though the presence of seasonality is not visible in the cycle or subseries plot the upward trend is clearly visible. From the observation it is confirmed that the total expenditure for NHPC is increasing in all the quarters from 2010 to 2018. Only in 2018, the total expenditure of NHPC is seen decreasing in quarter 4 as compared to that with 2017.

The final inference is supported by both types of plotting used, that is, there is a presence of upward trend in all the four quarters but there is no presence of regular patterns or no presence of seasonality. Hence, it is also confirmed that the total expenditure of NHPC is not affected by any particular seasons, but there is an increasing trend of total expenditure.

Looking into the pattern of trend and the presence of seasonality for both of the financial metrics, i.e., income from operation and total expenditure, it is very likely that the NHPC will have high profitability in the quarter 1 and quarter 2. This is because NHPC have high income from operation in the two quarters i.e., quarter 1 and quarter 2, but the level of total expenditure is same in all the quarters. The income from operation is low in quarter 3 and 4 but still NHPC has a high level of total expenditure in quarter 3 and 4. Due to this reason, there is a high probability for NHPC to have high profitability in quarter 1 and 2 as compared to quarter 3 and 4. In order to confirm the inference and assumption, the data points of earnings before interest and tax for NHPC is plotted in the chart below.

4.3.4 NHPC, Chart Analysis (Sequential & Cycle or Subseries plot), Earnings before interest and tax (EBIT)

Chart 4.p Sequential Plot (NHPC) Earnings before interest and tax

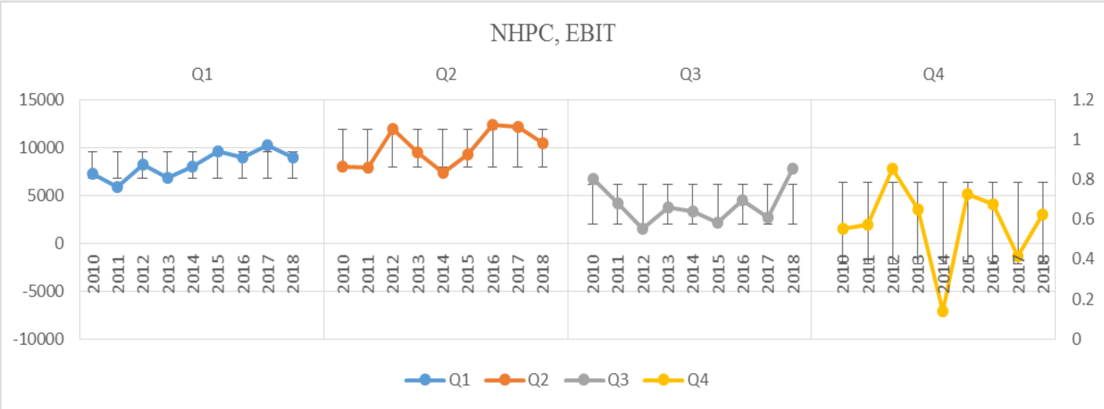



Source: Created by the researcher.

The sequential plotting of earnings before interest and tax (EBIT) in the above Chart 4.p is clearly supporting the inference and assumptions made earlier. It is supporting the inference of high EBIT in quarter 1 and 2. It is clearly visible that NHPC is generating high EBIT in quarter 1and 2 as compared to quarter 3 and 4, consistently from 2010 to 2018. This is mainly due to the higher income from operation in quarter 1 and 2 and the same level of total expenditure in all the quarters throughout the selected period of study. NHPC has higher EBIT in quarter 2 as compared to that with quarter 1. Hence, the inference formed after discussion is that the NHPC has higher EBIT in the month of April–September as compared to that in the months from October to

March. It is also observed that EBIT is highest during the months from July to September. The evidence and data above are supporting the presence of seasonality semi-annually as compared to quarterly data series.

Chart 4.q Cycle Plot (NHPC)




Source: Created by the researcher.

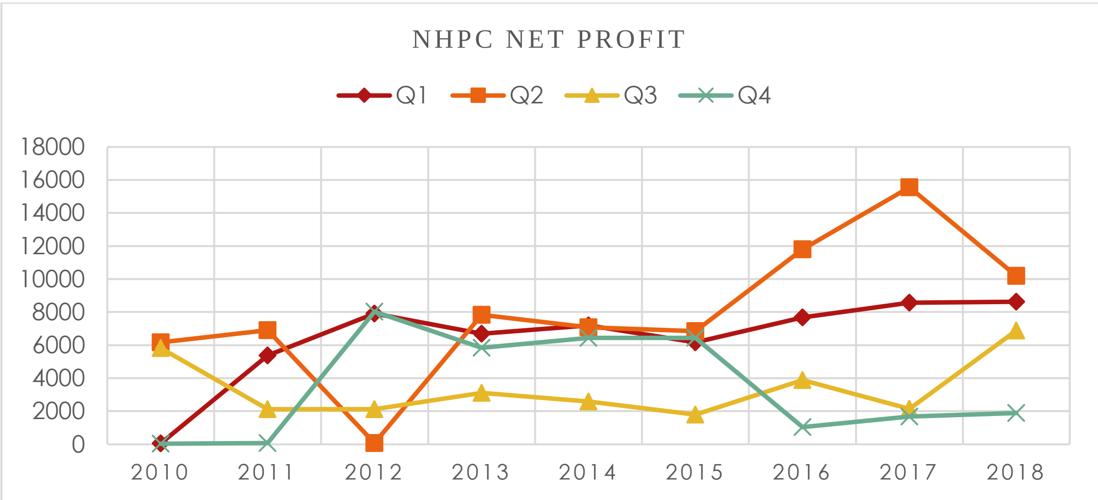
The above Chart 4.q is clearly showing that the EBIT of NHPC is higher in quarter 1 and 2 consistently from 2010 to 2018 as compared to the other quarters 3 and 4. It is also clearly quite visible that the data points of EBIT in quarter 2 is quite volatile as compared to quarter 1. Even though the NHPC is having higher EBIT in quarter 2, the EBIT in quarter 1 is much more stable and has consistent upward trend. In the other hand NHPC have lower EBIT in quarter 3 and 4 and EBIT is much more volatile in quarter 4 as compared to quarter 3. It is observed from the above data points that the NHPC has higher EBIT in the months from April to September and the months July to September has more fluctuations as compared to April–June. In the other hand, NHPC has lower EBIT in the months from October to March and the EBIT during January to February is very much volatile.

So, it is proved that there is a presence of seasonality but the presence of seasonality is much stronger during six months period rather than the three months data. So, the inference is that the NHPC is being impacted by the seasonality during six-month time period in generating EBIT.

In order to make the inference much resilient, the net profit of NHPC is plotted below to see if there exists the presence and impact of seasonality.

4.3.5 NHPC, Chart Analysis (Sequential & Cycle or Subseries plot), Net profit

Chart 4.r Sequential Plot (NHPC) Net profit



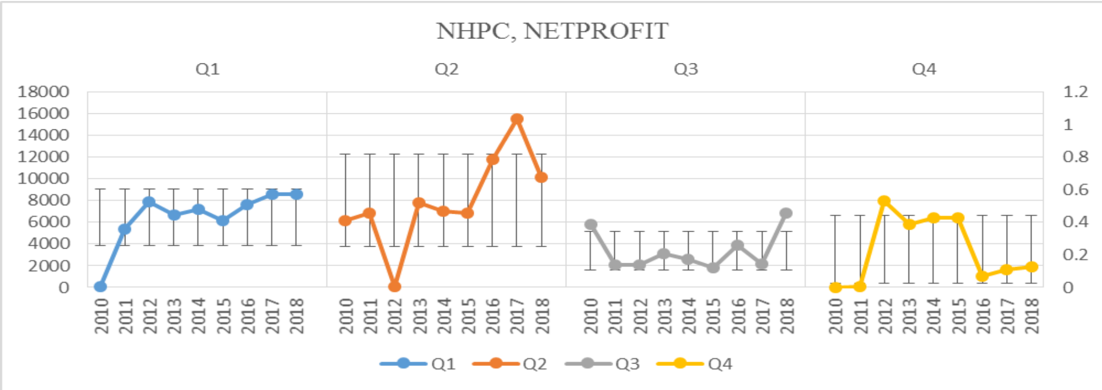

Source: Created by the researcher.

NHPC have a higher net profit in quarter 1 and 2 as compared to the other two quarters, similar to its EBIT, NHPC have more volatility in the data series of net profit in quarter 2 as compared to that with quarter 1. NHPC have high net profit in quarter 1 which is consistently increasing since 2010 to 2018. It is also visible that the net profit in quarter 4 is moving in opposite direction as compared to that with quarter 2, i.e., when the net profit in quarter 2 is increasing, the net profit in quarter 4 is decreasing and vice versa.

Hence, the plotting above in the Chart 4.q is supporting the same inference that NHPC is generating higher EBIT and net profit in the quarter 1 and 2 as compared to that of quarter 3 and 4. This is mainly due to the movement of income from operation and total expenditure. The movement of EBIT and net profit is related with the movement of income from operation and total expenditure. Also, there is a stronger repetitive pattern formed within the time periods of six months as compared to that of three months' time period.

The net profit of NHPC is also following the similar type of pattern which relates to its EBIT. In order to confirm the statement, the cycle or subseries plot has been created below.

Chart 4.s Cycle Plot (NHPC)




Source: Created by the researcher.

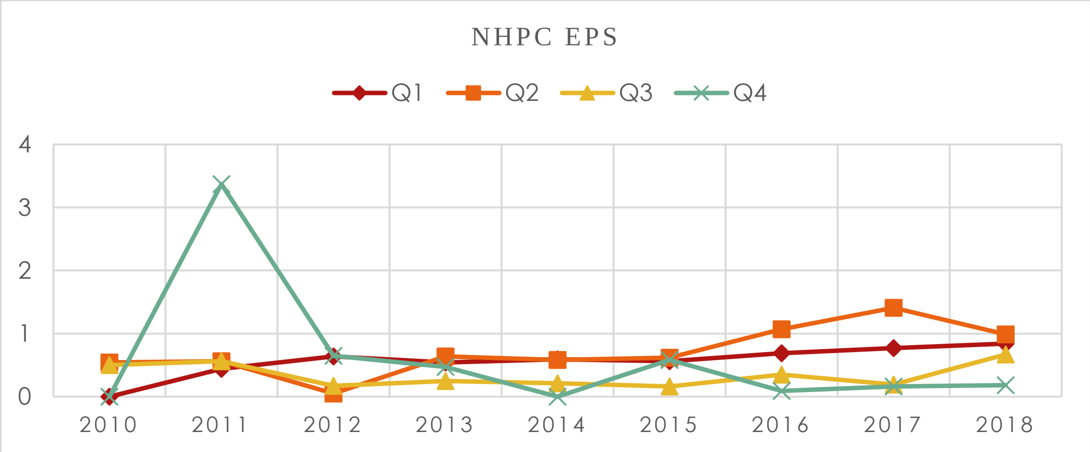
The data series relating to net profit of NHPC as plotted above in the Chart 4.s is supporting the above statement. The NHPC is generating higher net profit in quarter 1 and 2. It is also clearly visible that the plotting relating to net profit in quarter 2 is fluctuating more as compared to quarter 1. Quarter 3 and 4 has the lowest net profit for NHPC, as compared to quarter 1 and 2.

Hence, it is confirmed that NHPC is generating higher income from operation, EBIT and net profit during the months from April to September and it is lower during the months of October–March. But the NHPC has no difference in the total expenditure, the movement of total expenditure for NHPC is somewhat same in all the four quarters during the selected period of study from 2010 to 2018.

Lastly, earnings per share (EPS) is directly related with the movement of EBIT and net profit. To confirm if there exists the presence of seasonality in EPS the sequential and cycle or subseries plot has been created below.

4.3.6 NHPC, Chart Analysis (Sequential & Cycle or Subseries plot), EPS

Chart 4.t Sequential Plot (NHPC) EPS



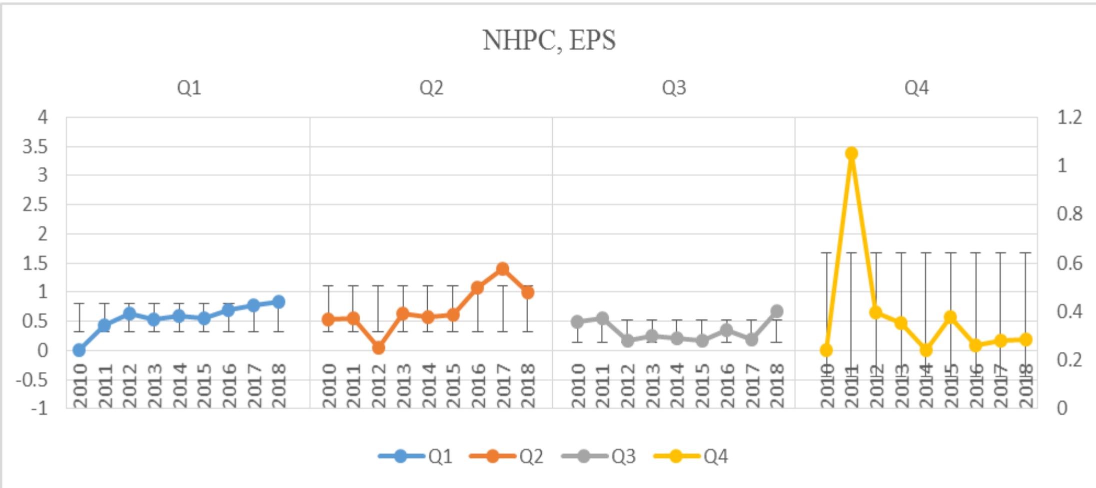

Source: Created by the researcher.

Earnings per share is the simplest barometer to indicate the earning potential for the shareholders. Understanding the movement and digging into the possible patterns can bring fruitful results for both the management and shareholders. As EPS is related with net profit, it is more likely that the EPS will also follow the same pattern as net profit. Earnings per share is directly related to net profit and the total outstanding shares. Increase and decrease in the net profit and total outstanding shares will affect the value of EPS. EPS in the quarter 1 and 4 for NHPC in the year 2010 is zero. This can be due to two reason one can be the lesser net profits earned or loss made by NHPC. Checking the data points of net profit in the above Table 4.b, very fewer net profits are recorded by the NHPC in quarter 1 and quarter 4 in the year 2010. Due to this reason the EPS for NHPC is recorded as zero in quarter 1 and 4 in the year 2010. EPS in the year 2011 increased manifold in quarter 4 due to large increase in the net profit of NHPC. After 2011 EPS in quarter 4 has been decreasing continuously till 2018, except a small increase in the year 2014–2015. Even though NHPC had zero EPS in quarter 1 in the year 2010, EPS for quarter 1 has been increasing gradually till 2018. From 2013 onwards, the trend is quite clearly visible for EPS, NHPC has higher EPS in quarter 1 and 2 from 2013 onwards as compared to the other two quarters.

Hence, it can be inferred as previous inference for the NHPC's other selected financial metrics except total expenditure that EPS for NHPC is also higher in the months April–September, which is quarter 1 and 2 as compared in the other months from October to March. This trend or pattern is quite clear and visible from the year 2013 to 2018.

In order to confirm it, the cycle or subseries plots are being plotted below.

Chart 4.u Cycle Plot (NHPC)




Source: Created by the researcher.

The cycle or subseries plots as portrayed in the Chart 4.u also supports the inference inferred in the above discussions. NHPC has higher EPS in the quarter 1 and 2 as compared to quarter 3 and 4. NHPC have a drastically higher EPS in quarter 4, in the year 2011 as compared to 2010. EPS in quarter 1 for NHPC is increasing gradually within the selected period of study.

The overall inference that can be drawn from the data series as plotted in the different charts above from Chart 4.l to Chart 4.u is that for NHPC, the impact of seasonality is more clearly within a range of six months rather than three months except for total expenditure. There is no presence of seasonality for the total expenditure but the total expenditure of NHPC has been seen increasing continuously in all quarters from 2010 to 2018. NHPC is earning higher income from operation, EBIT, net profit and EPS in quarter 1 and 2 as compared to quarter 3 and 4. It can be inferred that the months April to September is crucial NHPC as this power generating company is earning higher income from operation, EBIT, net profit and EPS during these months. Again, the months April–June are giving more consistent income from operation, EBIT, net profit and EPS as compared during the month from July to September. It is noted that as compared to the increase in total expenditure NHPC is not able to maintain the growth in its earnings.

### 4.4.1 NTPC, Selected financial metrics

Table 4.c

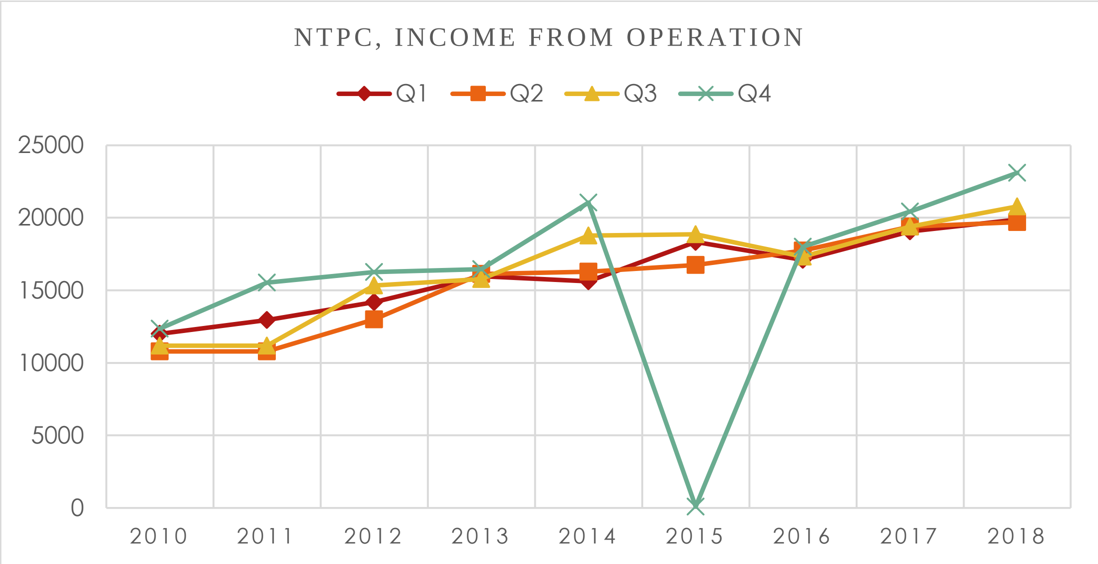
NTPC, financial metrics amount in Rs. (Cr.)

| Sl.no | Year / quarter | Income from operation | Total expenditure | EBIT | Net profit | EPS |
|---|---|---|---|---|---|---|
| 1 | 2010 1 | 12002.68 | 9439.80 | 30,881.70 | 21,936.20 | 2.66 |
| 2 | 2010 2 | 10782.79 | 8212.81 | 30,398.00 | 21,519.50 | 2.61 |
| 3 | 2010 3 | 11183.73 | 8479.84 | 32,293.60 | 23,649.80 | 2.87 |
| 4 | 2010 4 | 12353.39 | 10419.81 | 23,117.30 | 20,176.50 | 2.45 |
| 5 | 2011 1 | 12944.49 | 10640.48 | 26,620.70 | 18,418.90 | 2.23 |
| 6 | 2011 2 | 10782.79 | 8212.81 | 30,398.00 | 21,519.50 | 2.61 |
| 7 | 2011 3 | 11183.73 | 8479.84 | 32,293.60 | 23,649.80 | 2.87 |
| 8 | 2011 4 | 15518.94 | 12398.34 | 35,811.80 | 27,818.40 | 3.37 |
| 9 | 2012 1 | 14171.49 | 11946.39 | 25,778.40 | 20,757.80 | 2.52 |
| 10 | 2012 2 | 12989.29 | 11748.17 | 33,656.50 | 21,073.80 | 2.56 |
| 11 | 2012 3 | 15332.30 | 13232.97 | 21,514.30 | 21,303.90 | 2.58 |
| 12 | 2012 4 | 16263.56 | 12887.42 | 34,744.30 | 25,934.40 | 3.15 |
| 13 | 2013 1 | 15959.96 | 13089.61 | 30,763.40 | 24,986.70 | 3.03 |
| 14 | 2013 2 | 16119.67 | 12681.92 | 36,694.10 | 31,423.50 | 3.81 |
| 15 | 2013 3 | 15774.91 | 12608.45 | 31,991.10 | 25,967.60 | 3.15 |
| 16 | 2013 4 | 16461.84 | 13576.65 | 37,724.40 | 43,816.10 | 5.31 |
| 17 | 2014 1 | 15612.89 | 12289.94 | 33,719.10 | 25,270.20 | 3.06 |
| 18 | 2014 2 | 16272.27 | 13131.44 | 32,840.00 | 24,929.00 | 3.03 |
| 19 | 2014 3 | 18779.39 | 15173.59 | 36,315.30 | 28,612.80 | 3.47 |
| 20 | 2014 4 | 21038.83 | 17703.92 | 33,349.10 | 30,935.40 | 3.75 |
| 21 | 2015 1 | 18336.75 | 15933.59 | 24,031.60 | 22,012.00 | 2.67 |
| 22 | 2015 2 | 16736.63 | 14645.88 | 20,907.50 | 20,716.30 | 2.51 |
| 23 | 2015 3 | 18858.09 | 15451.78 | 34,063.10 | 30,740.00 | 3.73 |
| 24 | 2015 4 | 84.64 | 16056.68 | 38,296.90 | 29,440.30 | 3.57 |
| 25 | 2016 1 | 17084.58 | 14884.86 | 21,997.20 | 21,353.50 | 2.59 |
| 26 | 2016 2 | 17722.90 | 15190.77 | 27,077.40 | 28,982.80 | 0 |
| 27 | 2016 3 | 17317.50 | 14183.24 | 32,300.70 | 24,928.70 | 0 |
| 28 | 2016 4 | 17990.09 | 14125.62 | 39,870.00 | 27,164.10 | 0 |
| 29 | 2017 1 | 19062.91 | 15247.56 | 38,153.50 | 23,695.30 | 2.87 |
| 30 | 2017 2 | 19397.94 | 15436.28 | 39,616.60 | 24,959.70 | 3.03 |
| 31 | 2017 3 | 19395.92 | 15630.00 | 37,659.20 | 24,687.20 | 3 |
| 32 | 2017 4 | 20416.67 | 17458.01 | 34,288.40 | 8,979.20 | 0 |
| 33 | 2018 1 | 19879.32 | 17304.82 | 32,371.10 | 26,181.70 | 3.18 |
| 34 | 2018 2 | 19698.75 | 16890.66 | 30,696.90 | 24,386.00 | 2.95 |
| 35 | 2018 3 | 20774.37 | 18443.75 | 26,440.90 | 23,608.10 | 2.86 |
| 36 | 2018 4 | 23100.26 | 20229.26 | 44927.4 | 29,255.90 | 3.54 |

Source: Quarterly reports (BSE).

4.4.2 NTPC, Chart Analysis (Sequential & Cycle or Subseries plot), Income from operation

Chart 4.v Sequential Plot (NTPC) Income from operation

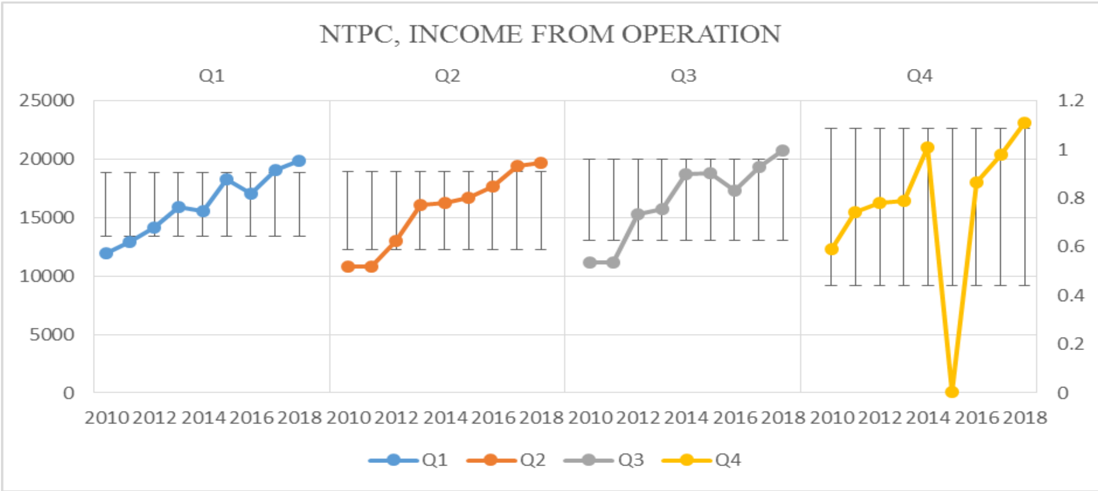



Source: Created by the researcher.

For NTPC, it is clearly visible in the above Chart 4.v that it has higher income from operation in quarter 4, except in 2015 as there was a sharp fall from 21038.83Cr. in 2014 to 84.64Cr. in 2015. It is observed from the above data series that there is specific pattern for the income from operation in the lower side. The data series is random for the lower income from operation. The results are mix in all the quarters, there is no specific quarter when the income from operation is lower consistently for a specific time period. Hence, it can be inferred that the NHPC has a presence of seasonality when the income from operation is higher but there is no presence of seasonality when the income from operation is lower.

In order to confirm the inference, the following chart has been plotted below.

Chart 4.w Cycle Plot (NTPC)

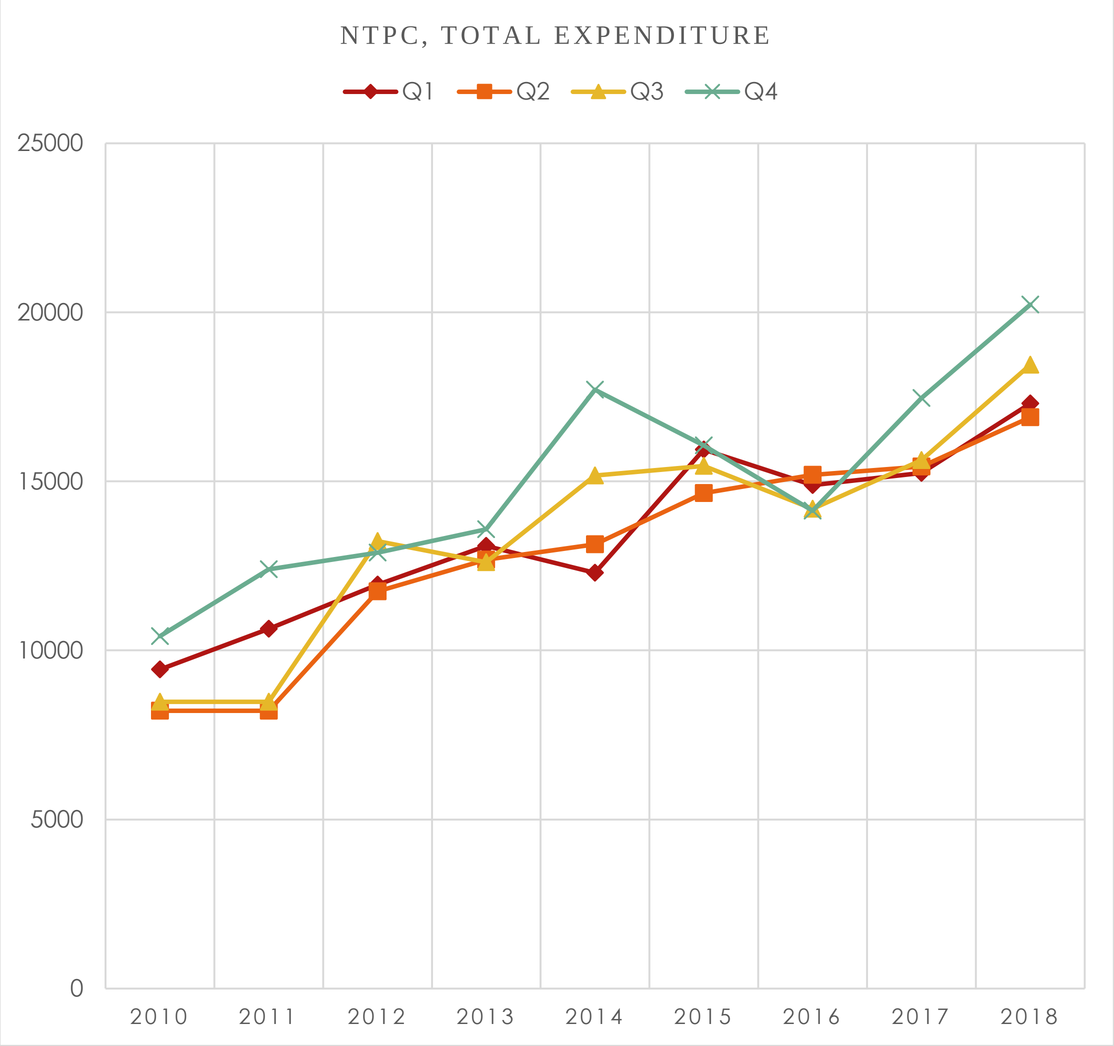



Source: Created by the researcher.

The above Chart 4.w is clearly depicting that all the three quarters i.e., quarter 1, 2 and 3 are all in the same line. This means that the income from operation for NTPC is same in all the three quarters. There is not much differences in the income from operation between these three quarters which also means that there exists no regular pattern between these three quarters. But from the observation in the above cycle or subseries plotting in Chart 4.w, NTPC has a higher income from operation in quarter 4. This means that NTPC has a higher income from operation in the quarter 4 as compared to quarter 1, 2 and 3. The inference which is developed from the discussion is that NTPC is able to generate higher income from operation during the months from January to March. This means that there is an impact of seasonality for NTPC in generating the higher income from operation. Even though the seasonality can be found in higher side, the presence of seasonality could not be found in the lower side.

4.4.3 NTPC, Chart Analysis (Sequential & Cycle or Subseries plot), Total Expenditure

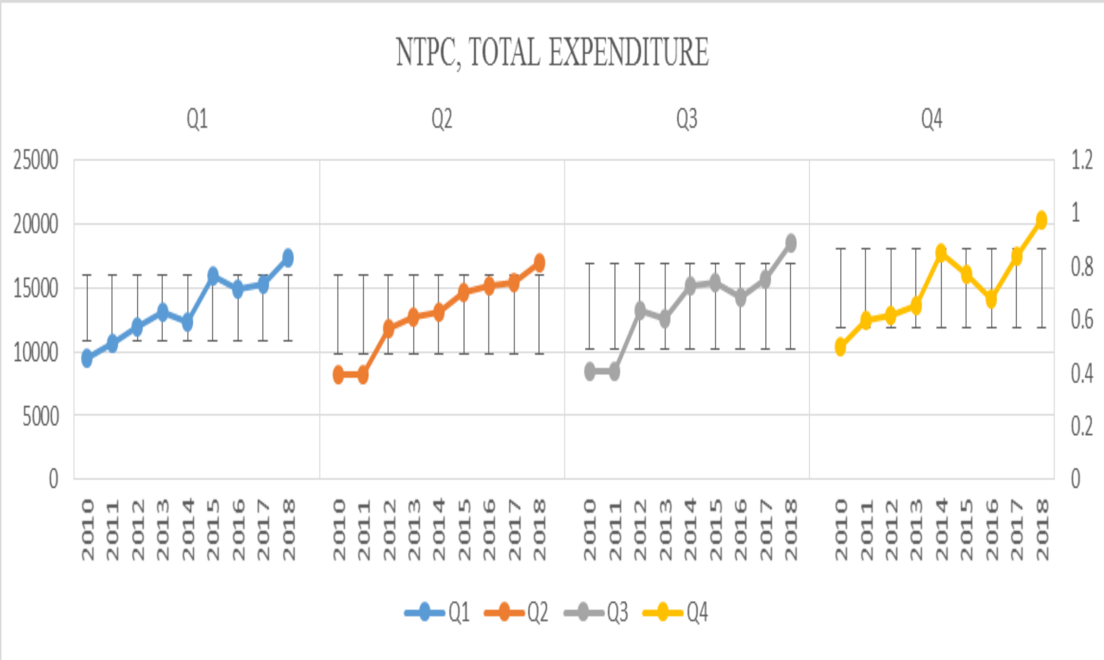
Chart 4.x Sequential Plot (NTPC) Total Expenditure




Source: Created by the researcher.

Looking into the pattern of the total expenditure for NTPC in the above Chart 4.x, similar to the income from operation it has higher total expenditure during quarter 4, except it is slightly lower in the year 2012 and 2016. The total expenditure is not following any specific pattern in the other quarters 1, 2 and 3. The other important observation is that the total expenditure is consistently increasing in each quarter as compared to the previous year. It is yet confirmed that there is a presence of seasonality when the total expenditure is higher for NTPC but there is no presence of seasonality when the total expenditure is lower. It is to be noted that the total expenditure for NTPC in each quarter is increasing. The following cycle or subseries chart is plotted below to confirm the same.

Chart 4.y Cycle Plot (NTPC)




Source: Created by the researcher.

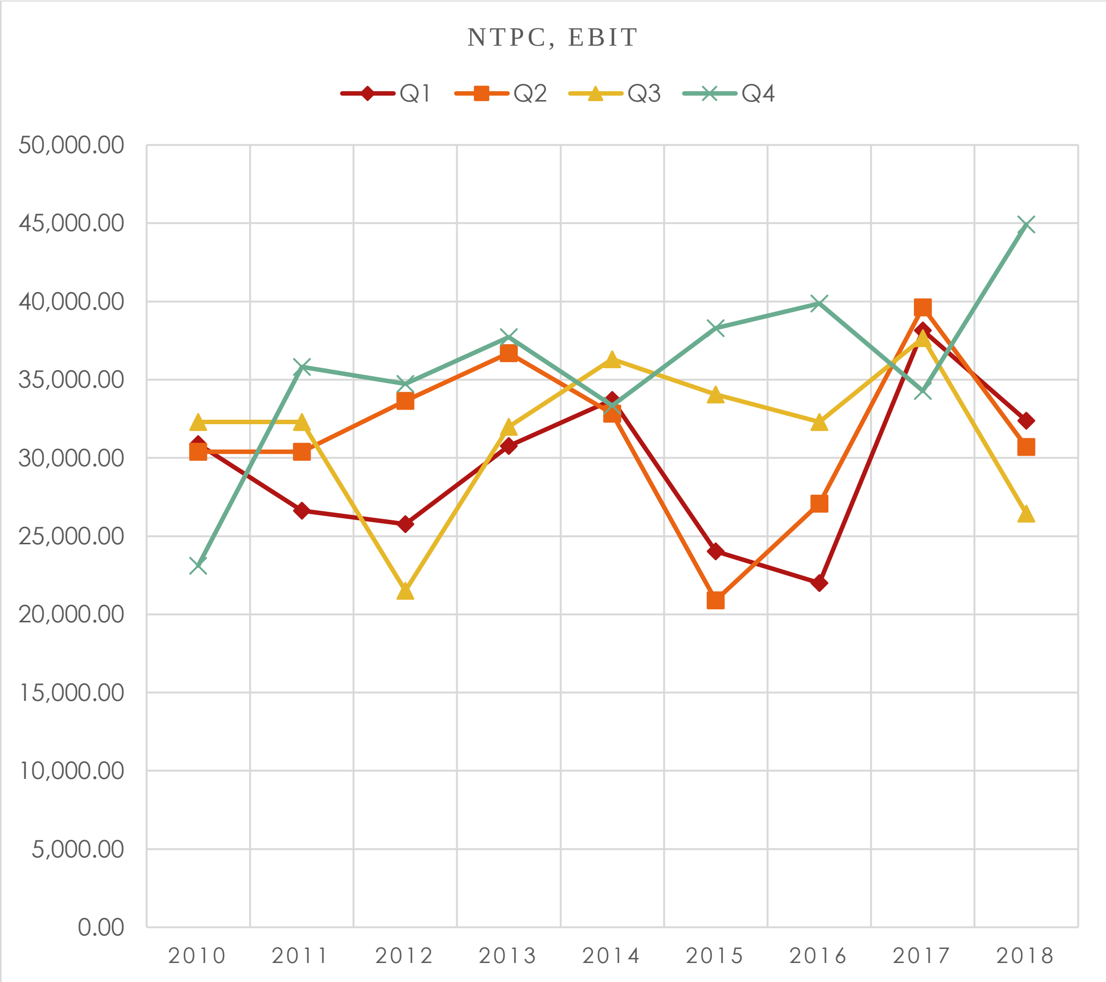
The Chart 4.y is clearly depicting that the total expenditure in quarter 4 is in higher level as compared to the other quarters, this means that there exists some kind of pattern. Or in simple words the NTPC is incurring high expenditure during January–March. Hence, the total expenditure for NTPC is dependent on the season. But it is to be noted that, similar to its income from operation, there is no particular pattern when the total expenditure is lower. There is no impact of different seasons on NTPC to have its total expenditure in the lower level.

Till now a very important observation is that both the income from operation and total expenditure is higher for NTPC during the months of January–March.

The assumption from the discussion is that, as the total expenditure is also comparatively higher to the income from operation, this can effect on the profitability of the NTPC. In order to confirm the assumption and the presence of seasonality in the profitability another sequential plot has been done below.

4.4.4 NTPC, Chart Analysis (Sequential & Cycle or Subseries plot), Earnings before interest and tax (EBIT)

Chart 4.z Sequential Plot (NTPC) Earnings before interest and tax

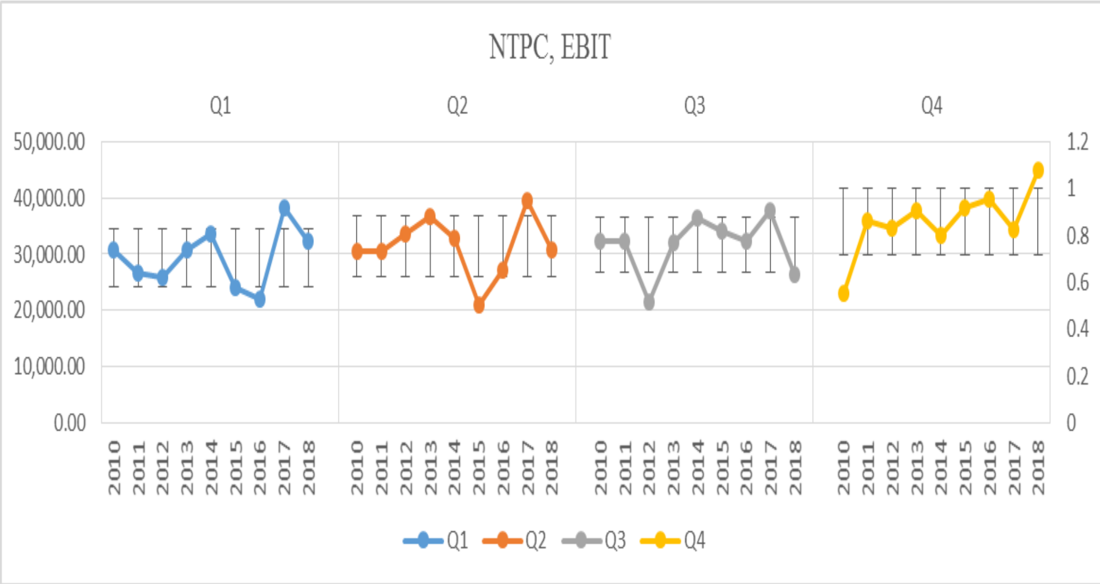



Source: Created by the researcher.

After a close and careful observation in the above chart, it is found that the trend line of EBIT for NTPC in quarter 4 is moving in an opposite direction as compared to the other quarters 1, 2 and 3. The EBIT for NTPC is moving in tandem between quarter 1 and 4 only in 2012–2013 or else the quarter 4 is totally moving in an opposite direction.

It is also observed that, even though the income from operation was consistently higher in quarter 4, it is not the same case for EBIT. Out of 9 years, the EBIT was lower in quarter 4 for 3 times, i.e., in the year 2010, 2014 and 2017. This may be due to the increasing total expenditure in quarter 4. If the NTPC would have incurred lesser total expenditure in quarter 4, the EBIT would have been consistently higher in quarter 4. Still, as compared to the other quarters the NTPC is generating higher EBIT in quarter 4. Some kind of pattern could also be recognized i.e., NTPC had the lowest EBIT in quarter 4 in 2010, but in the next year i.e., in 2011, the EBIT was highest in quarter 4. After that NTPC is having higher EBIT, consistently till 2013, again in 2014, the EBIT was lowest in 2014. After that NTPC is generating highest EBIT again in quarter 4 till 2016. It is quite clear the EBIT was lowest in quarter 4, but in 2018 quarter 4 is again generating highest EBIT. Quarter 4 is very much crucial for NTPC, this is because in the months from January to March the NTPC is having higher income from operation, higher expenditure and higher EBIT. But in order to understand the movement of EBIT, the previous year data is very much important. As once the EBIT is lowest in quarter 4 in a particular year, according to the previous data there is a high probability that the EBIT will be highest in the next year. The cycle or subseries chart is plotted below to have a clearer view.

Chart 4.aa Cycle Plot (NTPC)

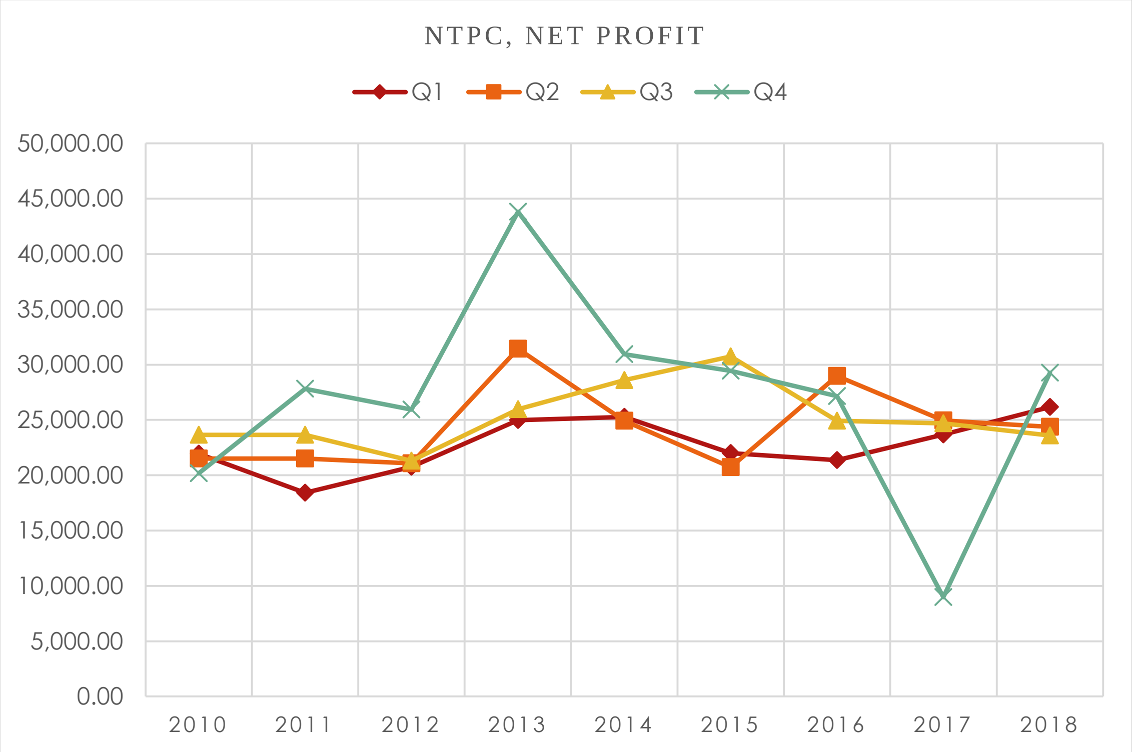



Source: Created by the researcher.

The cycle or subseries plot in the above chart is clearly depicting that the EBIT is higher in quarter 4 as compared to the other quarters. Even though there is a presence of seasonality, there is no upward movement in the data series of EBIT for NTPC in any of the quarters. In every quarter there is sideways movement of EBIT for NTPC. The growth rate of EBIT for NTPC is not so much impressive and progressive. Comparatively, quarter 4 has quite impressive EBIT as compared to the other quarters.

4.4.5 NTPC, Chart Analysis (Sequential & Cycle or Subseries plot), Net profit

Chart 4.ab Sequential Plot (NTPC) Net profit

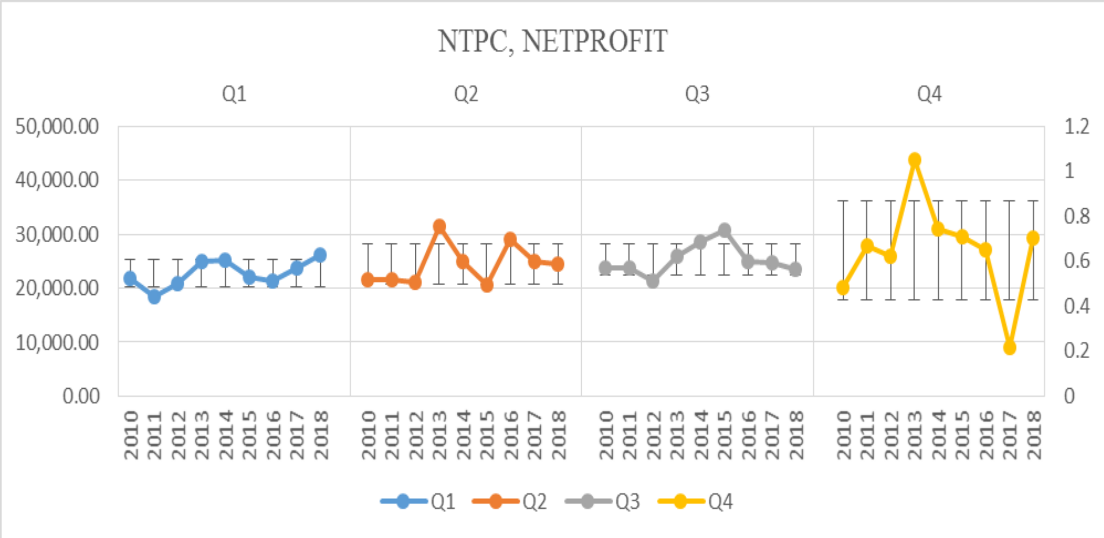



Source: Created by the researcher.

Net profit for NTPC was lower in quarter 4 in 2010 for NTPC, but after that the net profit is consistently higher in quarter 4 as compared to the other quarters. But it is also observed that from the year 2013, there was a sharp decline in net profit till 2017. Even though there was a sharp decline in the net profit in all the quarters, the net profit in quarter 4 is comparatively higher than the other quarters. Again from 2017 to 2018, the net profit of NTPC in quarter 4 increased sharply.

The inference that is developed from the discussion is that there is no significant presence of seasonality in the data series of net profit.

Chart 4.ac Cycle Plot (NTPC)

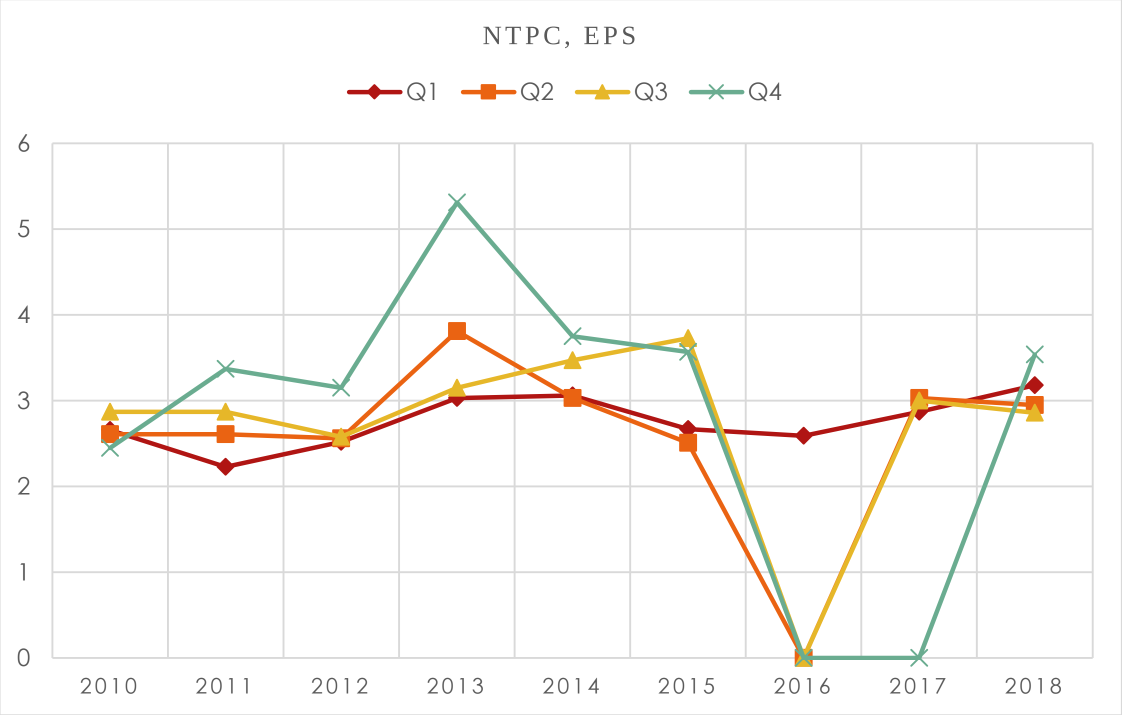



Source: Created by the researcher.

The above chart is quite clear in terms of representing the data series of NTPC relating to the net profit. It is visible that the net profit for NTPC is fluctuating more in quarter 4 as compared to the other quarters. This may be due to the reason that NTPC has high income from operation and higher expenditure in quarter 4, also it has some regular pattern relating to EBIT in quarter 4. Due to this reason, the impact of net profit for NTPC in quarter 4 is seen.

4.4.6 NTPC, Chart Analysis (Sequential & Cycle or Subseries plot), EPS

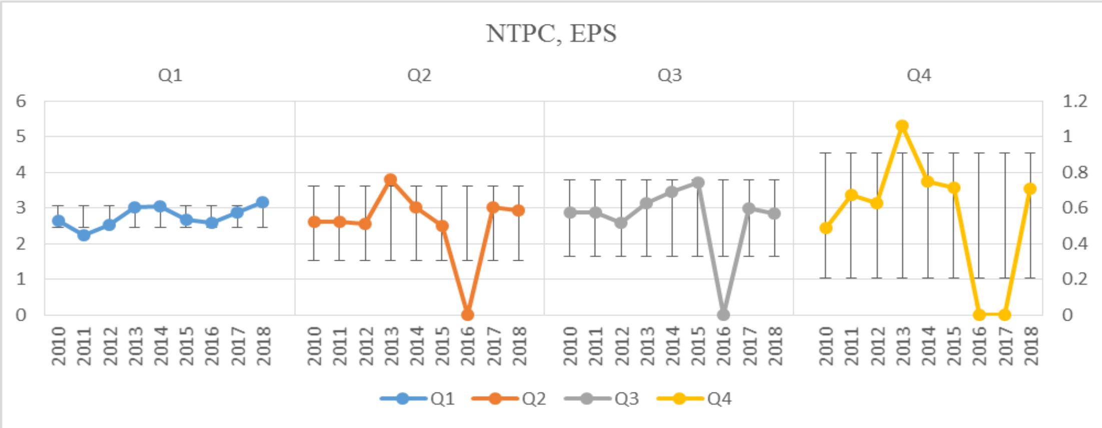
Chart 4.ad Sequential Plot (NTPC) EPS




Source: Created by the researcher.

The data series of EPS for NTPC is showing the presence of seasonality during quarter 4, as it is on the higher side except in the year 2017, the EPS in quarter 4 is lower by a huge margin as compared to the other quarters. The movement of EPS in quarter 1 is flat, this means the NTPC is generating same level of EPS in quarter 1 without much difference from 2010 to 2018. The EPS in other three quarters i.e., quarter 2, 3 and 4 are having same kind of movement, even though the EPS in quarter 4 is in the higher side most of the time. This proves to some extent the presence of seasonality for EPS in quarter 4. In order to confirm the same, the cycle or subseries plot has been created below.

Chart 4.ae Cycle Plot (NTPC)




Source: Created by the researcher.

Earnings per share (EPS) depicts the earning potential of the shareholders per share. The EPS is a simple way of understanding the potential of the company in generating wealth for the investors. This is an effective way of understanding the financial position of the company. NTPC is able to generate higher EPS during quarter 4, continuously for four years i.e., from 2010 to 2013. Observing the plots of data series for EPS in the above Chart 4.ae, it is observed that the EPS of NTPC for quarter 4 is falling continuously from the year 2013 to 2017. It is also clearly visible that the EPS of NTPC is stable in quarter 1 as compared to the other quarters. The other three quarters i.e., quarter 2, 3 and 4 are having the same kind of movement for the EPS.

Hence, the inference that can be created from the discussion is that there is a presence of seasonality in quarter 4, which means NTPC is generating higher EPS during the months from January to March. The NTPC is generating stable EPS during the months from April to June, the periods from July to March is displaying much fluctuating EPS for NTPC. It is also noted that NTPC does not have an increasing trend for EPS in any of the quarters from 2010 to 2018. From the above observation it is found that it is more likely for NTPC to generate better returns during the periods from January to March.

4.5.1 RPOWER, Selected financial metrics

Table 4.d

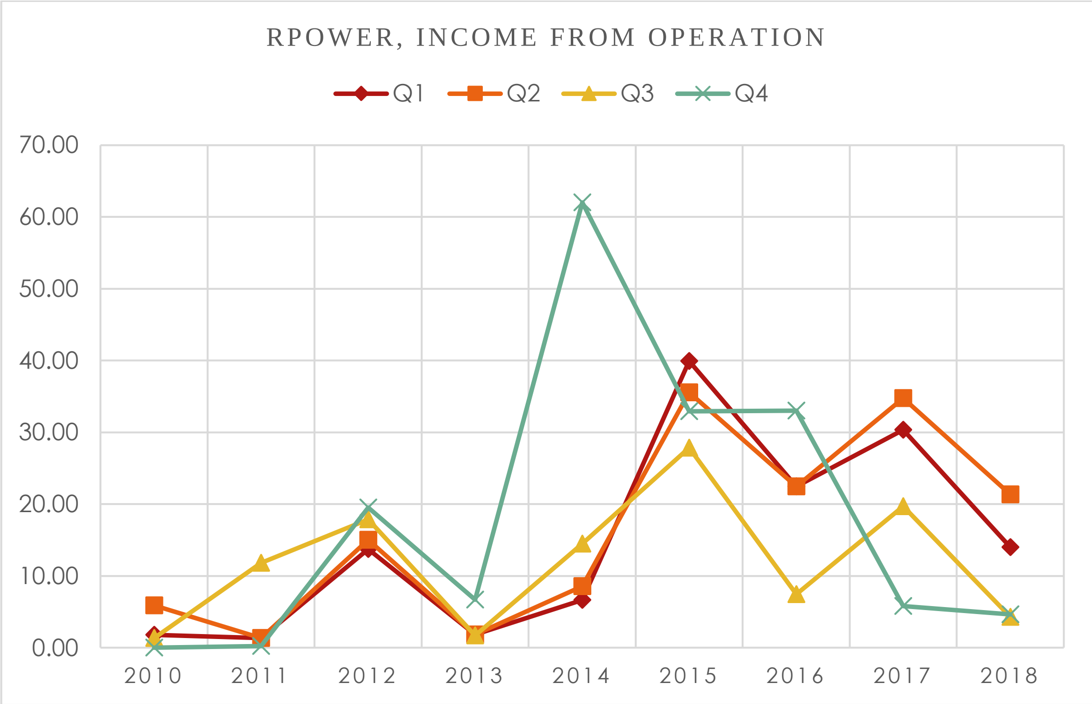
RPOWER, financial metrics amount in Rs. (Cr.)

| Sl.no | Year/ quarter | Income from operation | Total expenditure | EBIT | Net profit | EPS |
|---|---|---|---|---|---|---|
| 1 | 2010 1 | 0.00 | 28.64 | -286.43 | 1,056.41 | 0.44 |
| 2 | 2010 2 | 5.90 | 20.34 | -144.4 | 705.28 | 0.29 |
| 3 | 2010 3 | 1.33 | 26.15 | 628.52 | 611.32 | 0.26 |
| 4 | 2010 4 | 0.01 | 0.24 | 296.3 | 3.593 | 0 |
| 5 | 2011 1 | 1.33 | 24.75 | 1,873.28 | 1,485.48 | 0.62 |
| 6 | 2011 2 | 1.33 | 29.03 | 283.87 | 283.87 | 0.12 |
| 7 | 2011 3 | 11.80 | 46.94 | 541.65 | 348.89 | 0.13 |
| 8 | 2011 4 | 0.22 | 0.75 | 252 | 6.272 | 0.02 |
| 9 | 2012 1 | 13.73 | 27.90 | -141.79 | 646.32 | 0.23 |
| 10 | 2012 2 | 15.00 | 50.79 | 1,529.75 | 1,087.61 | 0.39 |
| 11 | 2012 3 | 17.88 | 40.71 | 1,525.48 | 1,066.91 | 0.38 |
| 12 | 2012 4 | 19.52 | 52.22 | -258.49 | 307.72 | 0.11 |
| 13 | 2013 1 | 1.82 | 17.44 | 553.8 | 468.6 | 0.17 |
| 14 | 2013 2 | 1.82 | 24.08 | 459.8 | 357.6 | 0.13 |
| 15 | 2013 3 | 1.69 | 20.50 | 438 | 3,692.30 | 1.32 |
| 16 | 2013 4 | 6.68 | 60.64 | -169.7 | 620.8 | 0.22 |
| 17 | 2014 1 | 6.64 | 14.69 | 527.7 | 446.1 | 0.16 |
| 18 | 2014 2 | 8.54 | 30.06 | 433 | 161.6 | 0.06 |
| 19 | 2014 3 | 14.49 | 32.61 | 428.5 | 302.7 | 0.11 |
| 20 | 2014 4 | 62.02 | 64.74 | 371.2 | -345.6 | -0.12 |
| 21 | 2015 1 | 39.90 | 47.28 | 534.3 | 72.4 | 0.03 |
| 22 | 2015 2 | 35.55 | 42.36 | 533.2 | 72.6 | 0.03 |
| 23 | 2015 3 | 27.83 | 27.67 | 586.7 | 67 | 0.02 |
| 24 | 2015 4 | 32.92 | 33.93 | 526.6 | 39 | 0.01 |
| 25 | 2016 1 | 22.48 | 26.43 | 527.1 | 72.9 | 0.03 |
| 26 | 2016 2 | 22.45 | 35.12 | 518.1 | 91.3 | 0.03 |
| 27 | 2016 3 | 7.45 | 21.17 | 3,083.10 | 2,749.60 | 0.98 |
| 28 | 2016 4 | 33.01 | 38.95 | 1,533.60 | 1,113.80 | 0.4 |
| 29 | 2017 1 | 30.35 | 25.82 | 741 | 182.7 | 0.07 |
| 30 | 2017 2 | 34.74 | 18.04 | 831.9 | 46.5 | 0.02 |
| 31 | 2017 3 | 19.70 | 42.87 | 1,236.60 | 434.3 | 0.15 |
| 32 | 2017 4 | 5.78 | 113.67 | 803.9 | -20.9 | -0.01 |
| 33 | 2018 1 | 14.00 | 136.41 | 1235.6 | 170.7 | 0.06 |
| 34 | 2018 2 | 21.36 | 127.53 | 1584.9 | 491.9 | 0.18 |
| 35 | 2018 3 | 4.27 | 124.44 | 1015.6 | 0.8 | 0 |
| 36 | 2018 4 | 4.64 | 124.54 | 286.2 | -641 | -0.23 |

Source: Quarterly reports (BSE).

4.5.2 RPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Income from operation

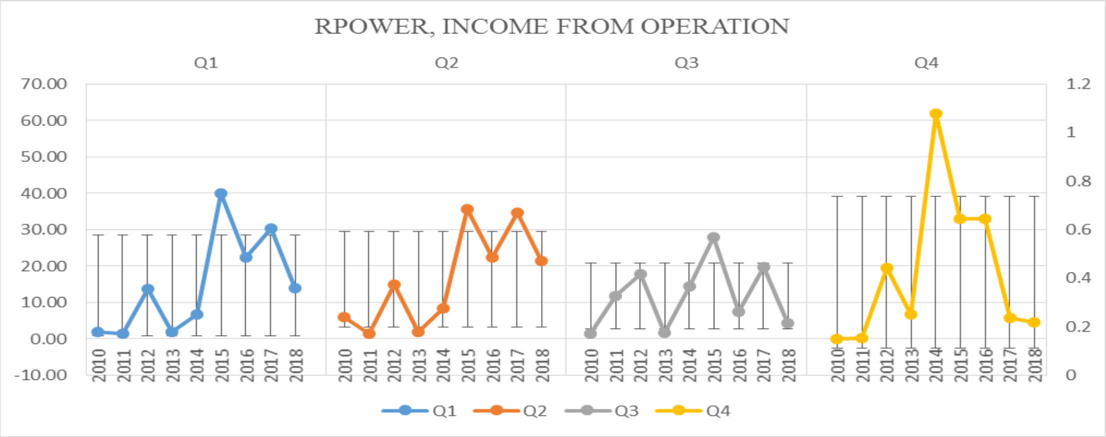
Chart 4.af Sequential Plot (RPOWER) Income from operation




Source: Created by the researcher.

In order to check the impact of different seasons on the income from operation related to RPOWER, the sequential chart has been plotted above. Closely monitoring the quarterly data series in different time series from 2010 to 2018, there is no specific quarter where the income from operation for RPOWER is highest, consistently for a long period of time. The data series as plotted above in the Chart 4.af is much more random and does not support any specific repetitive patterns. As the data series are random in nature, it is proved that there is no presence of seasonality in the income from operation generated by RPOWER. In other words, it is observed that there is no impact of any seasons for RPOWER in generating the income from operation. In order to support the findings, the more sophisticated and helpful cycle or subseries plot has been created using the same data points for the income from operation of RPOWER.

Chart 4.ag Cycle Plot (RPOWER)

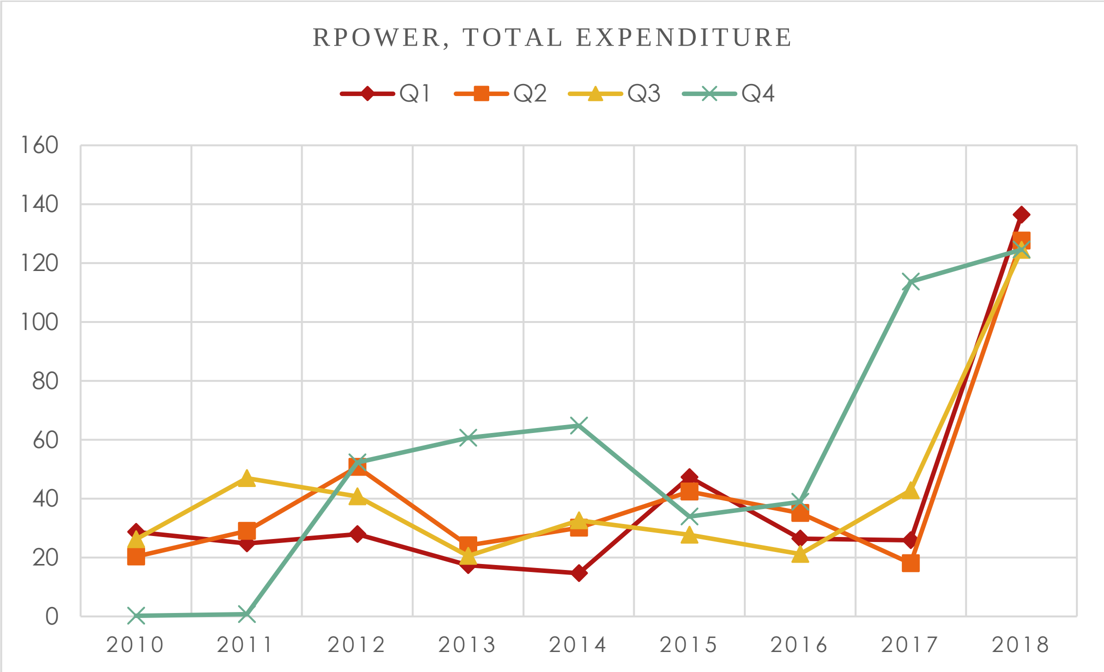



Source: Created by the researcher.

The cycle or subseries plot is very efficient in showing the presence of seasonality and trend in different time periods, this type of plotting also helps in decoding if any pattern is present in the data set in a very simple way. Looking in the above Chart 4.ag it is very clear that all the data points in different quarters relating to income from operation of RPOWER are all aligned in the same line. There is no specific quarter when the income from operation is higher, consistently. This means the data series for the income from operation is random in nature and does not support the presence of seasonality. Hence, it can be inferred that there is no presence of seasonality in the data set of income from operation of RPOWER.

4.5.3 RPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Total Expenditure

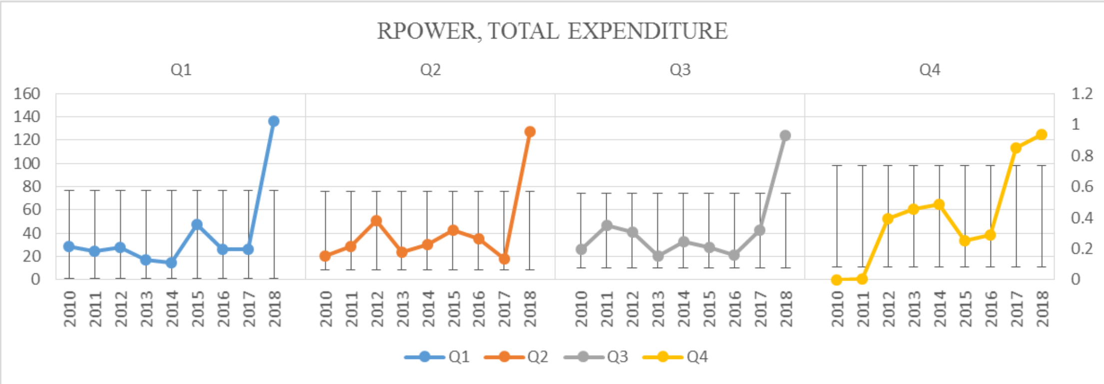
Chart 4.ah Sequential Plot (RPOWER) Total Expenditure




Source: Created by the researcher.

The plotting of the data set relating to total expenditure of RPOWER above in the Chart 4.ah is also not supporting the presence of seasonality. As it is very clear that the data series relating to total expenditure is moving randomly in each quarter from 2010 to 2018. There is no single quarter where the total expenditure is lower or higher as compared to other quarters consistently within the selected time period of 9 years. Hence, it can be inferred that this is no specific season where the RPOWER is incurring higher or lower total expenditure. In order to confirm the inference, the following cycle or subseries plot is created below using the same data set.

Chart 4.ai Cycle Plot (RPOWER)

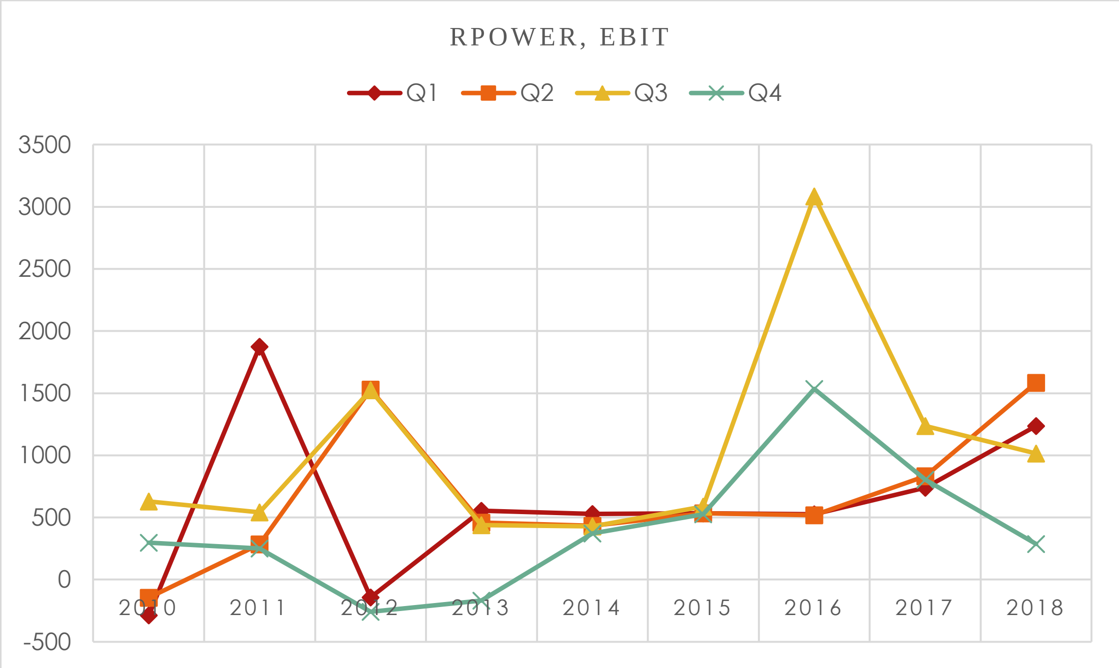



Source: Created by the researcher.

The data plotted in the above Chart 4.ai is not showing the sign of any particular pattern. All the quarter data related to total expenditure are seen in the same line aligned together. Not a single quarter data for the total expenditure is significantly in a higher or a lower position. It is also clear that from 2017 there is a sharp increase in the total expenditure of RPOWER in all the quarters. Hence, it is confirmed that there is no presence of seasonality in the data set relating to the total expenditure for RPOWER.

4.5.4 RPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Earnings before interest and tax

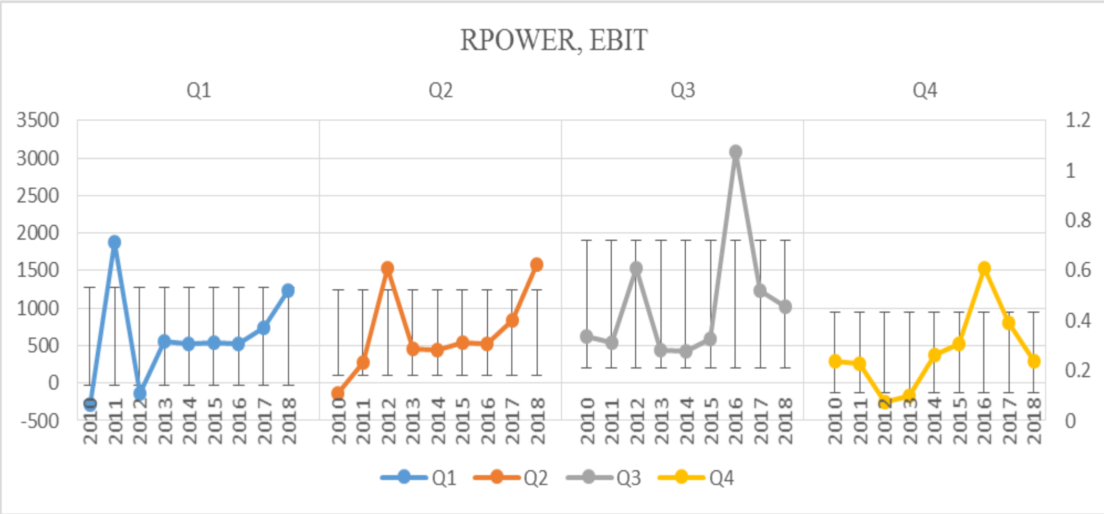
Chart 4.aj Sequential Plot (RPOWER) Earnings before interest and tax




Source: Created by the researcher.

The randomness of the data series in the above Chart 4.aj is visible clearly. All the quarterly data series related to the earnings before interest and tax (EBIT) of RPOWER plotted above is seen crossing each other randomly. There is no particular quarter where the EBIT of RPOWER is higher or lower consistently as compared to the other quarters. As the plotting are random in nature it is figured out that there is no particular pattern supporting the presence of seasonality in the data. Hence, it is noted that there is no seasonality present in the data series relating to EBIT for the RPOWER. To re confirm the statement, cycle or subseries plot is created below.

Chart 4.ak Cycle Plot (RPOWER)

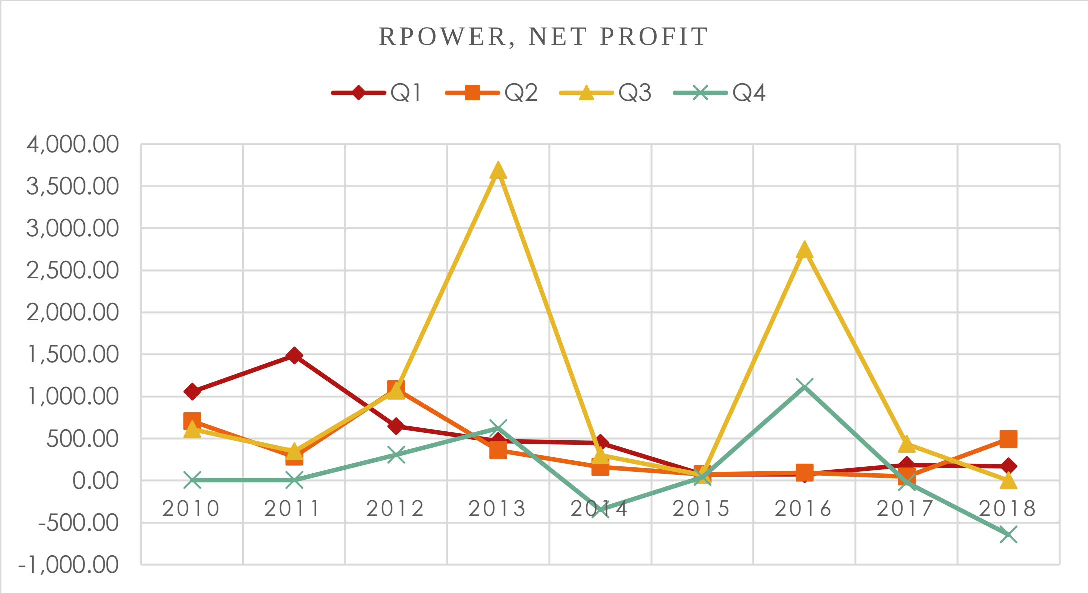



Source: Created by the researcher.

The cycle or subseries plot, which is a widely used technique to understand the seasonality in the data, is not reflecting the presence of seasonality in the data set of EBITs for RPOWER. There are no significant differences in the plotting to support the presence of particular repetitive pattern in the data set of RPOWER relating to EBIT. Even though there are no significant differences between the plotting of different quarters, it is observed that the RPOWER is generating slightly lower EBIT during the quarter 4 as compared to the other quarters. The trend in quarter 1 and 2 is quite similar, from 2013 onwards the EBIT for RPOWER is seen increasing in both the quarters. In the other hand the trend in the quarter 3 and 4 is quite similar, as it is seen that from 2016 onwards the EBIT is continuously falling till 2018.

4.5.5 RPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Net profit

Chart 4.al Sequential Plot (RPOWER) Net profit

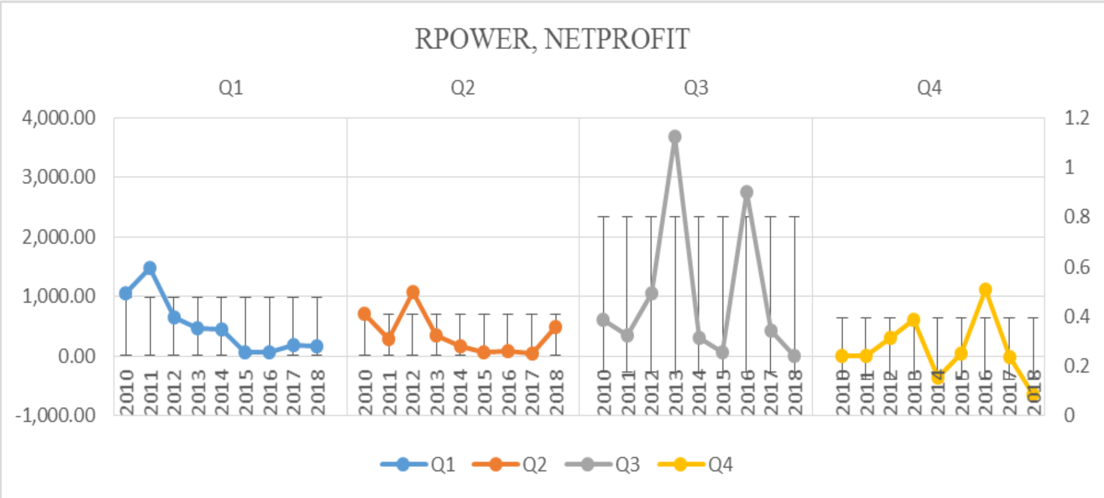



Source: Created by the researcher.

Similar to the other financial metrics like income from operation, EBIT, RPOWER has no particular pattern present in the data series related to the net profit. The view in the above Chart 4.al is very clear, all the quarters are jumbled up, and no particular quarter is clearly above the other quarters. This data series specific to the net profit does not showcase the presence of any particular pattern. Hence, it can be inferred that there is no presence of the seasonality in the data series related to the net profit of the RPOWER.

The cycle or subseries plot has been plotted below to confirm the inference developed through the observation using the sequential plotting.

Chart 4.am Cycle Plot (RPOWER)

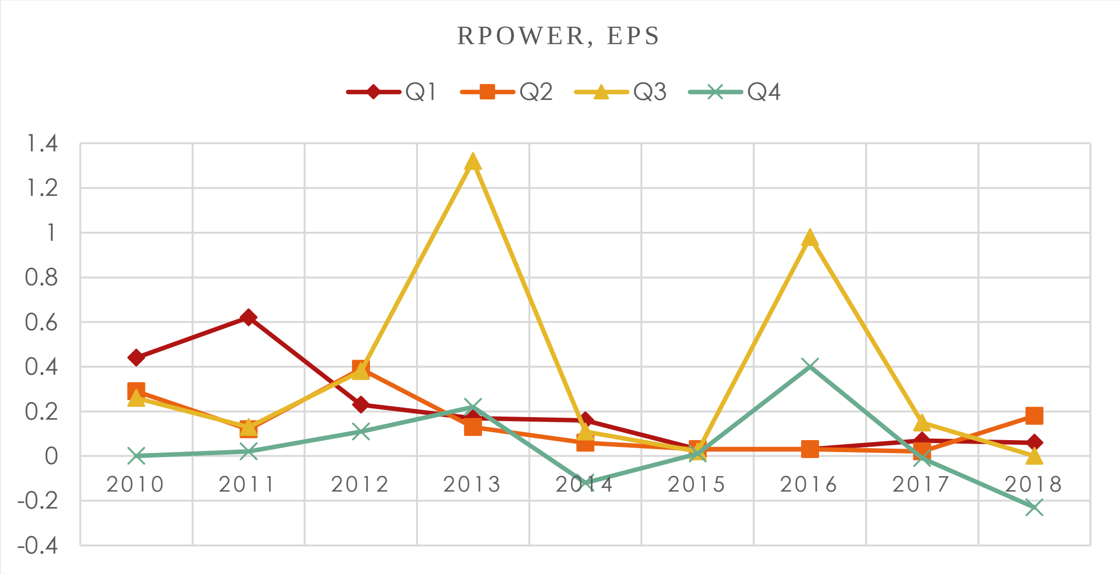



Source: Created by the researcher.

Observing the plotting in the above Chart 4.am, it is quite clearly depicting that there is no particular pattern present in the data series relating to net profit for RPOWER. This is confirmed as the data series for all the quarters are seen in the same line. There is no any specific quarter where the net profit is higher. More or less the pattern and trend is same in all the four quarters. From keen observation, it is found that the pattern of net profit for RPOWER is same in the months from April to September and in the months from October to March. But this segregation of pattern is not sufficient to prove the presence of seasonality in the data series of EPS. Hence, it can be inferred that there is no presence of seasonality for RPOWER in generating the net profit within the selected time period of the study.

4.5.6 RPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), EPS

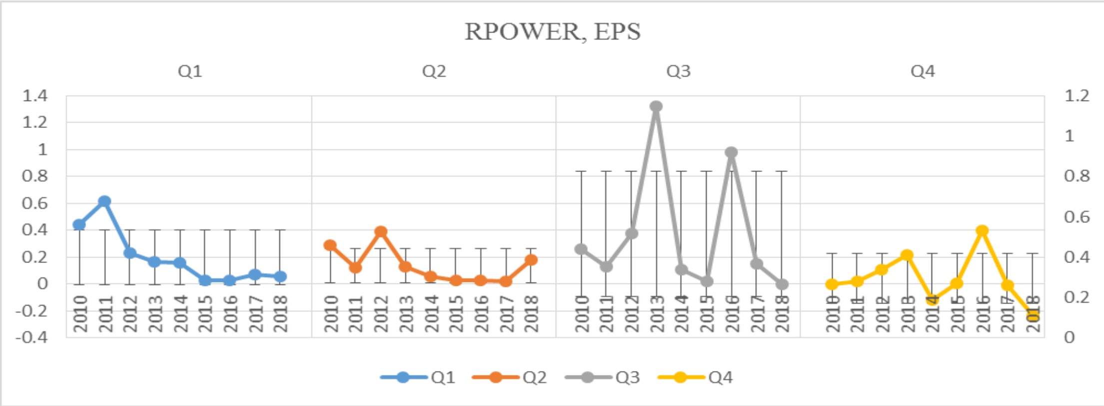
Chart 4.an Sequential Plot (RPOWER) EPS




Source: Created by the researcher.

The EPS of RPOWER as plotted in the above Chart 4.an is similar to the other financial metrics as discussed earlier namely, income from operation, EBIT and net profit. Similar to the other financial metrics, EPS for RPOWER too has no significant pattern present in the data series. This has been nicely depicted above in the Chart 4.an. There is no specific quarter where the RPOWER is having the highest or the lowest EPS. All the quarterly data series plotted are more random and jumbled up. This is a clear indication of randomness of the data and supports the fact that there is no impact of different seasons for the RPOWER in generating a higher or the lower EPS continuously. In order to support the inference, the same data series are plotted as cycle or subseries plot. This is one of the most popular method of showing the presence of pattern or seasonality in the data.

Chart 4.ao Cycle Plot (RPOWER)




Source: Created by the researcher.

The RPOWER's data relating to EPS is plotted above in the Chart 4.ao. Observing the data series as plotted above, it is found that there is no specific pattern present, all the quarters, i.e., 1–4 is seen in the same level, which means the EPS for RPOWER is not much of a difference in any of the quarter. This also suggests that the data does not have any specific pattern. Hence, it is confirmed that there is no seasonality present in the data set of RPOWER relating to EPS. It also means that the EPS of RPOWER is not dependent on any seasons. Hence, there is no impact of seasonality in generating the EPS by RPOWER.

4.6.1 RTNPOWER, Selected financial metrics

Table 4.e

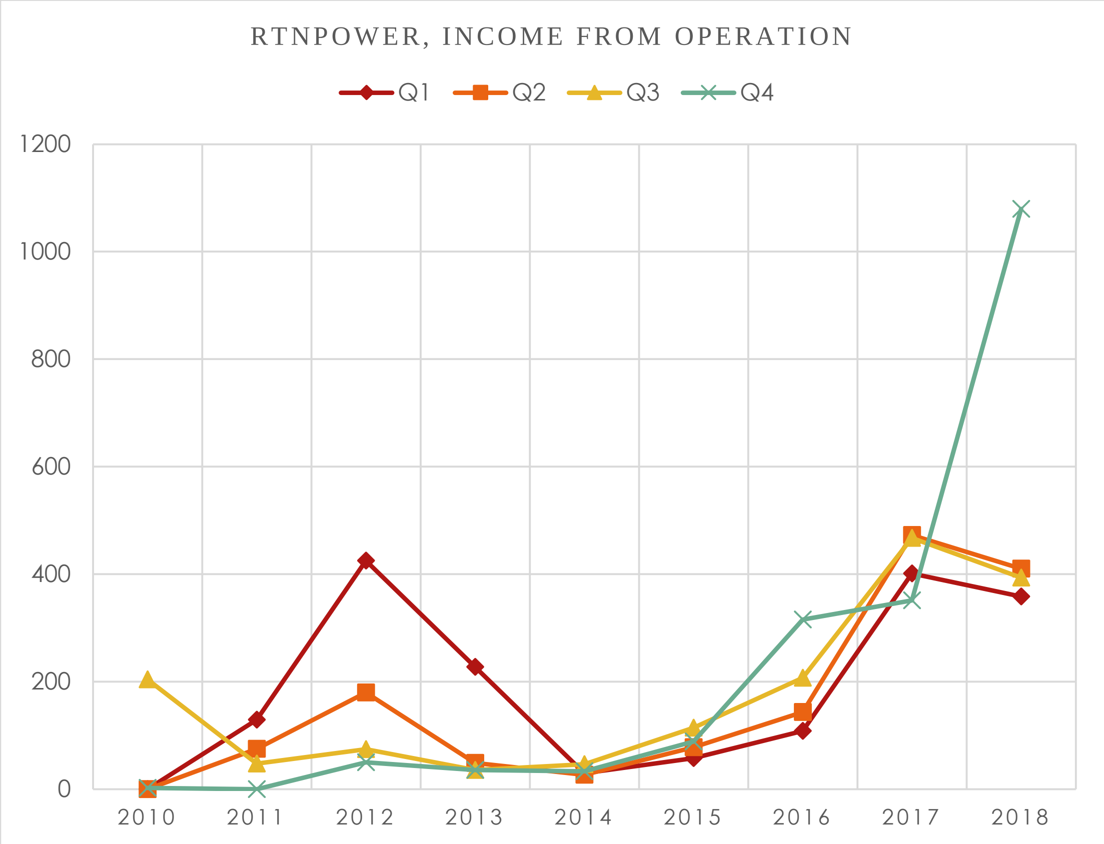
RTNPOWER, financial metrics amount in Rs. (Cr.)

| Sl.no | Year/ quarter | Income from operation | Total expenditure | EBIT | Net profit | EPS |
|---|---|---|---|---|---|---|
| 1 | 2010 1 | No data | No data | No data | No data | No data |
| 2 | 2010 2 | No data | No data | No data | No data | No data |
| 3 | 2010 3 | 204.01 | 104.85 | -97.85 | 96.08 | 0.15 |
| 4 | 2010 4 | 2.04 | 47.5 | 10.62 | 0.961 | 0 |
| 5 | 2011 1 | 128.75 | 63.36 | 65.39 | 58.64 | 0.03 |
| 6 | 2011 2 | 74.78 | 40.08 | 34.7 | 26.77 | 0.01 |
| 7 | 2011 3 | 47.32 | 47.48 | 7.34 | 6.97 | 0 |
| 8 | 2011 4 | 0 | 0.314 | 1.43 | 0.043 | 0.001 |
| 9 | 2012 1 | 424.96 | 48.97 | 375.99 | 318.91 | 0.16 |
| 10 | 2012 2 | 179.51 | 59.79 | 119.73 | 95.41 | 0.05 |
| 11 | 2012 3 | 74.18 | 20.63 | 65.04 | 57.37 | 0.03 |
| 12 | 2012 4 | 49.53 | 16.46 | 33.07 | 52.54 | 0.02 |
| 13 | 2013 1 | 227.37 | 340.91 | -113.53 | 120.95 | -0.05 |
| 14 | 2013 2 | 48.51 | 17.2 | 31.32 | 74.25 | 0.03 |
| 15 | 2013 3 | 35.33 | 12.46 | 22.87 | 16.28 | 0.01 |
| 16 | 2013 4 | 35.61 | 287.78 | -252.17 | -232.41 | -0.09 |
| 17 | 2014 1 | 29.45 | 360.53 | -232.41 | -367.76 | -0.14 |
| 18 | 2014 2 | 26.81 | 954.38 | 92.07 | -285.57 | -0.11 |
| 19 | 2014 3 | 46.33 | 864.64 | 344.63 | -51.72 | -0.02 |
| 20 | 2014 4 | 33.27 | 1,184.08 | 357.97 | -47.66 | -0.02 |
| 21 | 2015 1 | 57.29 | 1,497.01 | -3.82 | -765.85 | -0.29 |
| 22 | 2015 2 | 77.86 | 1,779.50 | 110.22 | -673.27 | -0.25 |
| 23 | 2015 3 | 114.2 | 1,460.54 | 114.49 | -665.09 | -0.23 |
| 24 | 2015 4 | 88.31 | 1,554.10 | -1.17 | -1,294.09 | -0.44 |
| 25 | 2016 1 | 107.96 | 2,658.19 | 299.38 | -1,879.53 | -0.64 |
| 26 | 2016 2 | 143.28 | 4,687.57 | 2,173.95 | -287.27 | -0.1 |
| 27 | 2016 3 | 207.1 | 5,703.70 | 3,035.50 | 519.3 | 0.18 |
| 28 | 2016 4 | 315.1 | 4,612.70 | 5,352.20 | 2,814.30 | 0.95 |
| 29 | 2017 1 | 401.3 | 4,057.30 | 2,752.80 | 49.7 | 0.17 |
| 30 | 2017 2 | 472.3 | 1,167.20 | 1,916.50 | -507.3 | -0.17 |
| 31 | 2017 3 | 467.2 | 1,573.90 | 1,896.00 | -595.1 | -0.2 |
| 32 | 2017 4 | 351.4 | 3,826.00 | 400.3 | -2,152.50 | -0.73 |
| 33 | 2018 1 | 358.5 | 6,550.20 | 1294.4 | -1,369.60 | -0.46 |
| 34 | 2018 2 | 409.8 | 5,948.40 | 1799 | -898.2 | -0.3 |
| 35 | 2018 3 | 393.5 | 6,411.80 | 909.70 | 1,876.20 | -0.64 |
| 36 | 2018 4 | 1,079.30 | 7,599.20 | 1848.5 | -39.8 | -0.01 |

Source: Quarterly reports (BSE).

4.6.2 RTNPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Income from operation

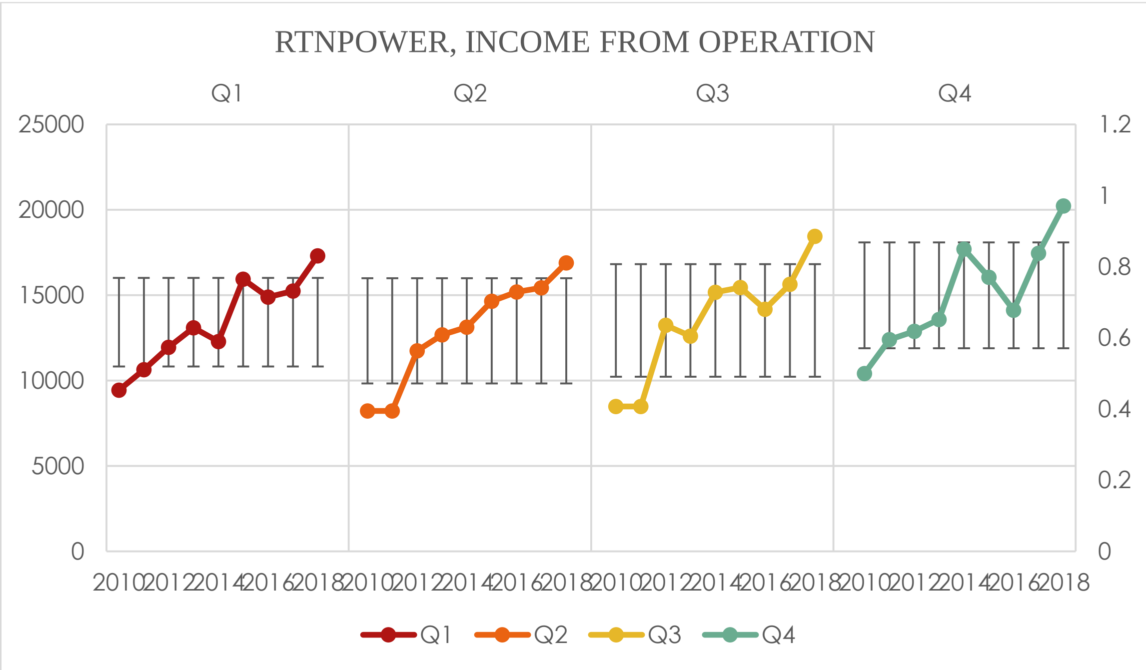
Chart 4.ap Sequential Plot (RTNPOWER) Income from operation




Source: Created by the researcher.

The income from operation, which is plotted in the Chart 4.ap, representing a sequential plotting for the data series of RTNPOWER is observed in order to check the presence of seasonality in the data. A close look in the chart seems like a bunch of wire flowing in the same direction. All the quarters data i.e., quarter 1–4 looks all jumbled up and not a single quarter within the time span of 9 years is aloof from the other quarters. This is a clear indication that the performance of a RPOWER in terms of income from operation is not different in any specific quarters. Hence, it can be understood that the data is not following a specific pattern. This means the income from operation of RTNPOWER is not affected by any particular seasons or the movement of the data relating to income from operation is not following a specific path created by any particular season. The inference from the discussion is that the income from operation of RTNPOWER is not affected by any seasons. It is also observed that the income from operation of RTNPOWER is moving flat from the year 2010 till 2014, except there was a sharp upward movement in quarter 1 in the year 2011–2012. From 2014 onwards, the income from operation of RTNPOWER is moving in the upward direction till the year 2017. The income from operation of RTNPOWER is increasing only in quarter 4 from the year 2017 to 2018. But all this movements do not support the presence of seasonality in the data. To double confirm the inference a very effective of proving it is by plotting the cycle or the subseries plot.

Chart 4.aq Cycle Plot (RTNPOWER)



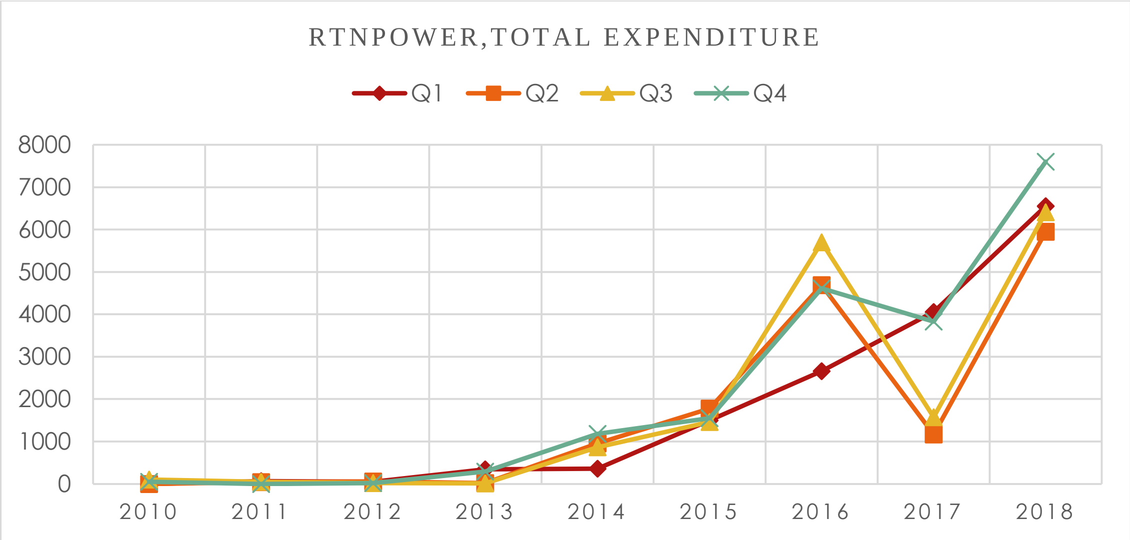

Source: Created by the researcher.

The cycle or the sequential plotting in the above Chart 4.aq is seen plotted in the same level, even though RTNPOWER had no record of income from operation for the quarter 1 and 2 in the year 2010. The plotting above is not showing the presence of any regular pattern in the data. There is no significant difference within the quarters, when the

RTNPOWER is earning higher or lower income from operation. This is one of the important observations to find the presence of the seasonality in the data. Hence, it is confirmed that the RTNPOWER is not affected by any particular season in generating the higher or lower income from operation.

### 4.6.3 RTNPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Total Expenditure

Chart 4.ar Sequential Plot (RTNPOWER) Total Expenditure

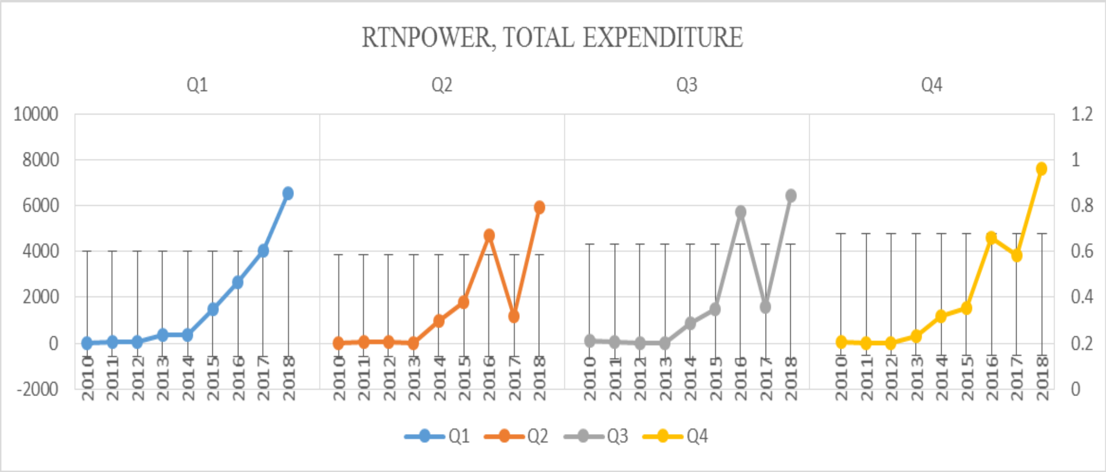



Source: Created by the researcher.

The data in the above chart plotted representing the total expenditure of RTNPOWER does not show any specific pattern. The total expenditure incurred quarterly by the RTNPOWER which is plotted in the Chart 4.ar is aligned together in the same direction. There is no specific quarter when the total expenditure of RTNPOWER is higher or lower consistently over the selected period of the study from 2010 to 2018. It is observed from the above sequential chart that the total expenditure in quarter 1 is increasing consistently from the year 2014 to 2018. There is a fluctuation in the total expenditure incurred by the RTNPOWER in the other quarters namely, quarter 2, 3 and 4. During the year 2017, when the total expenditure was lower than the previous year, still the total expenditure in quarter 1 was increasing continuously from the previous year. It is to be noted that even though there is no specific pattern, the expenditure for RTNPOWER is continuously increasing during the months from April to June.

In order to get a clearer view, the following chart has been created below.

Chart 4.as Cycle Plot (RTNPOWER)

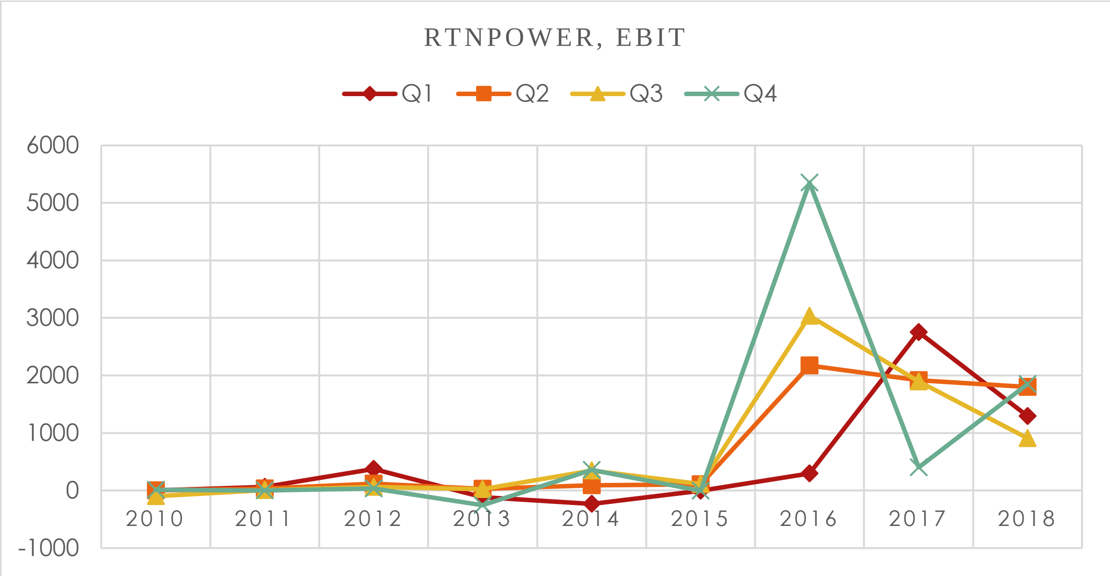



Source: Created by the researcher.

As discussed above the cycle or the subseries plotting is also depicting the same picture in the Chart 4.as. There is no any specific quarter when the total expenditure of RTNPOWER is higher or lower continuously from 2010 to 2018. Hence, it is confirmed that there is no presence of seasonality in the data series relating to the total expenditure of RTNPOWER. But it is quite clear that even though there is no presence of the seasonality, the total expenditure of RTNPOWER in the quarter 1 is continuously increasing. Even in 2016–2017, the total expenditure of RTNPOWER was still increasing in quarter 1 when the total expenditure was decreasing in the other quarters.

4.6.4 RTNPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Earning before interest and tax (EBIT)

Chart 4.at Sequential Plot (RTNPOWER) Earnings before interest and tax

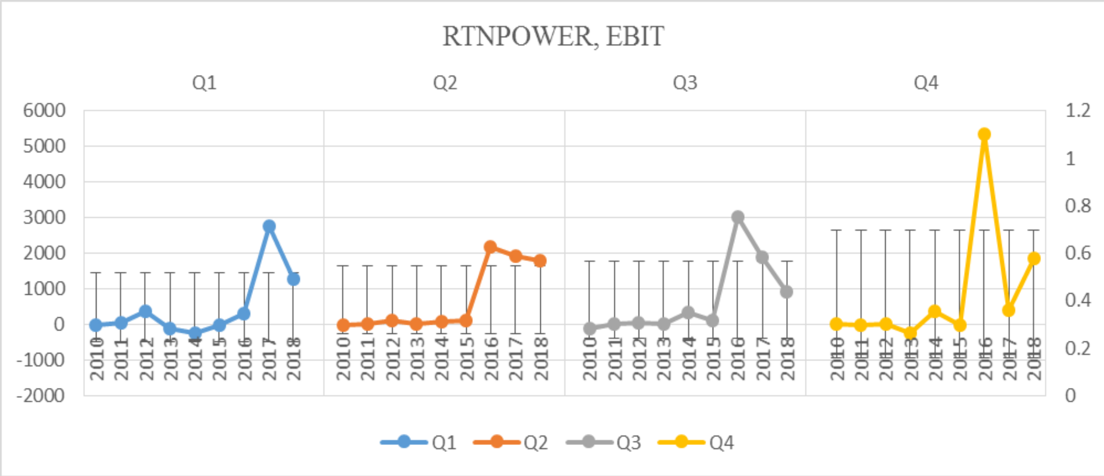



Source: Created by the researcher.

The data series plotted above related to the EBIT for RTNPOWER does not show any characteristics that signals the presence of seasonality in the data. As it is observed, the EBIT of RTNPOWER in different quarters are crisscrossing each other within the span of nine years from 2010 to 2018. There is no particular quarter when the RTNPOWER is able to generate highest or lowest EBIT consistently for a selected period of study. All the data plotted above embodies more random in nature and no definite pattern could be found. Hence, the plots clearly confirm that the EBIT of RTNPOWER is not affected by any seasons.

In order to confirm it, the cycle or the subseries plot are created below using the same data series.

Chart 4.au Cycle Plot (RTNPOWER)

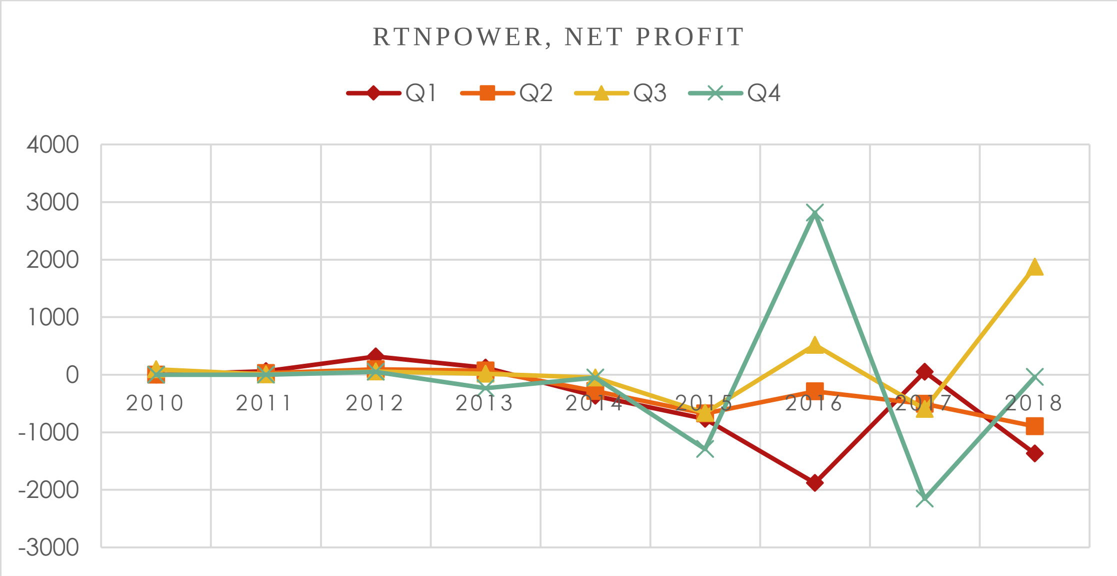



Source: Created by the researcher.

All the quarterly data of RTNPOWER representing EBIT, in the above Chart 4.au is seen parallel in the same line. There is no significant difference of one particular quarter with the other quarter. This is a clear indication that the data series is random and there is no presence of regular pattern. Hence, it is confirmed that there is no impact of any seasons on the RTNPOWER in generating the EBIT.

4.6.5 RTNPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), Net profit

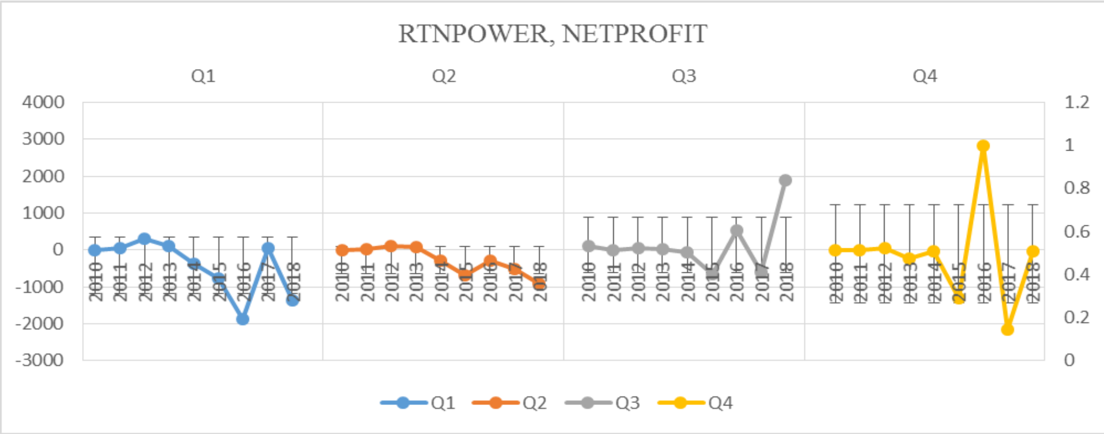
Chart 4.av Sequential Plot (RTNPOWER) Net profit




Source: Created by the researcher.

The net profit of RTNPOWER in different quarters are running in the same line (slightly downward) from 2010 to 2015. This is clearly depicted by the above Chart 4.av. after 2015, the data series relating to net profit of RTNPOWER is moving in all directions randomly. There is no any particular patterns, assuring the presence of seasonality. The data series is random, so it can be concluded that the RTNPOWER is not affected by any particular season. Hence, it can be inferred that there is no presence of seasonality in the data of RTNPOWER relating to EBIT from 2010 to 2018.

Chart 4.aw Cycle Plot (RTNPOWER)

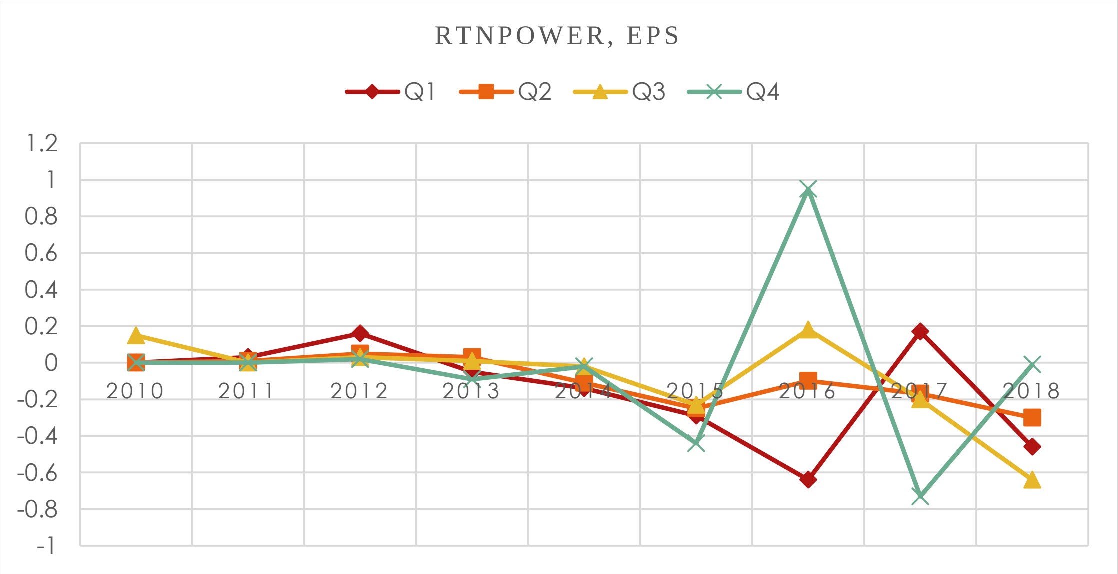



Source: Created by the researcher.

Before concentrating and discussing about the seasonality, it is clearly visible that RTNPOWER is hardly able to maintain positive net profit numbers. All the four quarters are showcasing the same situation, hardly RTNPOWER has high net profit which is consistent for quite few years. Hence, the plotting of the data series relating to net profit in the above chart is not supporting any kind of regular pattern, the data is more kind of random series. It is also clearly visible that the plotting are seen aligned in the same parallel line, this means the RTNPOWER is not affected by any particular season in generating the net profit.

4.6.6 RTNPOWER, Chart Analysis (Sequential & Cycle or Subseries plot), EPS

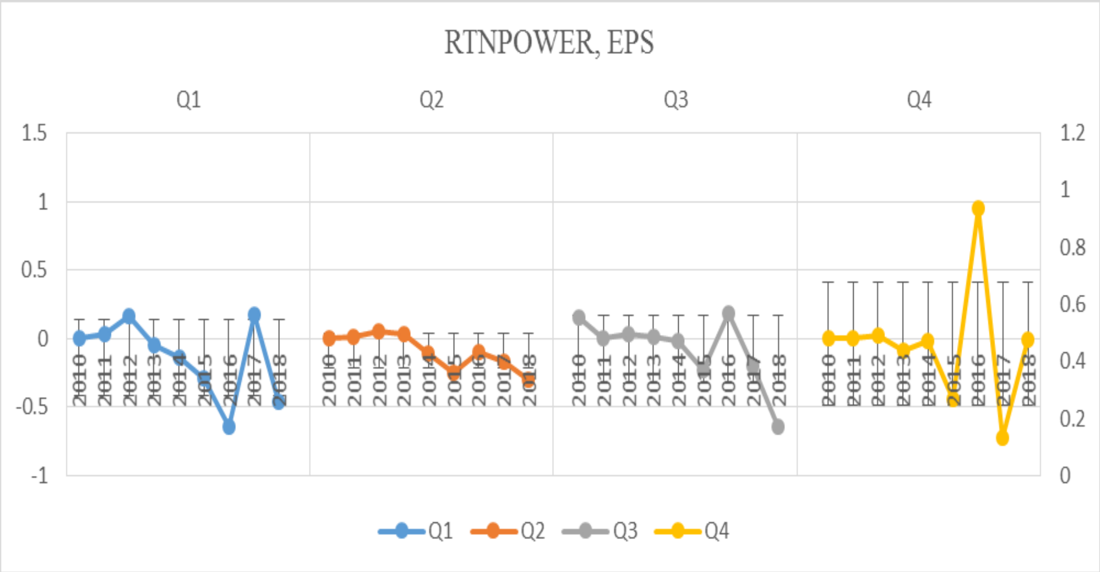
Chart 4.ax Sequential Plot (RTNPOWER) EPS




Source: Created by the researcher.

The pattern for earnings per share or EPS in Chart 4.ax is very much similar to that with the net profit in the Chart 4.av. EPS is a by-product of net profit, this may be the reason for the two financial metrics to have the same like pattern. Like net profit, RTNPOWER also does not have any particular quarter when it is generating a very high or low EPS consistently, the plotting of the data series for EPS is more kind of random. The RTNPOWER too has down trend for EPS within the selected time period of the study.

Chart 4.ay Cycle Plot (RTNPOWER)




Source: Created by the researcher.

The cycle or the subseries plot for the RTNPOWER relating to the EPS is aligned in the same line. This means there was no any particular quarter when the RTNPOWER was able to generate higher EPS. In other words there was also no particular quarter when the EPS was lowest consistently within the span of nine years. This is enough evidence to support that there is no any impact of any seasons on RTNPOWER in generating the EPS. Hence, it can be inferred that the data of RTNPOWER relating to EPS has no presence of seasonality.

4.7.1 SJVN, Selected financial metrics

Table 4.f

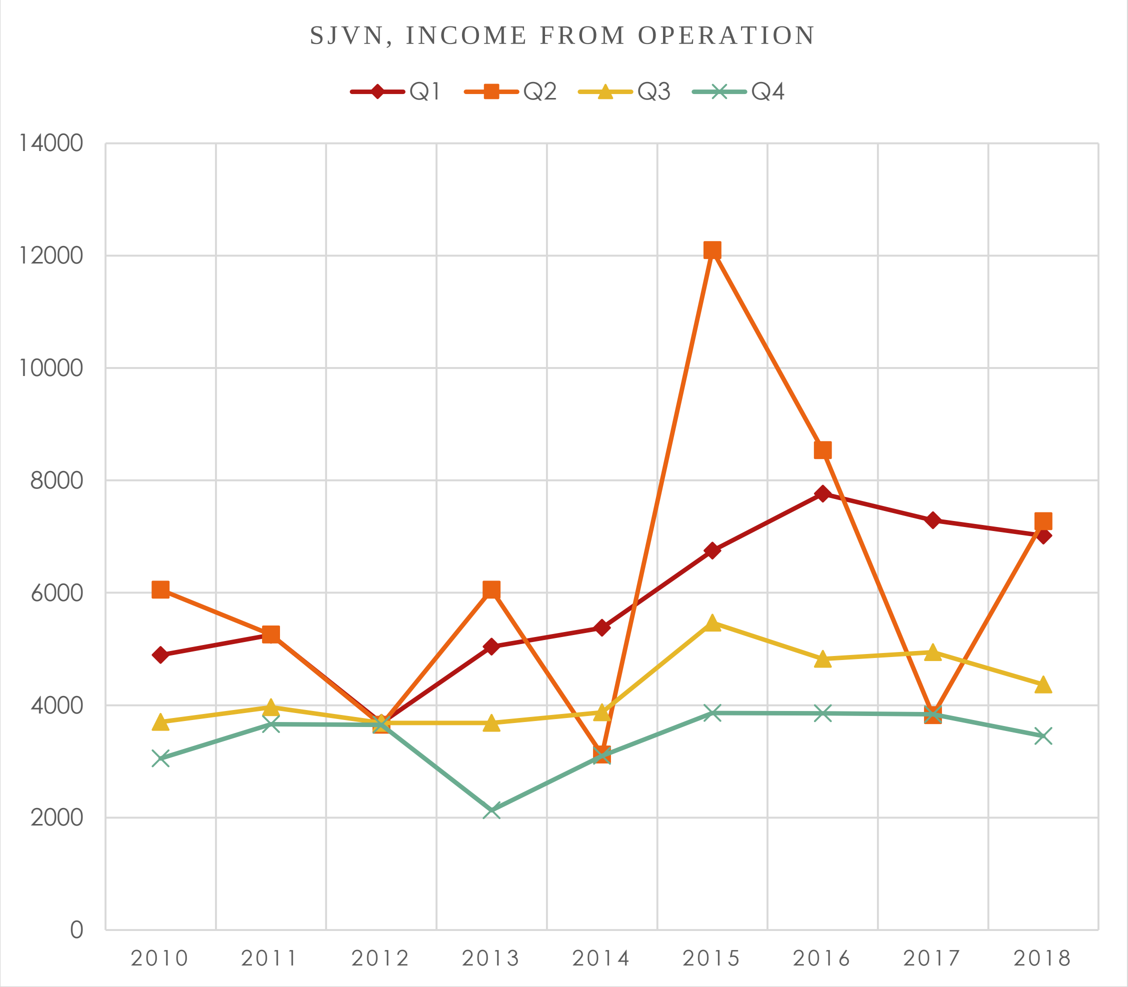
SJVN, financial metrics amount in Rs. (Cr.)

| Sl.no | Year/ quarter | Income from operation | Total expenditure | EBIT | Net profit | EPS |
|---|---|---|---|---|---|---|
| 1 | 2010 1 | 4893.2 | 1434.2 | 376 | 285.3 | 0 |
| 2 | 2010 2 | 6054.3 | 1436.4 | 493.26 | 375.63 | 0.091 |
| 3 | 2010 3 | 3698.9 | 1469.4 | 248.28 | 185.46 | 0 |
| 4 | 2010 4 | 3051 | 2844.6 | 72.73 | 126.35 | 0 |
| 5 | 2011 1 | 5249.80 | 1,598.70 | 3,651.10 | 2,907.60 | 0.7 |
| 6 | 2011 2 | 5,253.90 | 1,463.10 | 3,790.80 | 3,195.90 | 0.78 |
| 7 | 2011 3 | 3,964.10 | 1,594.20 | 2,369.90 | 1,915.00 | 0.46 |
| 8 | 2011 4 | 3658.9 | 19.795 | 227.51 | 110.28 | 0.027 |
| 9 | 2012 1 | 3,682.50 | 1,570.20 | 3,965.50 | 3,482.10 | 0.84 |
| 10 | 2012 2 | 3,651.20 | 1,521.10 | 4,699.10 | 4,111.00 | 0.99 |
| 11 | 2012 3 | 3,682.50 | 1,657.50 | 2,025.00 | 1,896.30 | 0.45 |
| 12 | 2012 4 | 3,651.20 | 1,938.20 | 1,713.00 | 1,197.40 | 0.29 |
| 13 | 2013 1 | 5,041.00 | 1,619.30 | 3,423.20 | 3,152.70 | 0.76 |
| 14 | 2013 2 | 6,051.50 | 1,745.70 | 4,318.70 | 3,870.30 | 0.94 |
| 15 | 2013 3 | 3,579.70 | 1,734.00 | 1,847.20 | 1,920.60 | 0.46 |
| 16 | 2013 4 | 2,132.00 | 1,680.80 | 452.1 | 1,579.80 | 0.38 |
| 17 | 2014 1 | 5376.80 | 1,694.80 | 3,705.20 | 3,432.40 | 0.83 |
| 18 | 2014 2 | 3,120.40 | 1,776.40 | 4,564.60 | 4,156.30 | 1 |
| 19 | 2014 3 | 3,874.40 | 1,789.80 | 2,084.60 | 2,109.30 | 0.51 |
| 20 | 2014 4 | 3097 | 2,175.50 | 944.9 | 1,448.30 | 0.35 |
| 21 | 2015 1 | 6747 | 2,150.90 | 4,596.20 | 4,242.90 | 1.03 |
| 22 | 2015 2 | 12097 | 2,612.10 | 9,485.40 | 7,967.80 | 1.93 |
| 23 | 2015 3 | 5,467.90 | 3,058.50 | 2,409.40 | 2,706.00 | 0.65 |
| 24 | 2015 4 | 3,862.80 | 2,348.60 | 1,514.20 | 1,850.80 | 0.45 |
| 25 | 2016 1 | 7762.90 | 2,642.40 | 5,120.50 | 4,844.30 | 1.17 |
| 26 | 2016 2 | 8538.70 | 2,849.20 | 5,691.20 | 5,649.70 | 1.37 |
| 27 | 2016 3 | 4,823.20 | 2,829.00 | 1,994.20 | 2,116.00 | 0.51 |
| 28 | 2016 4 | 3,857.00 | 2,896.90 | 961.5 | 1,474.80 | 0.36 |
| 29 | 2017 1 | 7290.70 | 2,779.80 | 4,627.80 | 4,799.60 | 1.16 |
| 30 | 2017 2 | 3,819.30 | 2,753.50 | 5,732.80 | 5,218.70 | 1.26 |
| 31 | 2017 3 | 4,940.40 | 2,835.20 | 2,118.80 | 2,610.60 | 0.63 |
| 32 | 2017 4 | 3,838.70 | 2,489.60 | 5068.7 | 2,812.50 | 0.68 |
| 33 | 2018 1 | 7017.80 | 2,400.70 | 5481.9 | 4,513.70 | 1.09 |
| 34 | 2018 2 | 7272.60 | 2,668.10 | 5124.4 | 4,348.90 | 1.05 |
| 35 | 2018 3 | 4,365.80 | 2,121.40 | 3347.9 | 2,057.00 | 0.5 |
| 36 | 2018 4 | 3,447.90 | 2,707.80 | 1636 | 1,329.20 | 0.33 |

Source: Quarterly reports (BSE).

4.7.2 SJVN, Chart Analysis (Sequential & Cycle or Subseries plot), Income from operation

Chart 4.az Sequential Plot (SJVN) Income from operation

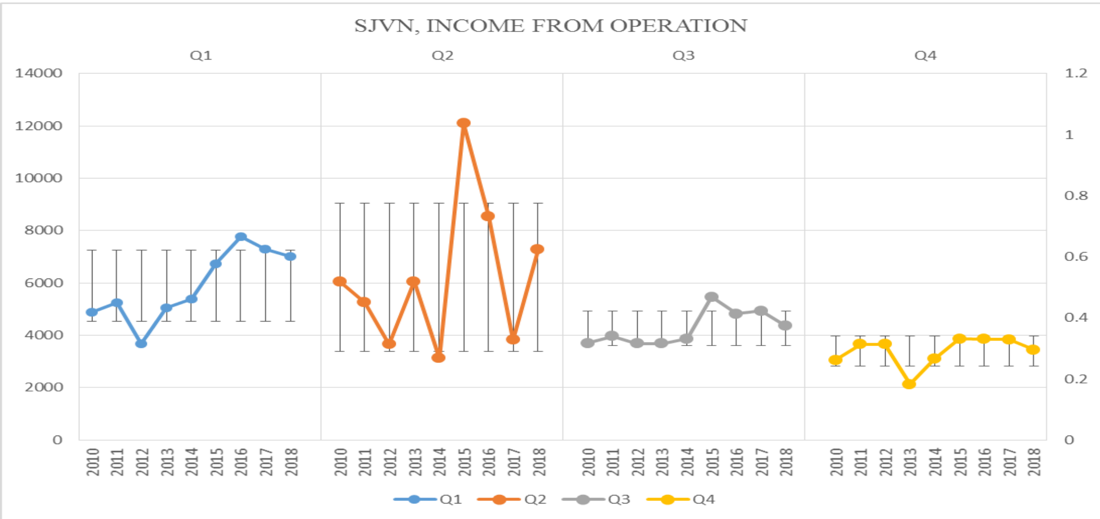



Source: Created by the researcher.

Data series in the above Chart 4.az representing income from operation for the power generating company, SJVN is plotted in order to find the presence of any regular pattern or seasonality in the data set. It is quite clear after observing the sequential plotting in the Chart 4.az, that the SJVN is generating lowest income from operation in quarter 4 as compared to the other quarters, from the year 2010 to 2018. The income from operation of SJVN in quarter 1 is consistently higher as compared to the quarter 3 and 4 within the selected time period of study. The income from operation of SJVN in quarter 2 is highly volatile, even though it has the highest income from operation recorded in the year, 2010, 2011, 2013, 2015, 2016 and 2018. Out of eight years, the SJVN is generating higher income from operation in quarter 2 continuously for six years, in the remaining two year the highest income from operation is in quarter 1. Hence, it can be inferred that out of four quarters SJVN is generating higher income from operation in the quarter 2, than accordingly in quarter 1, 3 and 4. Even though the quarter 2 is giving high income from operation, the values for income from operation in quarter 2 is very volatile. The other three quarters do not fluctuate much.

Hence, it is observed that there is a presence of particular pattern in the data series relating to the income from operation of SJVN, so it can be said that there is an impact of seasonality.

Chart 4.ba Cycle Plot (SJVN)

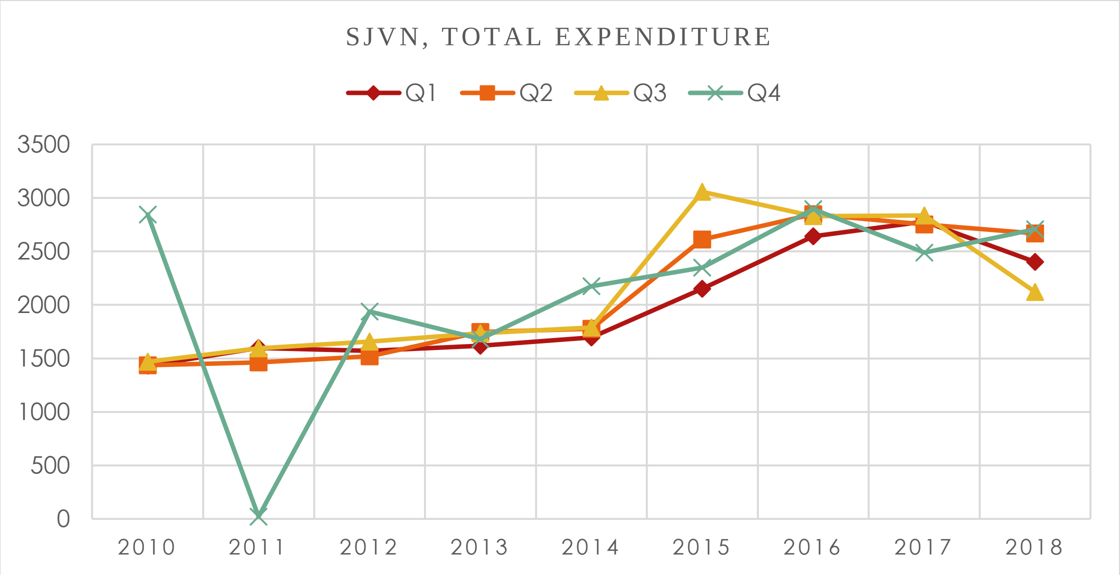



Source: Created by the researcher.

It is clearly depicted in the above Chart 4.ba that the income from operation in quarter 4 of SJVN is in the lowest level as compared to the income from operation in other quarters. This means SJVN is generating a lower income from operation in quarter 4 as compared to quarter 1, 2 and 3. The SJVN has the income from operation in quarter 2 in the highest level but it is also observed that the volatility is very high. The income from operation in quarter 1 is also higher next to the quarter 2 and is less fluctuating. All these inferences build a very strong conclusion that there is a presence of seasonality in the data set of SJVN related to the income from operation. It is noted that SJVN is generating lower income from operation in the months from January to March. SJVN in the other hand is generating higher income from operation in the months from July to September.

4.7.3 SJVN, Chart Analysis (Sequential & Cycle or Subseries plot), Total Expenditure

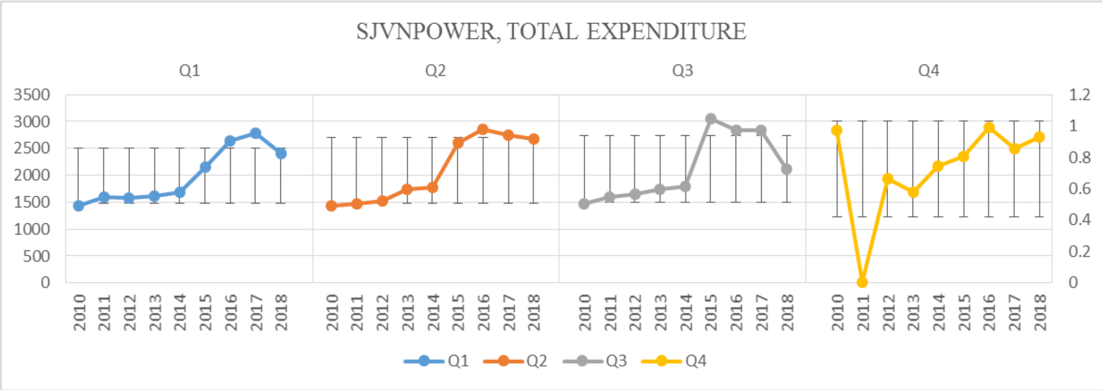
Chart 4.bb Sequential Plot (SJVN) Total Expenditure




Source: Created by the researcher.

The data plots of SJVN for total expenditure in the above Chart 4.bb is not presenting the presence of seasonality plainly. After a close observation, it is seen that the data series of total expenditure in each quarter is crisscrossing and moving as a bunch of wire in the same direction. There is no particular quarter in which the total expenditure incurred by SJVN is highest or lowest continuously for a selected period of study. This is a clear indication that there is no presence of seasonality in the data set relating to the total expenditure of SJVN.

Chart 4.bc Cycle Plot (SJVN)

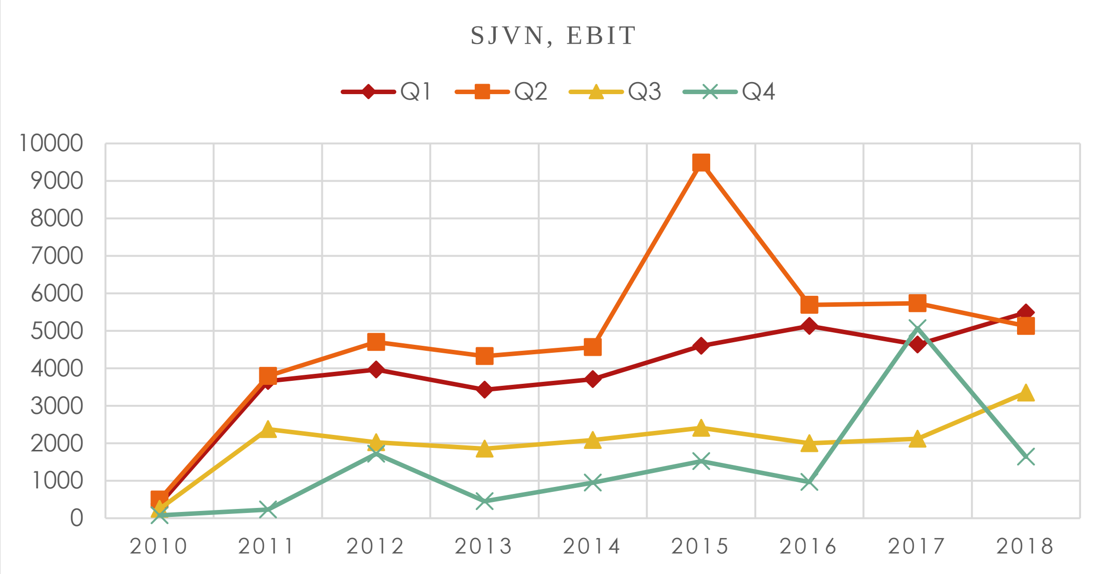



Source: Created by the researcher.

Unlike, the income from operation of SJVN, there is no presence of seasonality in the data series relating to the total expenditure. This supported by the visual portrayed by the Chart 4.bc. All the quarters representing the total expenditure lies in the same level. There is not any particular quarter which is distinctly above or lower than the level created by all four quarters. This means the total expenditure incurred by the SJVN is not affected by any particular season. The rate at which the expenditure is increasing is higher in quarter 4, as compared to the other three quarters for SJVN. Hence, it is confirmed that unlike income from operation SJVN has no presence of seasonality in the data series of total expenditure with the selected time span of nine years from 2010 to 2018.

4.7.4 SJVN, Chart Analysis (Sequential & Cycle or Subseries plot), Earnings before interest and tax (EBIT)

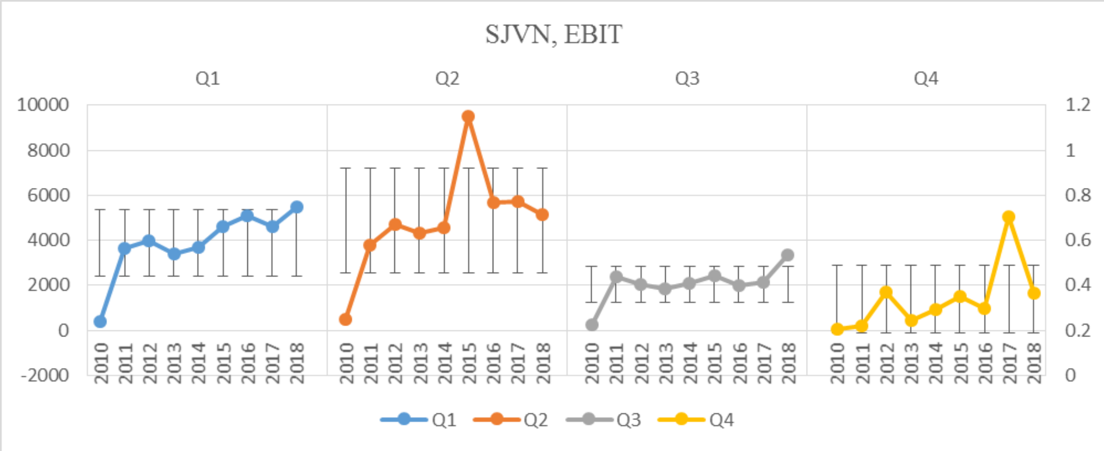
Chart 4.bd Sequential Plot (SJVN) Earnings before interest and tax




Source: Created by the researcher.

The presence of seasonality is clearly visible in the data series of SJVN relating to EBIT in the above Chart 4.bd. The quarter 2 representing the EBIT is seen clearly above all the other quarters. This means the SJVN is generating higher EBIT in quarter 2 as compared to the other quarters. In the other hand quarter 4 representing the data series of total expenditure is in the lowest level as compared to the other quarters. This clearly indicates that the SJVN is generating lower EBIT in quarter 4 except in the year 2017, when EBIT was lower in quarter 3. The inference which is developed from the discussion is that the SJVN is generating higher EBIT during the months July–September. In the other hand SJVN is generating lowest EBIT during the period from January to March.

Chart 4.be Cycle Plot (SJVN)

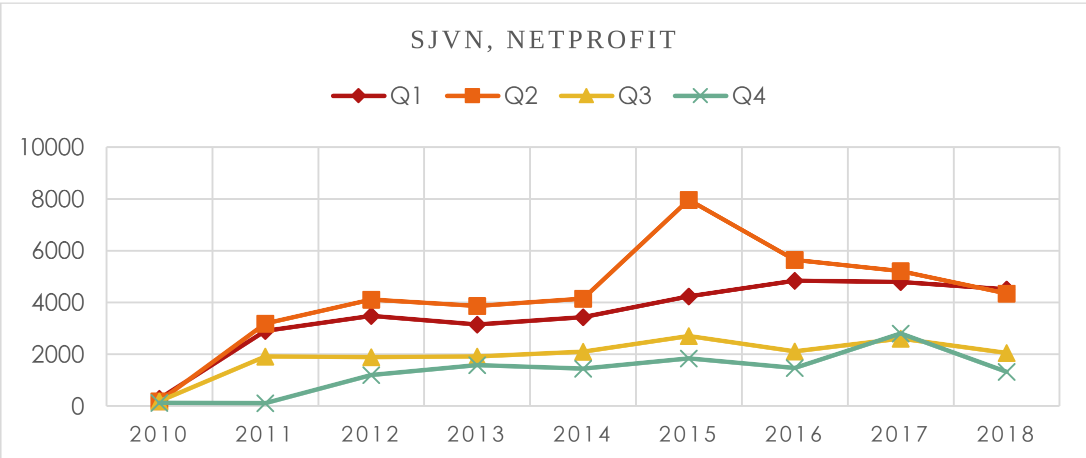



Source: Created by the researcher.

The inference is confirmed by the cycle or subseries plotting in the above Chart 4.be, relating to the data series of EBIT. The EBIT in quarter 2 is in the higher level as compared to the other quarters, while the EBIT in quarter 4 is in the lowest level. This means that the SJVN is generating higher EBIT during quarter 2 and is generating lowest EBIT during quarter 4. This is a clear indication of the presence of seasonality in the data series of SJVN relating to EBIT.

4.7.5 SJVN, Chart Analysis (Sequential & Cycle or Subseries plot), Net profit

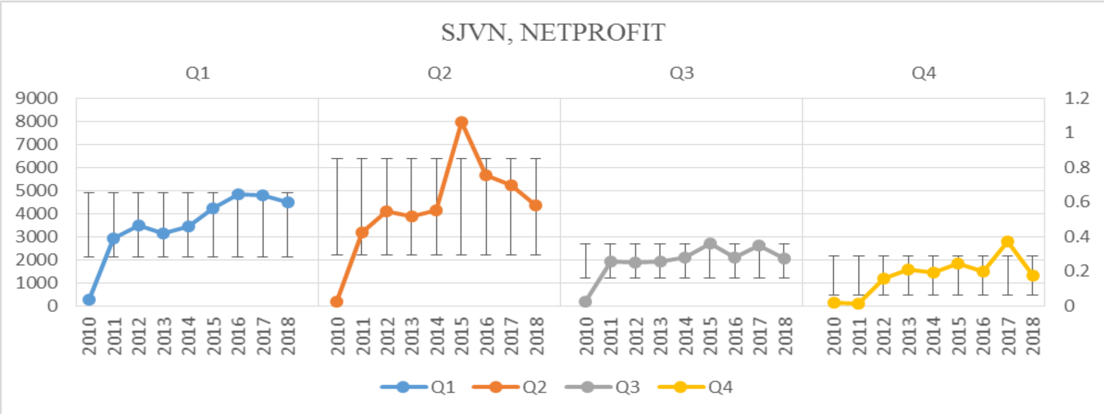
Chart 4.bf Sequential Plot (SJVN) Net profit




Source: Created by the researcher.

Similar to the EBIT, there is a presence of seasonality in the data series of SJVN relating to net profit. This may be due to the reason that the net profit is derived from the EBIT. Similar to EBIT, the SJVN's net profit is highest during the quarter 2 and lowest during the quarter 4. This is a clear indication of the presence of seasonality in the data series of net profit for SJVN. This mean the months from July to September is very crucial for SJVN to generate higher net profit and the periods from January to March is more sluggish as during this time period the SJVN is generating the lowest level of net profit.

Chart 4.bg Cycle Plot (SJVN)

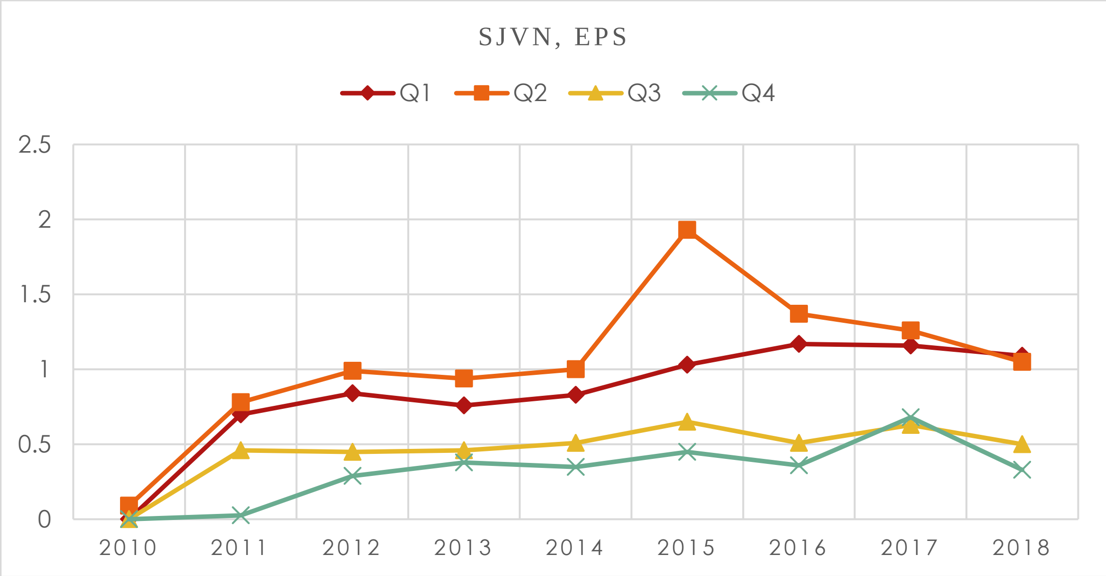



Source: Created by the researcher.

SJVN has a net profit in a lower level in quarter 4 as compared to the other quarters. As depicted in the above Chart 4.bg it is very clear that the SJVN is generating the lowest net profit during the months from January to March. It is just the opposite in quarter 2, as seen in the above chart the SJVN is generating the highest net profit during the months from July to September. Hence, it is confirmed that similar to EBIT, SJVN has the presence of seasonality in generating the net profit.

4.7.6 SJVN, Chart Analysis (Sequential & Cycle or Subseries plot), EPS

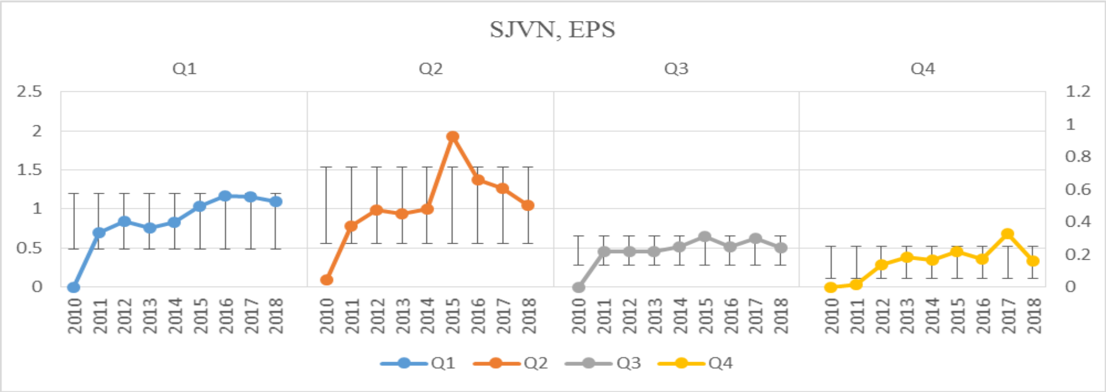
Chart 4.bh Sequential Plot (SJVN) EPS




Source: Created by the researcher.

Earnings per share (EPS) is the by-product of net profit and the total outstanding shares in the company. This may be the reason, the data points of SJVN for EPS are similar to net profit. Similar to net profit, the data set relating to EPS is also affected by different seasons. It is proved by the sequential plotting above in the Chart 4.bh. The SJVN is generating higher EPS during quarter 2 and is generating lower EPS during quarter 4. Hence, the inference is that there is a presence of seasonality in the data set of EPS for SJVN.

Chart 4.bi Cycle Plot (SJVN)




Source: Created by the researcher.

Observing the above Chart 4.bi, it has been confirmed that the data set of EPS in different time period has been affected by the different seasons, especially July–September and January–March. During July–September the SJVN is able to generate higher EPS as compared to the other quarters. While during January–March SJVN is generating lowest EPS. This is a clear indication that the EPS of SJVN is affected by different seasons. Hence, it is confirmed that the data set of SJVN has the presence of seasonality and is affected by the seasonality.

## 4.8 Summary

Table 4.g

SUMMARY

| | Income-from operation | | Total expenditure | | EBIT | | Net profit | | EPS | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Seasonality | | Seasonality | | Seasonality | | Seasonality | | Seasonality | |
| | Yes /no | Remark | Yes / no | Remark | Yes / no | Remark | Yes / no | Remark | Yes / no | Remark |
| NHPC | Yes | High-Q1 + Q2 | No | — | Yes | High-Q1 + Q2 | Yes | High-Q1 + Q2 | Yes | High-Q1 + Q2 |
| | | Low-Q3+Q4 | | — | | Low-Q3+Q4 | | Low-Q3+Q4 | | Low-Q3+Q4 |
| NTPC | Yes | High-Q4 | Yes | High-Q4 | Yes | High-Q4 | Yes | High-Q4 | Yes | High-Q4 |
| SJVN | Yes | High-Q2 | No | — | Yes | High-Q2 | Yes | High-Q2 | Yes | High-Q2 |
| | | Low-Q4 | | — | | Low-Q4 | | Low-Q4 | | Low-Q4 |
| RPOWER | No | — | No | — | No | — | No | — | No | — |
| RTNPOWER | No | — | No | — | No | — | No | — | No | — |
| GIPCL | No | — | No | — | No | — | No | — | No | — |

Source: Created by the researcher.

## 4.9 Conclusion

The main objective of this chapter was to check if there is the presence of seasonality in the data series related to the selected financial metrics namely, income from operation, total expenditure, earnings before interest and tax (EBIT), net profit and earnings per share (EPS) for the power generating companies in India. In order to find the presence of seasonality in the data set, the sequential plotting and cycle or subseries plotting has been used. The findings of this chapter are included as a summary in the above Table 4.g. It can be clearly seen in the above table that the three power generating companies namely, NHPC, NTPC and SJVN have the presence of seasonality in their data series relating to income from operation, EBIT, net profit and EPS. Among these three powers generating companies NHPC's and SJVN's, financial metric namely, total expenditure does not have the presence of seasonality and is not affected by any seasons. After close observation, these three powers generating companies also is not following the similar pattern, as it is observed that NHPC's selected financial metrics except total expenditure is affected in the same pattern within a repetition of six months i.e., NHPC has higher income from operation, EBIT, net profit and EPS during the months from April to September and it has lower EBIT, net profit and EPS during the months from October to March. In the other hand, NTPC has higher income from operation, total expenditure, EBIT, net profit and EPS during the months from January to March. It is also noted that there is no presence of seasonality for the selected financial metrics of NTPC on the lower side. SJVN has higher income from operation, EBIT, net profit, and EPS during the months from July to September and is lower during the periods from January to March. The most important observation from the above table is that NHPC and SJVN which focuses in hydro energy to produce electricity, both have higher income from operation, EBIT, net profit and EPS during the periods from July to September and is lower during the periods from January to March. Both the power generating companies (SJVN and NHPC) does not have the presence of seasonality in their total expenditure. In the other hand NTPC which uses thermal energy to produce electricity has the higher income from operation, total expenditure, EBIT, net profit and EPS during the periods from January to March. This means that the power generating companies using the hydro are earning high incomes during quarter 2 and the power generating companies using thermal power are generating higher incomes during quarter 4. But this cannot be generalized because the next most important observation from the table above is that the three power generating companies which does not have the presence of seasonality in their selected financial metrics are RTNPOWER, RPOWER and GIPCL. It is also noted that these three companies are not owned by the central government. The above three power generating companies which have seasonality in their selected financial metrics namely, NHPC, NTPC and SJVN are central government owned power generating companies. Hence, the inference which can be developed from the above observation and discussion is that there is a presence of seasonality for the selected financial metrics in the power generating companies under the central government ownership and there is no presence of seasonality for the selected financial metrics in the power generating companies under private ownership and state government ownership.

# Chapter V

# Impact of financial metrics as reported in the annual reports by the power generating companies in its share price volatility.

## 5.1 Objective and overview

This chapter is devoted in going-over the impact of financial metrics as reported in the annual report by the power generating companies on its share price volatility of the selected power generating companies listed in Bombay Stock Exchange (BSE). The statistical and econometric, both type of tools are used in progressing the study. GARCH (1, 1) model is used to calculate the share price return volatility of the selected power generating companies. The 30 days, calendar year time period will be considered. The 30 days' time period will include both the 15 days pre-annual report announcement date and the 15 days post annual report announcement date. The main point in considering the annual report presentation month is that all the participants in the market usually wait for the company to present its annual financial report. There will be too much noise in the market during the presentations of the annual reports by the companies, as all the market experts normally place their own opinions and the traders and investors at the same time will be trading and investing using their own insights. There will be high conjecture before and after the presentation of the annual report by the company. GARCH (1, 1) model which is one of the highly used models in calculating the share price volatility is used in foreseeing the share price volatility. The GARCH (1, 1) model uses three parameters and there are multiple approaches which help in parametrising the model. One of the popular approaches which determine the parameters in fitting the model is the maximum likelihood estimation approach.

This estimation approach helps in determining the parameters that will best explain the data that have been observed.

In order to use paired sample *T* test to check the impact of the financial metrics on the share price return and the share price volatility for the selected power generating companies in India before and after the presentation of the annual financial report, the following assumptions are to be achieved in the data set.

- The observed variable (dependent) must be continuous in nature.
- The observations should be independent of one another.
- The dependent variable should be normally distributed and should not contain any outliers.

The variables used for the purpose of study are share price volatility and share price return. There is an academic debate going on, whether a share price is discrete or a continuous variable. The share price is a discrete random variable but the volatility and the share price return is considered to be continuous. Even though the share price data is considered to be discrete the share price volatility and the return are considered to be continuous because the number of possible outcomes is too large and the probability of each outcome is too small. The second assumption is that the observations should be independent of each other. The observations used in this study is related to share price before and after the presentation of the annual report by the selected power generating companies. There are many debates on the topic stating whether the share price has memory or not, in other words whether the share price of today is dependent on yesterday's share price. The dependence of the present share price on the past share price is being supported by the technical analysis study but the empirical statistical works are much lacking in this field of study. The independence of the present-day share price as compared to previous day share price has been supported by the random walk theory. This theory states that the present share price is independent as compared to the past share price. The independence of the present share price as compared to the previous share price has been proved empirically by the random walk theorists. Fama, 1965 the random walk model has been supported by all the observations and the empirical results. The finding is that the present share price is independent and not dependent on the historical share price. The observations used in the research are not share price but the share price volatility and the share price return. So the inference can be made that the observed variables are independent of each other. The normality of the observation has been tested by using the Z score and Q–Q plot. There is no clear indication of the normal distribution and the data has many outliers too. The impact of outliers can give a wrong or manupulative results but it depends on the area of study. There are many break through findings in many of the researches just because of the presence of the outliers. This study focuses on the impact of the financial metrics to the share price volatility and share price return. Since the presence of the outliers are not so negligible, it is assumed that the selected statistical test may give biased results. The data selected for the purpose of study is not sufficing all the assumptions for the paired sample *t* test. Hence, a non parametric Wilcoxon signed rank test will be used to prove or disprove the hypothesis. Shier, (2004) , the wilcoxon signed rank test is efficient in testing the null hypothesis when the data is distribution free or non parametric in nature. This test is an alternate to paired sample *t*-test and one sample *t*-test.

The minimum sample size should be at least 30 in order to use the *t* test, which is not quite valid all the time. Small sample size can also be used and conduct paired sample *t* test, provided a very high co efficient relationship exists, which will typically reduce the type one error. There are many studies which proved that even the small size sample of two or three gave the most efficient result. Winter, 2013, in his sudy has empirically proved that even the extremely small sample size can use a paired *t*-test and will give good results if the pair correlation coeffecient within is high. All the observed pairs in this study does not have high pair correlation coeffecient.

5.2 Hypothesis

Ho: There is no significant impact of financial metrics as reported in the annual report on the share price volatility of power generating companies listed in Bombay Stock Exchange.

H1: There is significant impact of financial metrics as reported in the annual report on the share price volatility of power generating companies listed in Bombay Stock Exchange.

The above null hypothesis is framed in such a way that the true mean difference is assumed equal to zero. This is a two tailed test. Upper tailed test and lower tailed test will also be conducted if the alternate hypothesis is accepted. The upper tailed test will be conducted to check how great the true mean difference is from zero and vice versa.

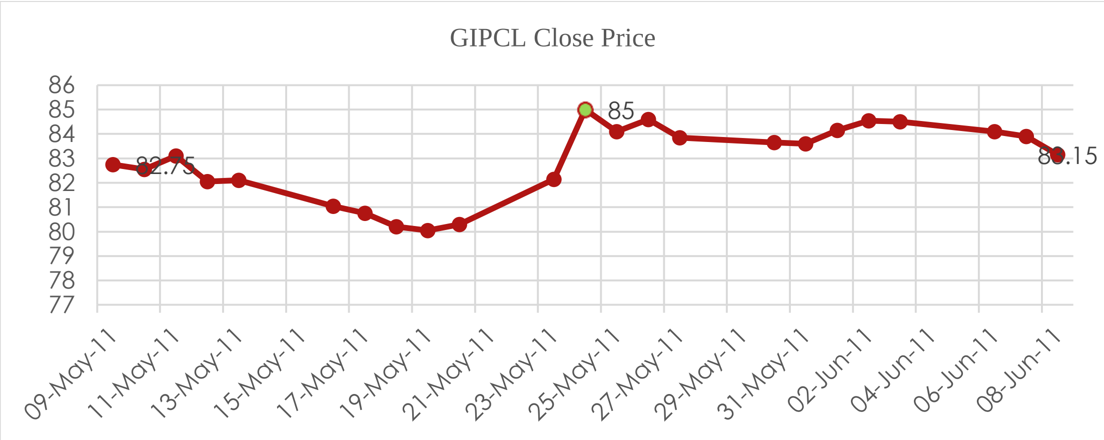
The share price of the selected power generating companies has been plotted to demonstrate the effect on the share price before and after the annual report has been published in the exchange from 2010 to 2019. The 30 days calendar time period has been used (not the 30-trading day). So, the data points are plotted 15 days before and 15 days after the results were published. The annual reports contain all the information relating to the financial metrics, so the annual reports itself are being used as a representative of financial metrics. The quality of the annual financial metrics will be judged on the basis of the quality of the financial metrics contained in the annual financial reports. The greatest challenge is on selecting the financial metrics which will represent the quality of the annual reports. There are multiple techniques to interpret the quality of the financial reports, one of the famous and mostly used technique is ratio analysis. Many of the stock traders and investors may not understand the sophisticated financial jargons (financial metrics) but the two simples yet one of the most important financial metrics which everybody understands are profit/loss and expenditure. Every trader and investor can easily understand this terminology profit/loss and expenditure and to some extent this will also show the quality of the financial reports. The financial metrics have been selected considering the perception of the traders and investors. The main objective is to check the impact of the financial metric on the share price volatility.

### 5.3 GIPCL

The closing share price of the power generating company GIPCL before and after the publication of the annual financial report has been plotted below.

5.3.1 Sequential plot pre and post annual report publication date (GIPCL)

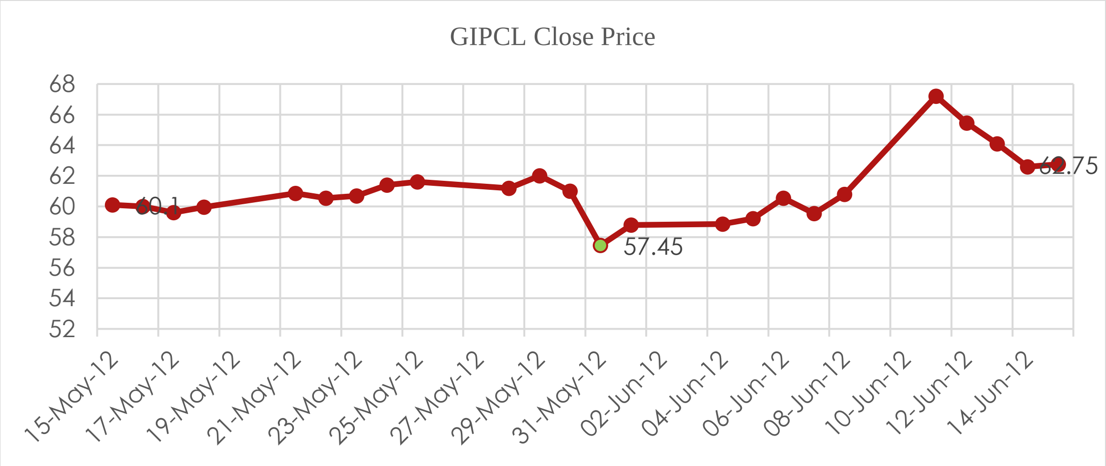
Chart: 5 (a) Close price plotted before and after 2011 annual report publish date by BSE.




Source: Created by the researcher.

The annual report date presented by GIPCL in the year 2011 was 24th of May. It is visible in the above Chart 5 (a) that the share price 15 days before the annual report got published was Rs 82.75 and on the annual report publication day was Rs 85, but post publication date after 15 days the share price closed at Rs 83.15. It is observed that the price was highest on the annual report publication date as compared to 15 days pre and post publication date.

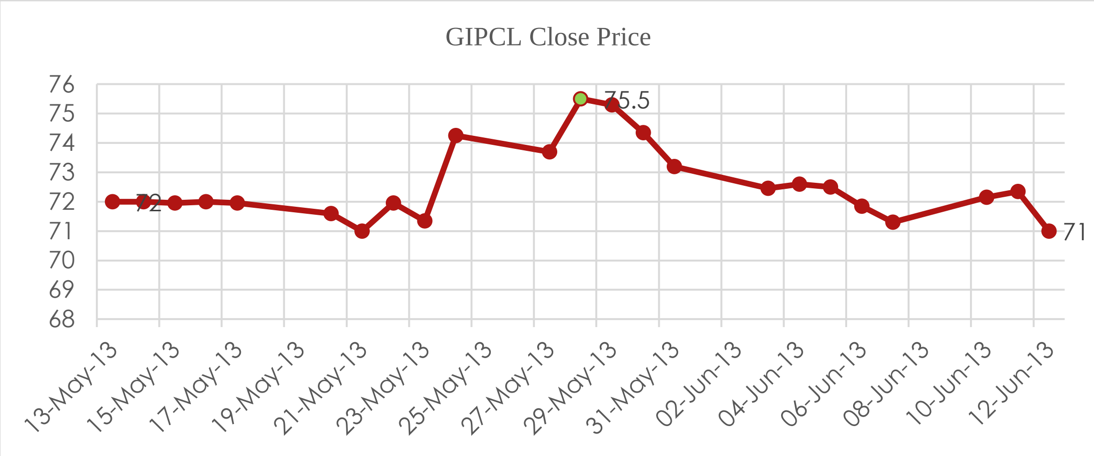
Chart: 5 (b) Close price plotted before and after 2012 annual report publish date by BSE.




Source: Created by the researcher.

The Chart 5 (b) is telling the just opposite story as compared to Chart 5 (a) for the year 2012 as compared to 2011. The share price is lowest in the date of the publication of the annual report by GIPCL. Before 15 days of the annual report publication date the share price was Rs 60.10 and in the publication day itself the share price was Rs 57.45, after 15 days from the annual report publication date the share price was Rs 62.75.

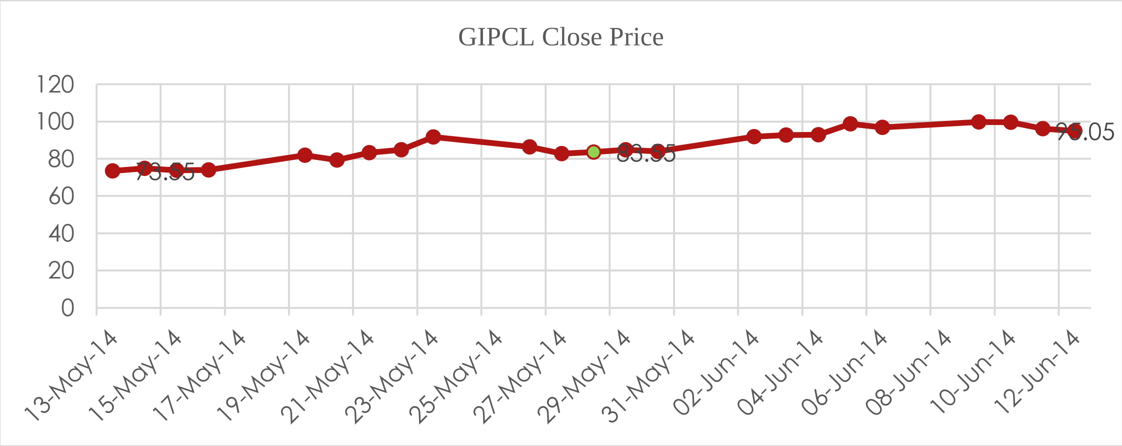
Chart: 5 (c) Close price plotted before and after 2013 annual report publish date by BSE.




Source: Created by the researcher.

The pattern in the year 2013 in the Chart 5 (c) above is similar to the year 2011 as depicted in the Chart 5 (a), The share price of GIPCL is highest in the report publication date, which was Rs 75.5, it is also noted like earlier the 15 days pre-report publication date share price Rs 72 and 15 days after the publication date share price Rs 71 is in the same range. Even though the pattern was different in the year 2012, the share price on the publication date was lowest.

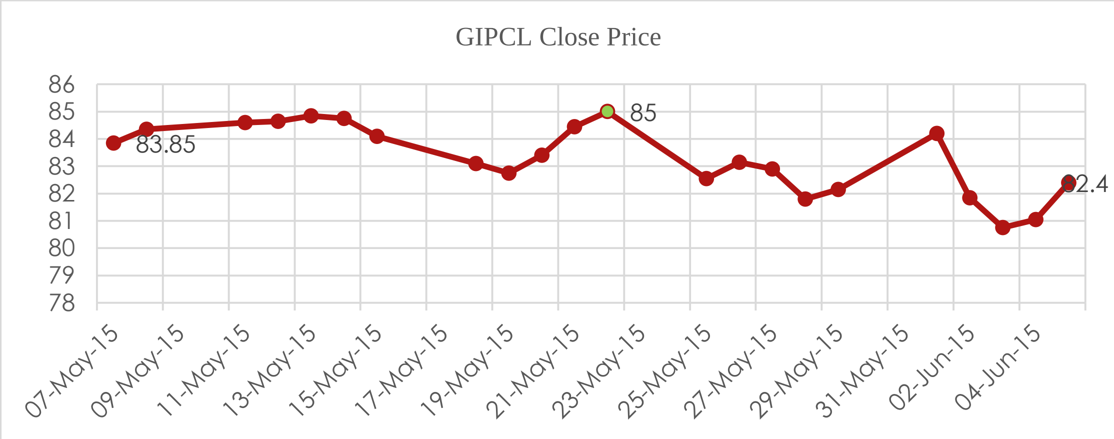
Chart: 5 (d) Close price plotted before and after 2014 annual report publish date by BSE.




Source: Created by the researcher.

In the year 2014, as depicted in the above Chart 5 (d), the share price is continuously increasing before 15 days from the publication date till 15 days after the publication date. As compared to 2011, 2012 and 2013, the year 2014 is only having an increasing trend, a price range of Rs 73.55 before 15 days from the publication date to Rs 83.55 on the annual report publication date, the share price of GIPCL reached a high of Rs 95.05 after the 15 days' time period post publication date.

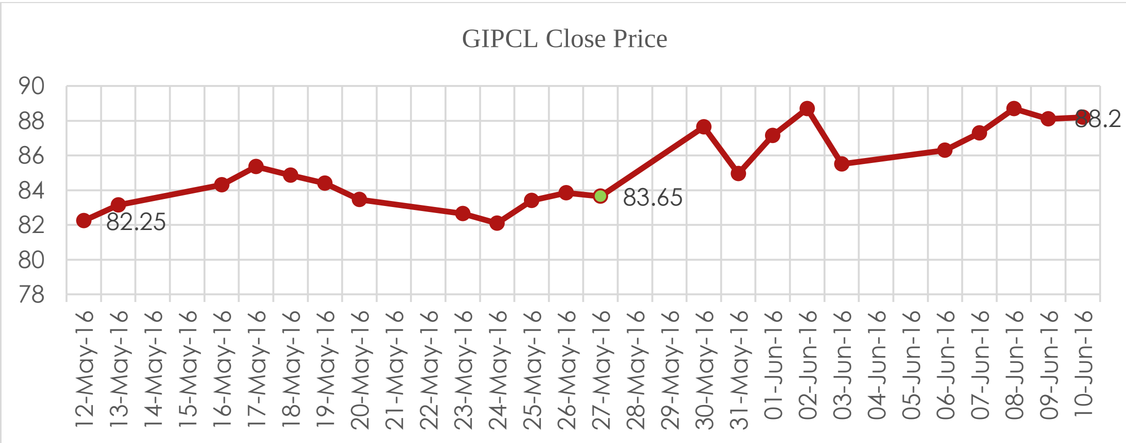
Chart: 5 (e) Close price plotted before and after 2015 annual report publish date by BSE




Source: Created by the researcher.

GIPCL in the year 2015 is also following a common pattern like 2011, 2012 and 2014, the share price was high in the report publication date Rs 85, but after the publication date prior to 15 days the share price fell to a low of Rs 82.4 which is very near to the share price 15 days prior to the annual publication date Rs 83.85.

Chart: 5 (f) Close price plotted before and after 2016 annual report publish date by BSE

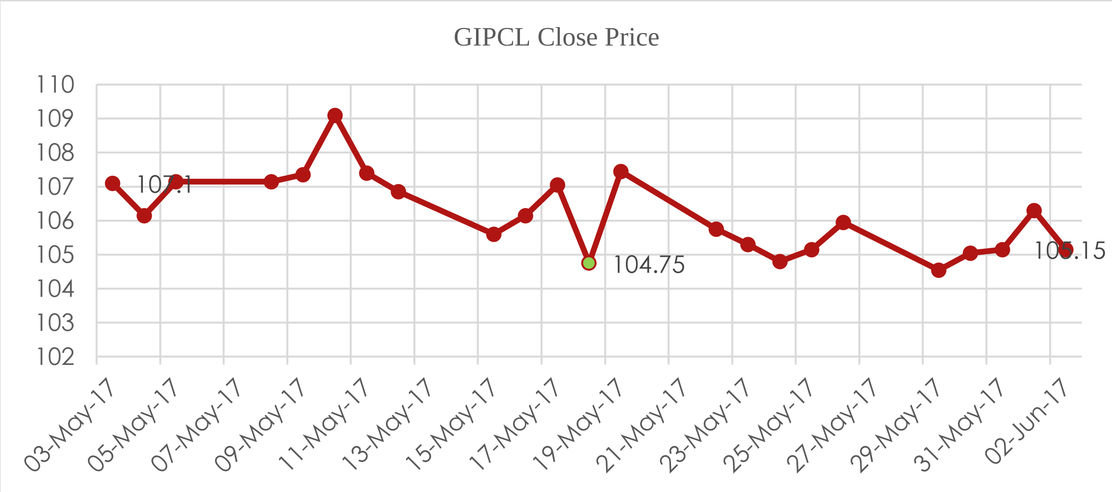



Source: Created by the researcher.

The share price trend 15 days before and after the report publication date in the year 2016 is similar to the year 2014. It is clearly depicted in the above Chart 5 (f) that the share price of GIPCL 15 days prior to the publication of the annual report was Rs 82.25

and on the date of annual report publication date the share price rose to Rs 83.65, the share price started to increase after the publication of the annual report and reached to Rs 88.2 after the 15 days' time period.

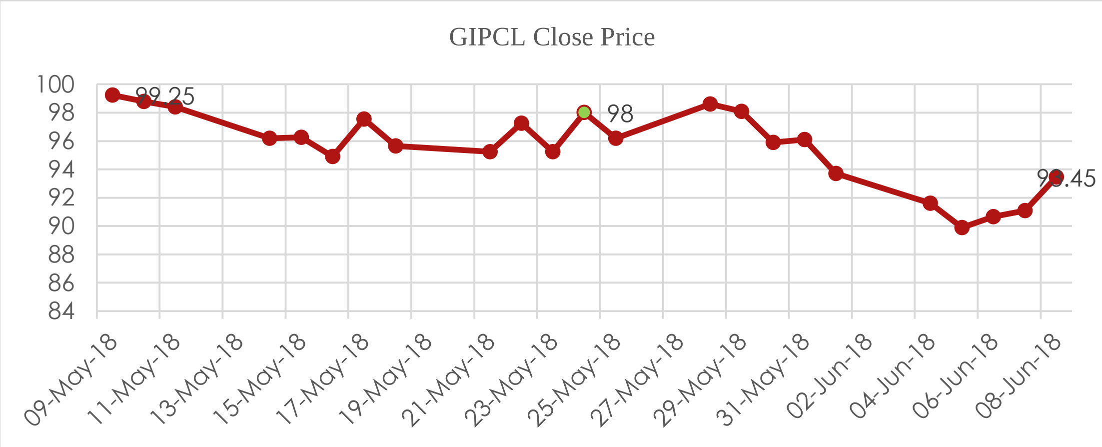
Chart: 5 (g) Close price plotted before and after 2017 annual report publish date by BSE.




Source: Created by the researcher.

As displayed in the above Chart 5 (g), there is no drastic change in the share price of GIPCL, 15 days before the publication of annual report in the year 2017 the share price of GIPCL was Rs 107.1 and on the day of the publication of annual report the share price was Rs 104.75, at the end of the 15 days' time period post annual report publication date the value of share price was Rs 105.15. It is observed that on the publication date the price of GIPCL was lower as compared to the share price 15 days pre and post annual report publication date.

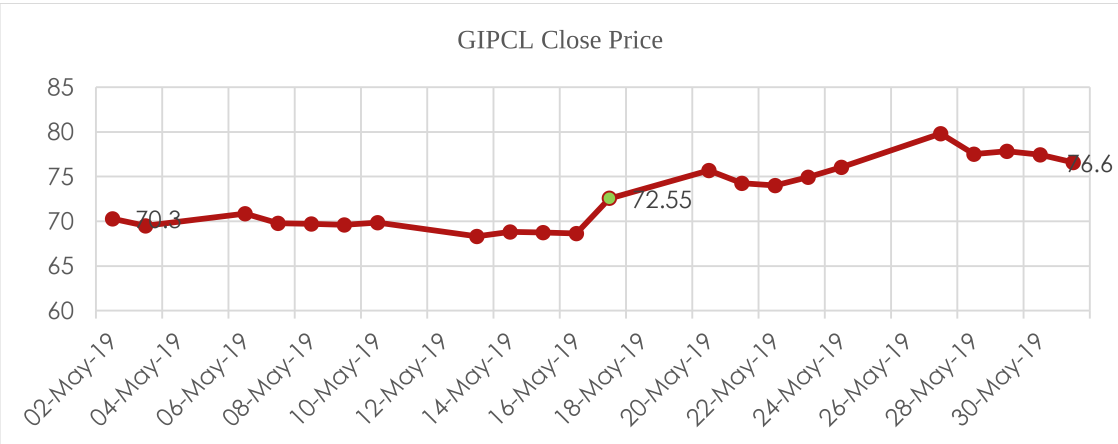
Chart: 5 (h) Close price plotted before and after 2018 annual report publish date by BSE.




Source: Created by the researcher.

The most important observation from the Chart 5 (h) above is that the share price of GIPCL in the year 2019 is decreasing 15 days prior to annual report publication date till 15 days post annual report publication date. The share price of GIPCL before 15 days from the date of annual report publication date was Rs 99.25, it fell to Rs 98 on the date of publication, and 15 days post publication of the annual report the share price of GIPCL reached Rs 93.45.

Chart: 5 (i) close price plotted before and after 2019 annual report publish date by BSE.




Source: Created by the researcher.

The Charts 5 (a)–5 (i) above is related with the share close price of GIPCL. The red dot in the series plotted is the demarcation between the share price before and after the presentation of annual report date by the power generating company, GIPCL. The trend in the above Chart 5 (i) is increasing from the share value of Rs 70.3, 15 days prior to the publication date to Rs 72.55 on the annual report publication day to Rs 76.6, 15 days after the annual report publication date.

In order to get a clearer picture about the movement of the share price, the share price volatility and the share price return 15 days before and after the publication of the annual report by GIPCL has been calculated and a significance test is conducted using the Wilcoxon signed rank test.

### 5.3.2 Share price volatility (GIPCL)

Table 5.a Year wise volatility data (GIPCL.)

| Year | Pre-report share price volatility (15 days) | Post-report shares price volatility (15 days) |
|---|---|---|
| 2010 | 3.13% | 0.87% |
| 2011 | 1.49% | 1.05% |
| 2012 | 2.24% | 1.71% |
| 2013 | 1.62% | 1.38% |
| 2014 | 69.00% | 1.57% |
| 2015 | 0.46% | 0.64% |
| 2016 | 1.96% | 1.03% |
| 2017 | 0.32% | 2.36% |
| 2018 | 5.10% | 1.15% |

Source: Computed by the researcher.

### 5.3.3 Hypothesis (Financial metrics and share price volatility)

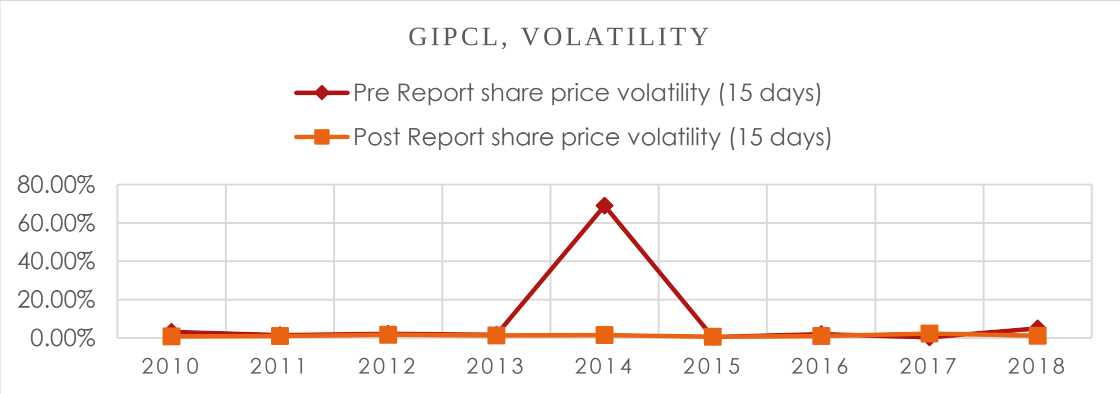
Ho: There is no significant impact of financial metrics as reported in annual reports on the share price volatility of GIPCL.

H1: There is significant impact of financial metrics as reported in annual reports on the share price volatility of GIPCL.

The hypothesis has been developed according to the objective of the study. The main objective of the study is to check whether there is a significant difference in the share price volatility of GIPCL, 15 days before and after the annual report publication date. Wilcoxon Signed rank test is used to reject or accept the null hypothesis, before that a sequential plotting of the data series related to the volatility of GIPCL share price pre and post annual report publication date has been used. The sequential plot of the data series will also help in understanding the pattern to some extent.

5.3.4 GIPCL, Share price volatility sequential plot (pre & post annual report date)

Chart 5.j GIPCL, Share price volatility sequential plot




Source: Created by the researcher.

The plotting in the above Chart 5.j gives a clear view relating to the movement of the share price volatility of GIPCL pre and post publication date of the annual report by the company. It is noted from the above chart that the movement between the pre and post period volatility is aligned to each other except there is a sudden hike in the pre-report period volatility in the year 2014. The difference in the volatility between the two periods is very significant in 2014 but there are no significant differences visible in the volatility between the pre and post annual report publication date in other years i.e., 2010, 2011, 2012, 2013, 2015, 2016, 2017 and 2018. The same will be confirmed by the Wilcoxon signed rank test.

5.3.5 Wilcoxon signed rank test (GIPCL share price volatility)

Wilcoxon signed rank test
Table 5.b (GIPCL share price volatility)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2010 | 2.26% | 1 | 0.0226 | 7 | 7 |
| 2011 | 0.44% | 1 | 0.0044 | 3 | 3 |
| 2012 | 0.53% | 1 | 0.0053 | 4 | 4 |
| 2013 | 0.24% | 1 | 0.0024 | 2 | 2 |
| 2014 | 67.43% | 1 | 0.6743 | 9 | 9 |
| 2015 | -0.18% | -1 | 0.0018 | 1 | -1 |
| 2016 | 0.93% | 1 | 0.0093 | 5 | 5 |
| 2017 | -2.04% | -1 | 0.0204 | 6 | -6 |
| 2018 | 3.95% | 1 | 0.0395 | 8 | 8 |

| Positive sum | Negative sum | Test statistics | Critical value (9,.05) |
|---|---|---|---|
| 38 | -7 | 7 | 5 |

Source: Computed by the researcher.

The values in the above table is calculated using the Wilcoxon method. The test statistics is 7 and the critical value is 5. Since the test statistics is greater in value than the critical value, there is not much evidence to reject the null hypothesis. Hence, the null hypothesis is accepted. It is confirmed that there is no significant impact of financial metrics on the share price volatility of GIPCL pre and post publication of annual reports prior to the publication date.

5.3.6 Share price return (GIPCL)

Table 5.c. Year wise share return data (GIPCL.)

| Year | Pre-return (15 days) | Post return (15 days) |
|---|---|---|
| 2010 | 2.72% | -2.18% |
| 2011 | 1.50% | 9% |
| 2012 | 4.86% | -5.96% |
| 2013 | 13.60% | 13.76% |
| 2014 | 1.37% | -3.06% |
| 2015 | 1.70% | 5.44% |
| 2016 | -1.32% | 0.38% |
| 2017 | -1.26% | -4.64% |
| 2018 | -5.11% | -3.95% |

Source: Computed by the researcher.

5.3.7 Hypothesis (Financial metrics and share price return)

Ho: There is no significant impact of financial metrics as reported in annual reports on the share price return of GIPCL.

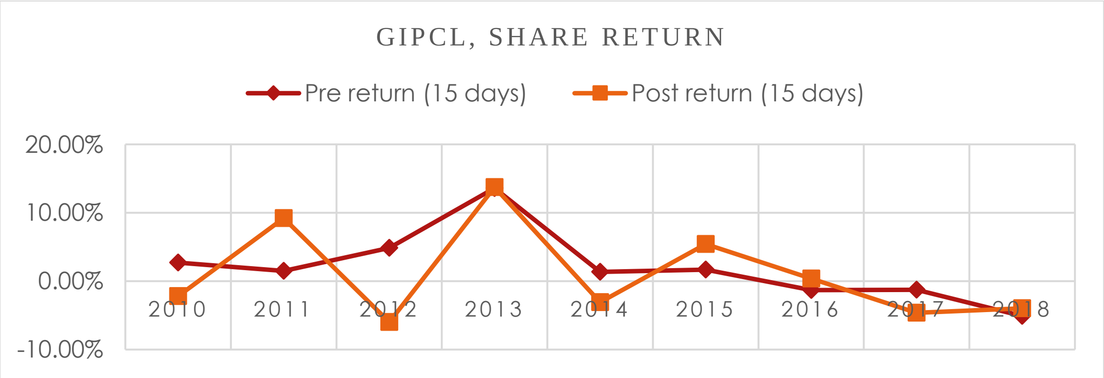
H1: There is significant impact of financial metrics as reported in annual reports on the share price return of GIPCL.

The development of hypothesis above is framed according to the objective of the study. The objective of the study is to test whether there is a significant difference on the share price return between the pre and post publication of annual report.

The sequential plotting using the data series of the pre and post period of annual report is being used below to get a clearer idea on whether there exist significant differences between the share price return of two periods.

5.3.8 GIPCL, Share price return sequential plot (pre & post annual report date)

Chart 5.k GIPCL, Share price return sequential plot




Source: Created by the researcher.

It is observed from the above Chart 5.k that in the year 2010, the pre-period share price return is higher than the post period and again in the next year that is in 2011, the post period share price return is higher than the pre-period share price return. In the year 2012, again the pattern was quite similar to the previous year in 2010, the pre-return share price was higher. The movement in the share price return is directly related with the movement in the share price. The share price is the reaction in the demand and supply of shares from the investors. GIPCL has one of the best financial performance amongst the selected power generating companies, but in this case, investors are not attracted by the financial soundness of the company, looking into the random pattern in the share price return 15 days pre and post period. It is observed that there is no specific pattern and the data series is quite random in nature, signifying that there is very less evidence supporting the impact of the financial metrics as reported in the annual reports on the share price return of GIPCL.

5.3.9 Wilcoxon signed rank test (GIPCL share price return)

The same has to be confirmed by using the statistical test. The result of Wilcoxon signed rank test is used to reject or accept the null hypothesis.

Wilcoxon signed rank test
Table 5.d (GIPCL share price return.)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2010 | 4.90% | 1 | 0.048955 | 7 | 7 |
| 2011 | -7.73% | -1 | 0.077279 | 8 | -8 |
| 2012 | 10.82% | 1 | 0.108214 | 9 | 9 |
| 2013 | -0.17% | -1 | 0.00168 | 1 | -1 |
| 2014 | 4.43% | 1 | 0.044303 | 6 | 6 |
| 2015 | -3.74% | -1 | 0.037372 | 5 | -5 |
| 2016 | -1.70% | -1 | 0.017007 | 3 | -3 |
| 2017 | 3.38% | 1 | 0.033834 | 4 | 4 |
| 2018 | -1.16% | -1 | 0.011603 | 2 | -2 |

| Positive sum | Negative sum | Test statistics | Critical value (9,.05) |
|---|---|---|---|
| 26 | -19 | 19 | 5 |

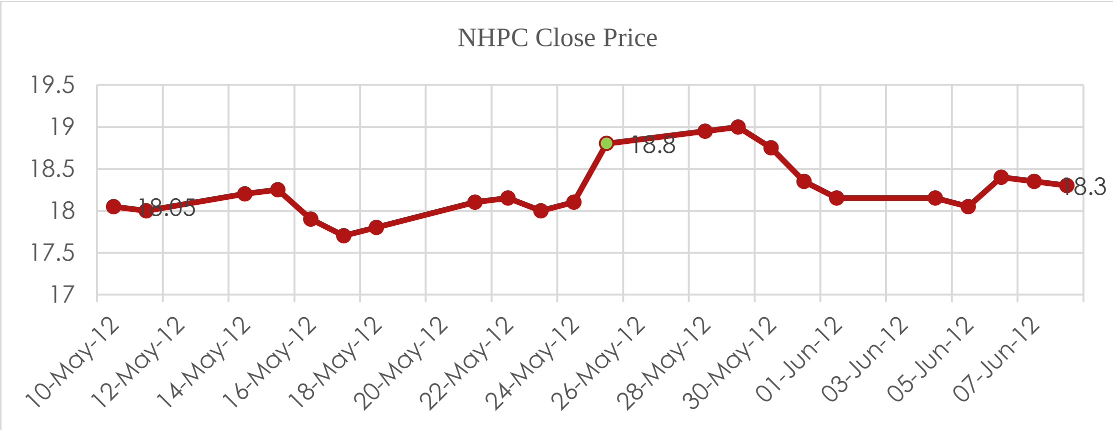
Source: Computed by the researcher.

Since the number of observations is lesser than 30 and due to the other factors, a non-parametric test has been conducted. The value of test statistics is 19 and the critical value is 5. As the test statistics is greater in value than the critical value, there is not much evidence to reject the null hypothesis, hence, the null hypothesis is accepted. It is confirmed that there is no significant impact of financial metrics as reported on the annual reports by GIPCL in its share price return.

### 5.4 NHPC

5.4.1 Sequential plot pre and post annual report publication date (NHPC)

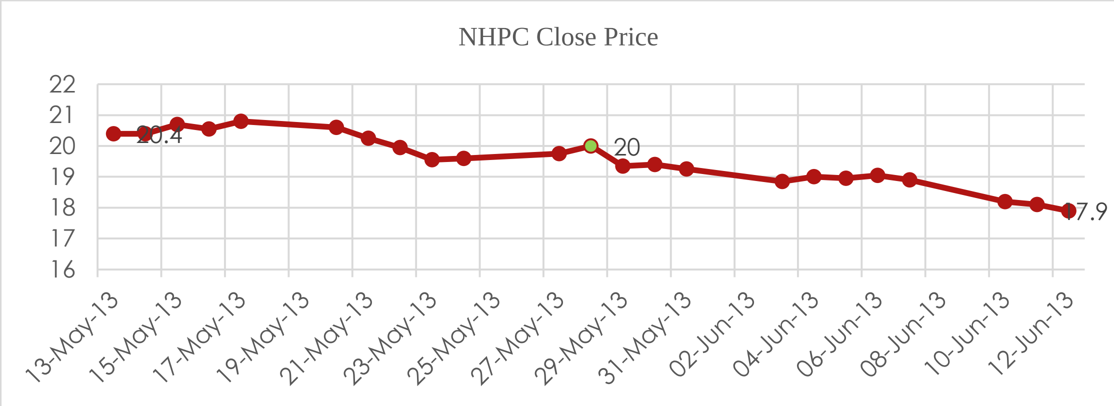
Chart: 5 (l) close price plotted before and after 2012 annual report publish date by BSE.




Source: Created by the researcher.

NHPC has a share price of Rs 18.05 before 15 days from the publication of annual report date, and on the report publication date, the share price increased a little higher to Rs 18.80, the difference was only of Rs .75, The price 15 days after the report publication date was Rs 18.30, which is lower than the value as on the report publication date. It is noted that the movement in share price is very less, it is lesser than Rs 1.

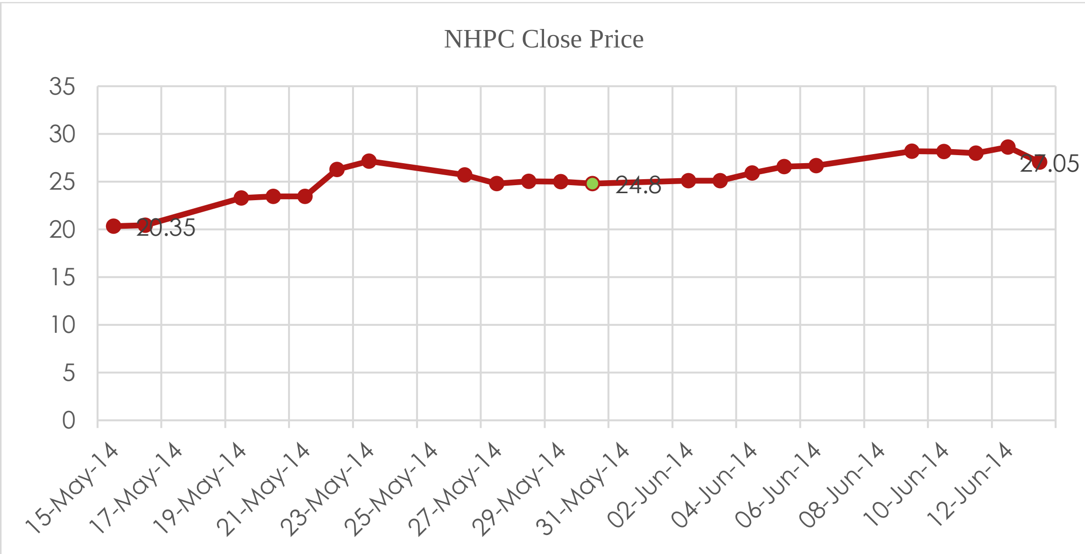
Chart: 5 (m) Close price plotted before and after 2013 annual report publish date by BSE.




Source: Created by the researcher.

It is clear from the above Chart 5 (m) that the share price of NHPC is lowest after the publication of the annual report. The value of share price was quite high comparatively before the publication of the annual report, it was Rs 20.40, and on the date of annual report publication the share price was Rs 20, but after the annual report was published the share price of NHPC declined to a low of Rs 17.9 in the year 2013. It is noted that the movement of share price in 2013 is higher as compared to 2012.

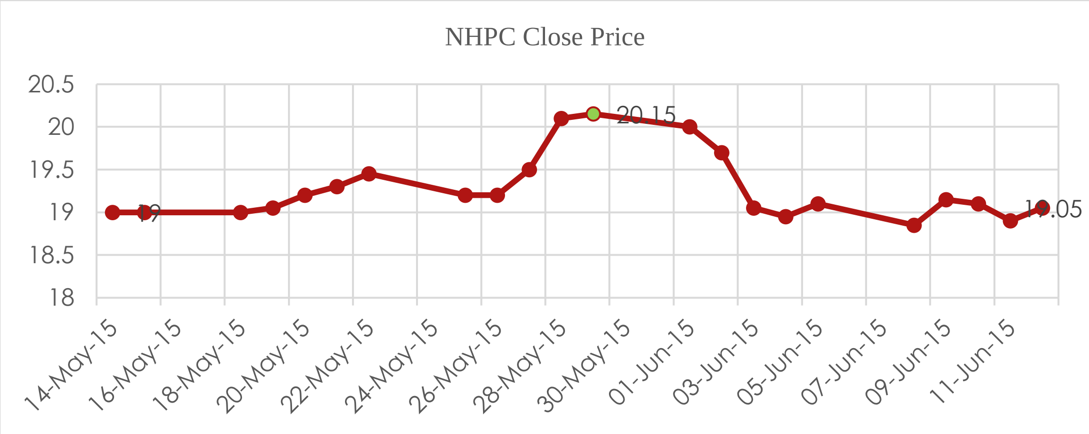
Chart: 5 (n) Close price plotted before and after 2014 annual report publish date by BSE.




Source: Created by the researcher.

The share price of NHPC 15 days prior to the publication of the annual report in the Bombay Stock Exchange was Rs 20.35 and after reaching a high of Rs 27.15 it declined to a low of Rs 24.8 on the annual report publication date. But still it was higher by Rs 4.45 as compared to that with the 15 days prior report date. After 15 days from the annual report date the share again touched the higher level of Rs 27.05. As compared to 2012, the movement in the value of share price is quite higher during 2013 and 2014.

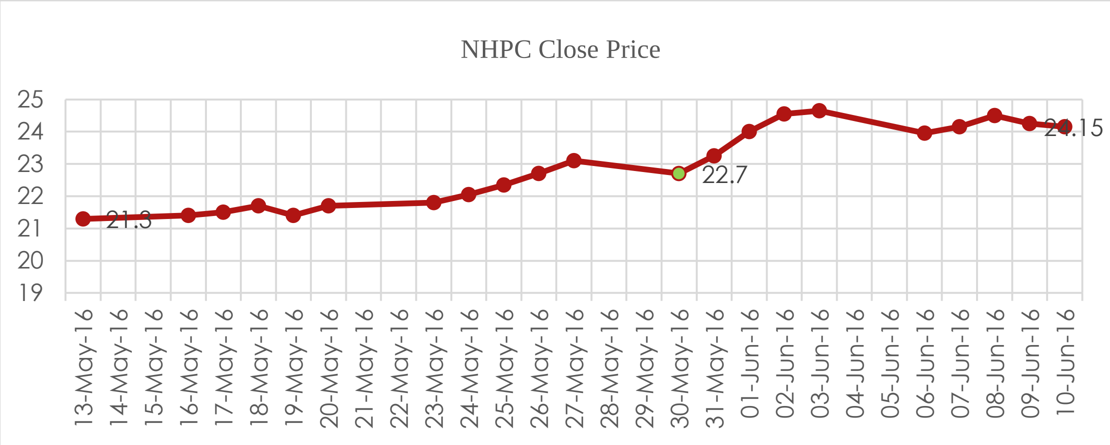
Chart: 5 (o) Close price plotted before and after 2015 annual report publish date by BSE.




Source: Created by the researcher.

The above Chart 5 (o) is not showing much movement in the share price pre and post annual report publication date. The share price of NHPC 15 days prior to the annual report publication date was just Rs 19 and in the report publication date the share value was Rs 20.15, the movement was in a difference of Rs 20.15, but again after the publication of the annual report date the share value fell to lower range of Rs 19.05. The movement in the 2015 is similar to that in the year 2012.

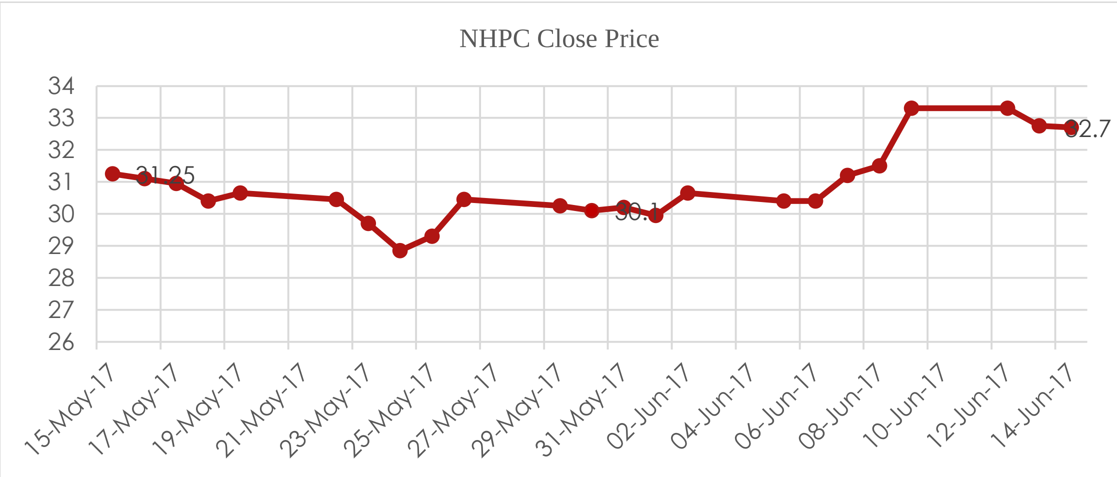
Chart: 5 (p) Close price plotted before and after 2016 annual report publish date by BSE.




Source: Created by the researcher.

It is observed in the above Chart 5(p), that the share value of NHPC is increasing continuously from the value of Rs 21.30 prior to the annual report publication date, and reached to a higher value of Rs 22.70 on the report publication date, finally the share price closed at the value of Rs 24.15 post publication date.

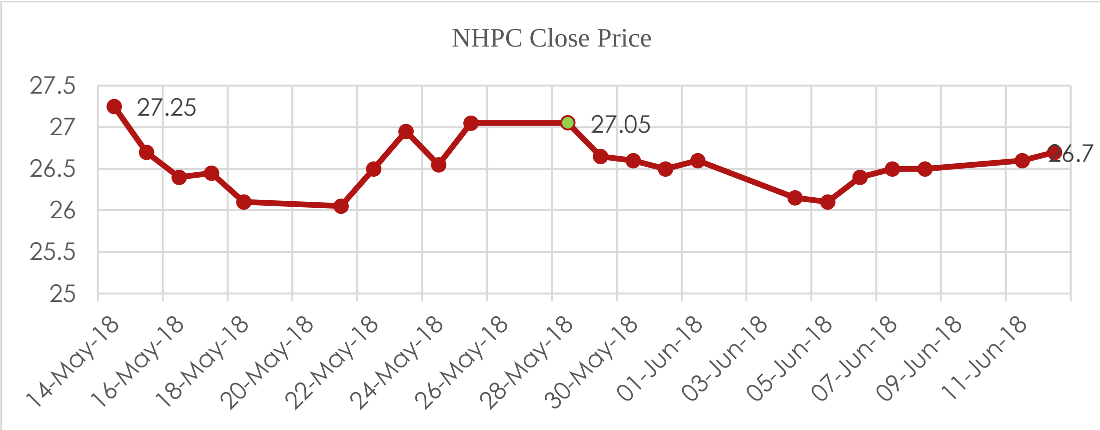
Chart: 5 (q) Close price plotted before and after 2017 annual report publish date by BSE.




Source: Created by the researcher.

It is observed from the above Chart 5 (q) that the movement in the share value of NHPC is not much higher. Fifteen days prior to the publication of the annual report the share value was Rs 31.25 and on the day of the publication of annual report the share price fell to a low of Rs 30.1, but the share price recovered after the publication of the annual report and it reached Rs 32.70.

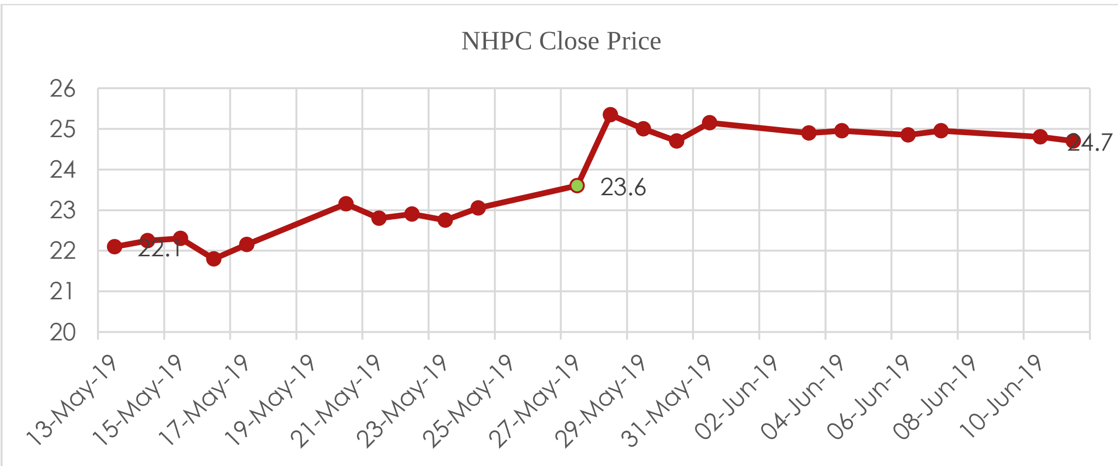
Chart: 5 (r) Close price plotted before and after 2018 annual report publish date by BSE.




Source: Created by the researcher.

In the year 2018, the share value of NHPC 15 days before the publication of annual report was Rs 27.25 and reached a low of Rs 26.05, after which it recovered to a price of Rs 27.05 on the date of annual report publication. Again, it declined to a price of Rs 26.70 post annual report publication date.

Chart: 5 (s) Close price plotted before and after 2019 annual report publish date by BSE.




Source: Created by the researcher.

There was a sharp movement in the share price of NHPC on a day after the annual report was published, the share value increased from Rs 23.60 to Rs 25.35, but after the sharp movement the share price movement was flat and closed at the price of Rs 24.70 after 15 days from the annual report publication date. It is also noted that the share price of NHPC 15 days prior to the publication of the annual report was only Rs 22.10.

### 5.4.2 Share price volatility (NHPC)

Table 5.e Year wise volatility data (NHPC)

| Year | Pre-report share price volatility (15 days) | Post-report shares price volatility (15 days) |
|---|---|---|
| 2011 | 3.48% | 0.48% |
| 2012 | 1.21% | 1.12% |
| 2013 | 1.58% | 5.04% |
| 2014 | 0.52% | 0.84% |
| 2015 | 1.61% | 0.65% |
| 2016 | 0.74% | 0.67% |
| 2017 | 0.47% | 0.49% |
| 2018 | 2.20% | 0.52% |

Source: Computed by the researcher.

### 5.4.3 Hypothesis (Financial metrics and share price volatility)

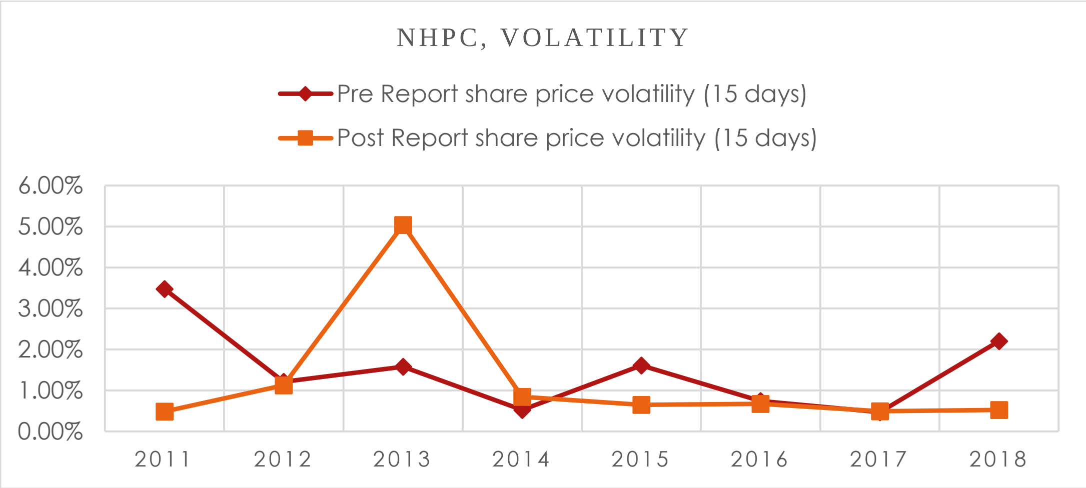
Ho: There is no significant impact of financial metrics as reported in annual reports on the share price volatility of NHPC.

H1: There is significant impact of financial metrics as reported in annual reports on the share price volatility of NHPC.

The objective of the study is to check if any significant difference is present in the share price volatility of NHPC before and after the presentation of the annual report. In order to justify the objective of the study, the above-mentioned hypothesis is formed. The hypothesis will be justified following two techniques, one way is by sequential plotting of the pre and post share price volatility data series and another method is by the statistical method, Wilcoxon signed rank test.

5.4.4 NHPC, Share price volatility sequential plot (pre & post annual report date)

Chart 5.t NHPC, Share price volatility sequential plot




Source: Created by the researcher.

The pre and post period volatility for NHPC is plotted in the above Chart 5.t. It is noted from the above observation that the movement in the data series of share price volatility post and pre-annual report publication date is random. There is no clear evidence showcasing that the data series relating to volatility in a particular period is higher. In the year 2011 the volatility was higher in the pre-report period as compared to the post-report period, again in the year 2013 it was just the opposite. Hence, there is no particular pattern where the volatility is higher or lower in any of two pre and post periods.

5.4.5 Wilcoxon signed rank test (NHPC share price volatility)

Wilcoxon signed rank test
Table 5.f (NHPC share price volatility)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | 3.00% | 1 | 0.03 | 7 | 7 |
| 2012 | 0.09% | 1 | 0.0009 | 3 | 3 |
| 2013 | -3.46% | -1 | 0.0346 | 8 | -8 |
| 2014 | -0.32% | -1 | 0.0032 | 4 | -4 |
| 2015 | 0.96% | 1 | 0.0096 | 5 | 5 |
| 2016 | 0.07% | 1 | 0.0007 | 2 | 2 |
| 2017 | -0.02% | -1 | 0.0002 | 1 | -1 |
| 2018 | 1.68% | 1 | 0.0168 | 6 | 6 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 23 | -13 | 13 | 3 |

Source: Computed by the researcher.

The test statistics in the above Table 5.f is quite clear and give no evidence to reject the null hypothesis. The test statistics is 13, which is higher than the critical value of 3, hence, there is not enough evidence to reject the null hypothesis. It is thus confirmed that there is no significant difference in the share price volatility of NHPC pre and post publication of annual report.

5.4.6 Share price return (NHPC)

Table 5.g Year wise share return data (NHPC.)

| Year | Pre-return (15 days) | Post return (15 days) |
|---|---|---|
| 2011 | 4.16% | -2.66% |
| 2012 | -1.96% | -10.50% |
| 2013 | 21.87% | 9.07% |
| 2014 | 6.05% | -5.46% |
| 2015 | 6.57% | 6.39% |
| 2016 | -3.68% | 8.64% |
| 2017 | -0.73% | -1.29% |
| 2018 | 6.79% | 4.66% |

Source: Computed by the researcher.

5.4.7 Hypothesis (financial metrics and share price return)

Ho: There is no significant impact of financial metrics on the share price return of NHPC.

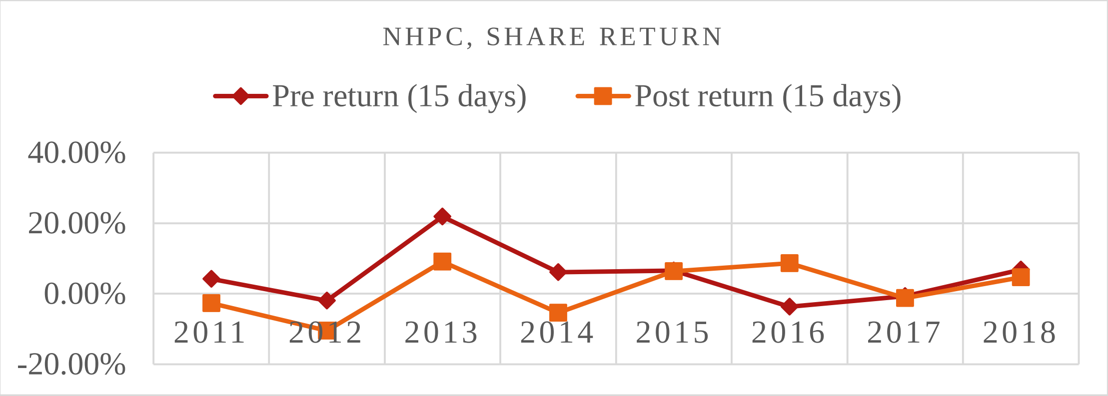
H1: There is significant impact of financial metrics on the share price return of NHPC.

The hypothesis which is developed above clearly represents the objective of the study. The main objective is to check whether there exists some significant different between the two-share price return pre and post publication of annual report by the NHPC.

NHPC, Share price return sequential plot (pre & post annual report date

5.4.8 GIPCL, Share price return sequential plot (pre & post annual report date)

Chart 5.u GIPCL, Share price return sequential plot




Source: Created by the researcher.

It is noted in the above chart that the share price return of NHPC prior to annual report publication date is continuously higher than the post period returns from the year 2011 till 2014, but after 2014 the pattern is different. In order to confirm whether there exists a significant difference, Wilcoxon signed rank test has been conducted below.

5.4.9 Wilcoxon signed rank test (GIPCL share price return)

Wilcoxon signed rank test
Table 5.h (NHPC share price return)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | 6.81% | 1 | 0.068147 | 4 | 4 |
| 2012 | 8.54% | 1 | 0.085392 | 5 | 5 |
| 2013 | 12.79% | 1 | 0.127947 | 8 | 8 |
| 2014 | 11.51% | 1 | 0.115117 | 6 | 6 |
| 2015 | 0.19% | 1 | 0.001851 | 1 | 1 |
| 2016 | -12.32% | -1 | 0.123179 | 7 | -7 |
| 2017 | 0.56% | 1 | 0.0056 | 2 | 2 |
| 2018 | 2.13% | 1 | 0.021263 | 3 | 3 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 29 | -7 | 7 | 3 |

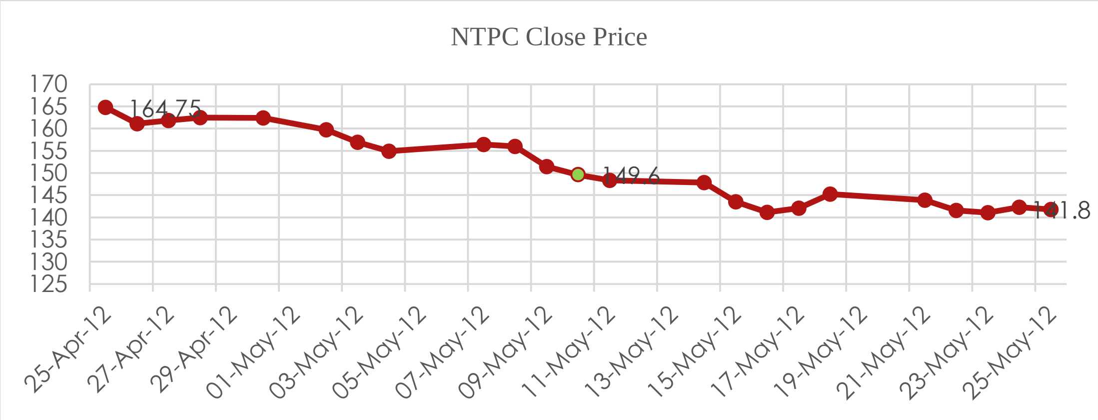
Source: Computed by the researcher.

Even though the chart was showing some kind of differences, the Wilcoxon signed rank test is not supporting it completely, as the test statistics is still higher than the critical value. The test statistics in the above Table 5.h is 7, which is higher than the critical value of 3. Hence, there is not much evidence to reject the null hypothesis. So, it is confirmed that the financial metrics as reported in the annual reports by NHPC does make a significant difference in the share price return.

## 5.5 NTPC

5.5.1 Sequential plot pre and post annual report publication date (NTPC)

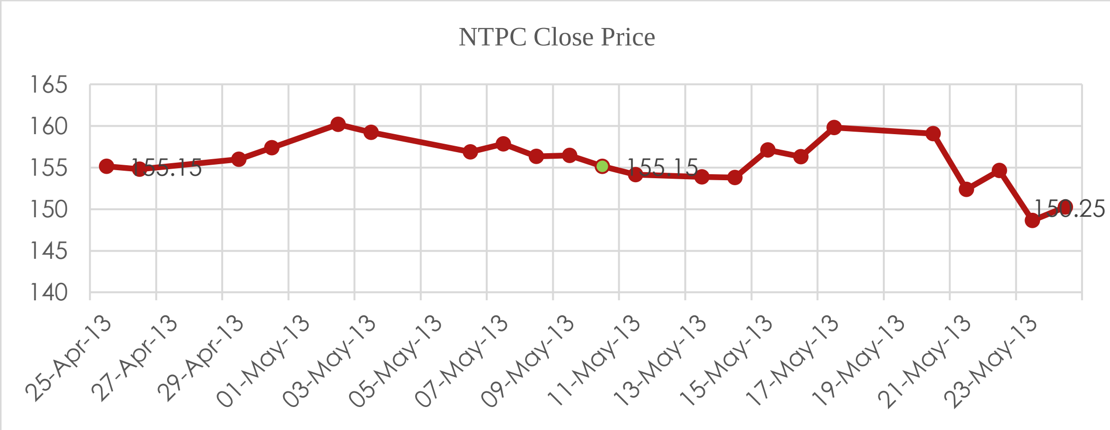
Chart: 5 (v) Close price plotted before and after 2012 annual report publish date by BSE.




Source: Created by the researcher.

The NTPC share price 15 days prior to the annual report publication date was Rs 164.75 and on the date when the report got published by the exchange the share price ended at Rs 149.6. After the annual report got published the share price closed at Rs 141.8. It is noted from the above Chart 5 (v) that the share price of NTPC is continuously falling before and after the annual report publication date.

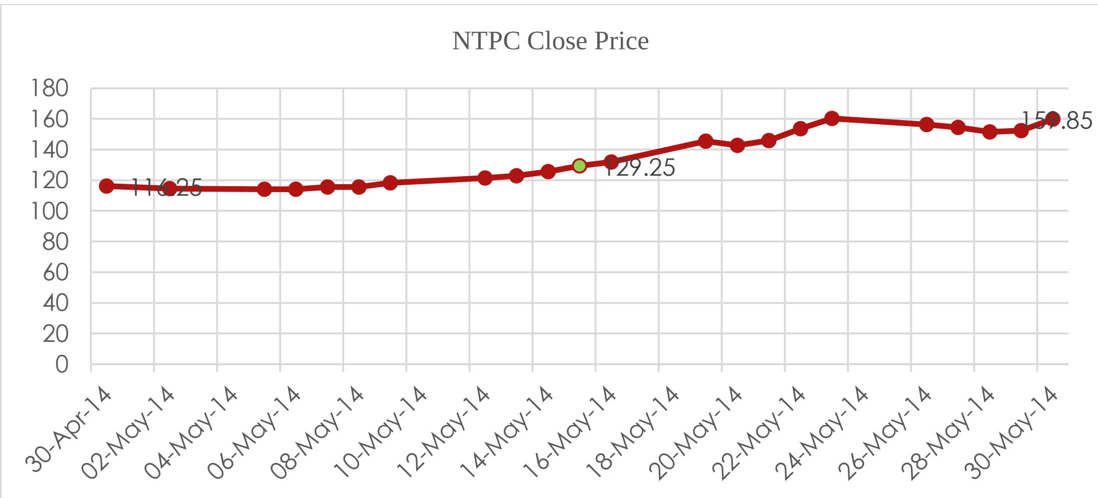
Chart: 5 (w) Close price plotted before and after 2013 annual report publish date by BSE.




Source: Created by the researcher.

Observing the trend in the above Chart 5 (w) for the year 2013, it is noted that the share price of NTPC is following the same kind of trend as in the year 2012. The share price fell to Rs 150.25 post annual report publication date from the price of Rs 155.15. The share price of NTPC 15 days prior to the annual report publication date was also Rs 155.15.

Chart: 5 (x) Close price plotted before and after 2014 annual report publish date by BSE.

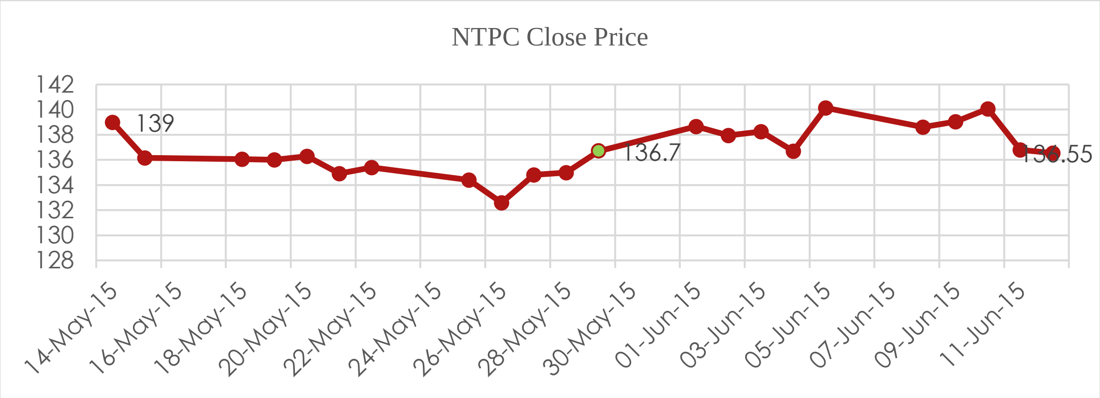



Source: Created by the researcher.

After observing the above Chart 5 (x), the upward trend of share price is clearly visible. The share price prior to 15 days from the publication of the annual reports was Rs

116.25 and on the date of publication the share price rose to Rs 129.25 after which it reached the level of Rs 159.85 post publication of the annual reports in the year 2014.

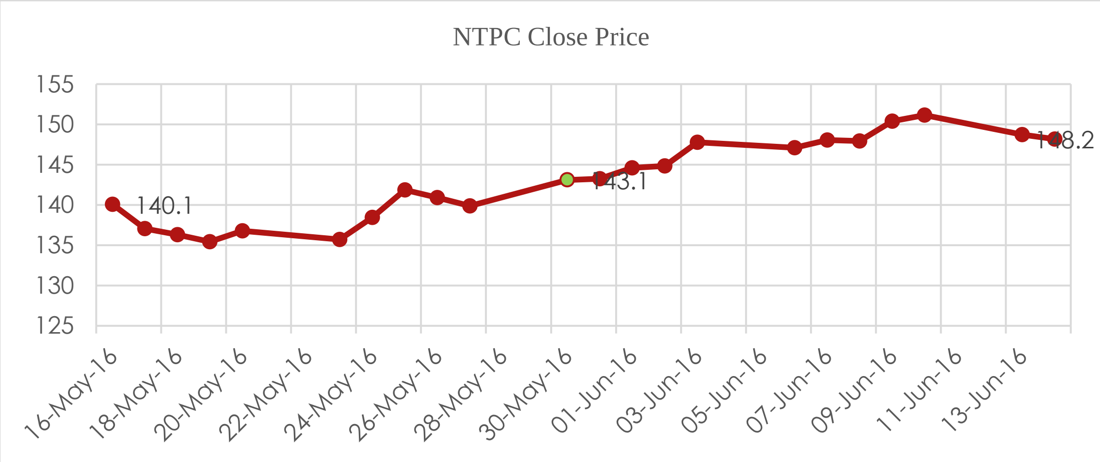
Chart: 5 (y) Close price plotted before and after 2015 annual report publish date by BSE.




Source: Created by the researcher.

The movement of share price was flat in the year 2015, as depicted in the Chart 5 (y). The share price was Rs 139 prior to the publication of annual report by the exchange, the share price of NTPC was in the same level of Rs 136.77 and 136.55 on the publication of annual report date and 15 days prior to the publication of the annual report date.

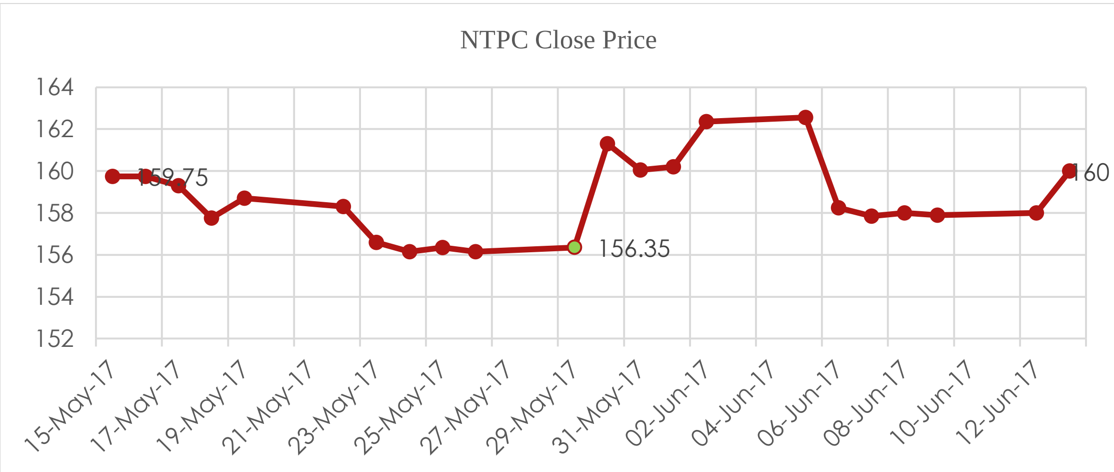
Chart: 5 (z) Close price plotted before and after 2016 annual report publish date by BSE.




Source: Created by the researcher.

The NTPC is showing the upward trend as observed from the Chart 5 (z), the share price of NTPC rose from the level of Rs 140.1 to the level of 148.2. During the annual report publication day, the share price was in the level of Rs 143.1. It is noted that the NTPC is having an upward trend during the report publication time period of 30 days (15 days pre-report and 15 days post repot).

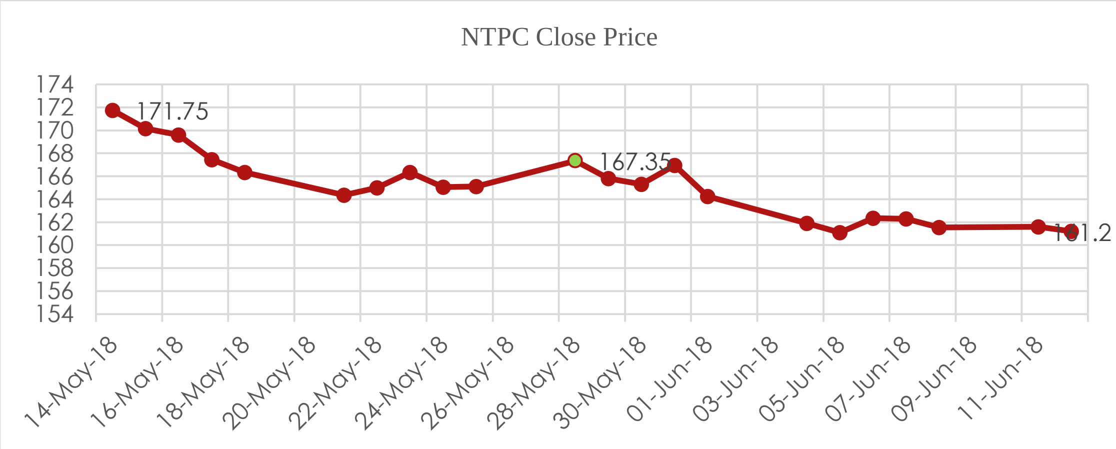
Chart: 5 (aa) Close price plotted before and after 2017 annual report publish date by BSE.




Source: Created by the researcher.

The movement of share price for the NTPC is somewhat flat as reflected by the Chart 5 (aa) above. The share price was Rs 159.75 and at the report publication date the share price was Rs 156.35 after which the share price post-report publication date reached Rs 160.

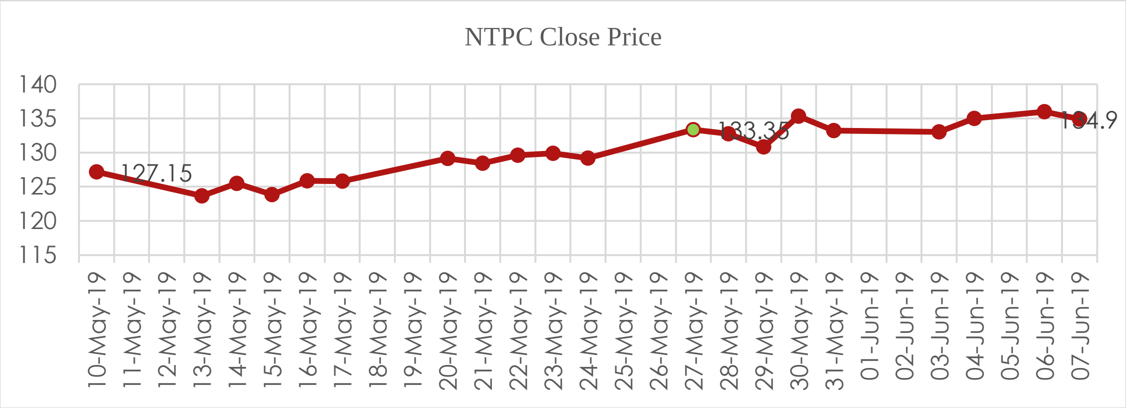
Chart: 5 (ab) Close price plotted before and after 2018 annual report publish date by BSE.




Source: Created by the researcher.

In the year 2018, NTPC had a share price of Rs 171.75 after which on the date of report publication it reached at the level of Rs 167.35. As depicted by the above Chart 5 (ab), the downward trend is clearly visible. The share price of NTPC 15 days after the annual report publication date was Rs 161.2.

Chart: 5 (ac) Close price plotted before and after 2019 annual report publish date by BSE.




Source: Created by the researcher.

According to the above Chart 5 (ac), the upward trend is clearly visible. The share price of NTPC was Rs 127.15 which rose to Rs 133.35 on the date of the annual report publication. After 15 days post the annual report publication date, the share price of NTPC touched the level of Rs 134.90.

5.5.2 Share price volatility (NTPC)

Table 5.i Year wise volatility data (NTPC.)

| Year | Pre-report share price volatility (15 days) | Post-report shares price volatility (15 days) |
|---|---|---|
| 2011 | 1.47% | 0.56% |
| 2012 | 0.41% | 1.17% |
| 2013 | 2.68% | 4.57% |
| 2014 | 1.20% | 1.20% |
| 2015 | 2.10% | 0.53% |
| 2016 | 0.36% | 1.20% |
| 2017 | 1.27% | 0.43% |
| 2018 | 2.90% | 86.00% |

Source: Computed by the researcher.

5.5.3 Hypothesis (financial metrics and share price volatility)

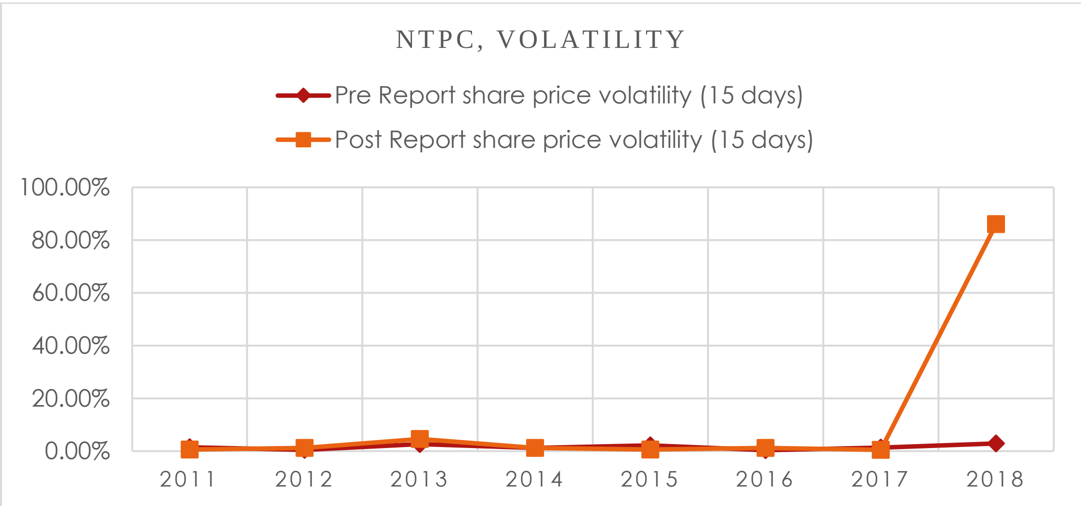
Ho: There is no significant impact of financial metrics as reported in annual reports on the share price volatility of NTPC.

H1: There is significant impact of financial metrics as reported in annual reports on the share price volatility of NTPC.

The objective of the study is to check if any significant difference exists on the share price volatility pre and post publication of annual report date. If the significant differences exist than it will be confirmed that there exists the impact of various financial metrics as reported in the annual report on the share price volatility of NTPC.

5.5.4 NTPC, Share price volatility sequential plot (pre & post annual report date)

Chart 5. ad, NTPC, Share price volatility sequential plot




Source: Created by the researcher.

The data series related to the share price volatility of NTPC pre and post publication date is aligned in the same level from the year 2011 to 2017. There is only a significant increase in the share price volatility post-report date in the year 2018. It means that there is no significant difference between the two-share price volatility pre and post annual report publication date.

### 5.5.5 Wilcoxon signed rank test (NTPC share price volatility)

Wilcoxon signed rank test
Table 5.j (NTPC share price volatility)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | 0.91% | 1 | 0.0091 | 5 | 5 |
| 2012 | -0.76% | -1 | 0.0076 | 2 | -2 |
| 2013 | -1.89% | -1 | 0.0189 | 7 | -7 |
| 2014 | 0.00% | -1 | 0 | 1 | -1 |
| 2015 | 1.57% | 1 | 0.0157 | 6 | 6 |
| 2016 | -0.84% | -1 | 0.0084 | 4 | -4 |
| 2017 | 0.84% | 1 | 0.0084 | 3 | 3 |
| 2018 | -83.10% | -1 | 0.831 | 8 | -8 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 14 | -22 | 22 | 3 |

Source: Computed by the researcher.

In order to confirm the above statement, the Wilcoxon signed rank test has been conducted. It is found that the test statistics which has a value of 22 is more than the critical value of 3. There is no significant evidence to reject the null hypothesis as the critical value is lesser than the value of test statistics. Hence, it is confirmed that, there is no significant impact of financial metrics on the share price volatility of NTPC.

### 5.5.6 Share price return (NTPC)

Table 5.k Year wise share return data.

| Year | Pre-return (15 days) | Post return (15 days) |
|---|---|---|
| 2010 | -9.20% | -5.21% |
| 2011 | -0.81% | -2.37% |
| 2012 | 11.00% | 23.00% |
| 2013 | -1.65% | -0.11% |
| 2014 | 2.14% | 3.56% |
| 2015 | -2.13% | 2.33% |
| 2016 | -2.56% | -3.67% |
| 2017 | 4.88% | 1.16% |
| 2018 | -9.20% | -5.21% |

Source: Computed by the researcher.

5.5.7 Hypothesis (financial metrics and share price return)

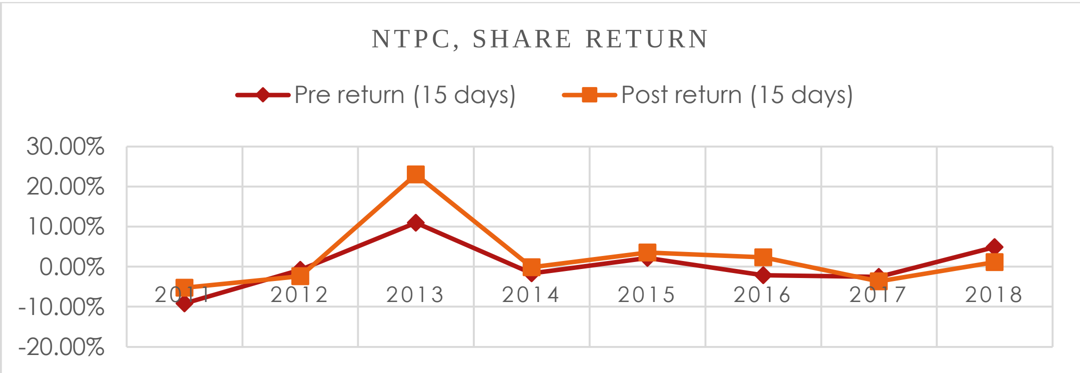
Ho: There is no significant impact of financial metrics as reported in annual reports on the share price return of NHPC.

H1: There is significant impact of financial metrics as reported in annual reports on the share price return of NHPC.

The objective of this study is to understand if the share price return is affected by the presentation of the annual report by the NTPC. Accordingly, the hypothesis has been framed.

5.5.8 NTPC, Share price return sequential plot (pre & post annual report date)

Chart 5 ae, NTPC, Share price return sequential plot




Source: Created by the researcher.

After observing the plots in the above Chart 5.ae, it is found that the data are much more random and are not specific to any particular pattern. In the year 2011, the share price return was higher post-report period and in the year 2012 it was just the opposite. The data series related to share price return is random in the above Chart 5ae. This is indicating that the share price return is not affected by the financial metrics as reported in the annual financial reports by the company.

5.5.9 Wilcoxon signed rank test (NTPC share price return)

Wilcoxon signed rank test
Table 5.l (NTPC share price return)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | -3.98% | -1 | 0.039818 | 6 | -6 |
| 2012 | 1.57% | 1 | 0.01566 | 4 | 4 |
| 2013 | -12.00% | -1 | 0.12 | 8 | -8 |
| 2014 | -1.54% | -1 | 0.015449 | 3 | -3 |
| 2015 | -1.42% | -1 | 0.014226 | 2 | -2 |
| 2016 | -4.46% | -1 | 0.044628 | 7 | -7 |
| 2017 | 1.11% | 1 | 0.011131 | 1 | 1 |
| 2018 | 3.71% | 1 | 0.037138 | 5 | 5 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 10 | -26 | 26 | 3 |

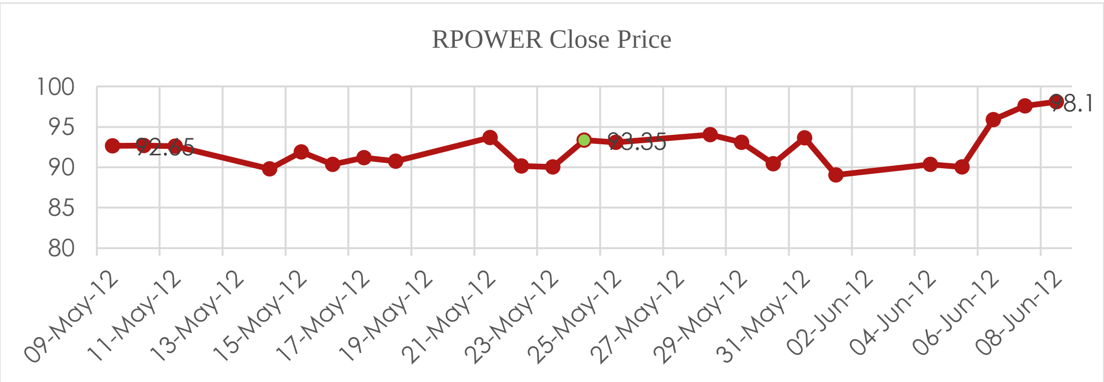
Source: Computed by the researcher.

The Wilcoxon signed rank test is conducted in order to accept or reject the null hypothesis. According to the value of the test statistics and the critical value there is very less evidence to reject the null hypothesis, hence, it is confirmed that there is no significant impact of financial metrics on the share price return of NHPC.

**5.6 RPOWER**

5.6.1 Sequential plot pre and post annual report publication date (RPOWER)

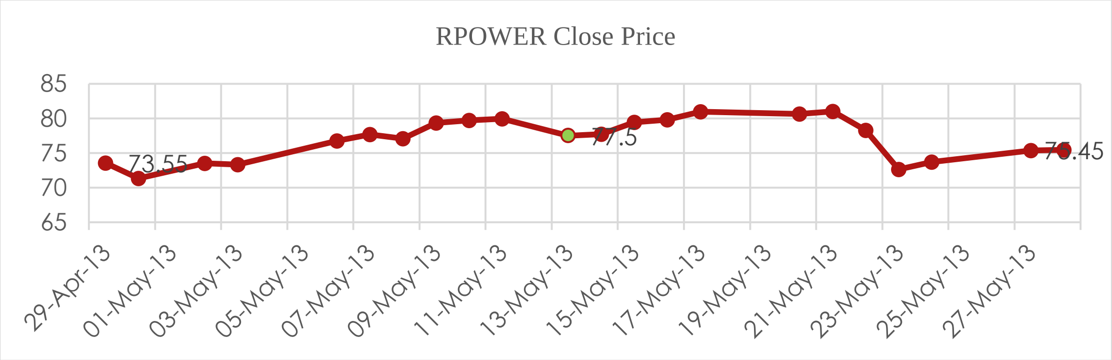
Chart: 5 (af) Close price plotted before and after 2012 annual report publish date by BSE.




Source: Created by the researcher.

The movement of the share price of RPOWER is flat as presented by the Chart 5 (af), the share price 15 days prior to the presentation of the annual report was Rs 92.65 and on the report presentation day, the share price was Rs 93.35. After 15 days from the report publication date, the share price was in the level of Rs 98.1. The share price of NTPC 15 days after the report publication date was comparatively higher.

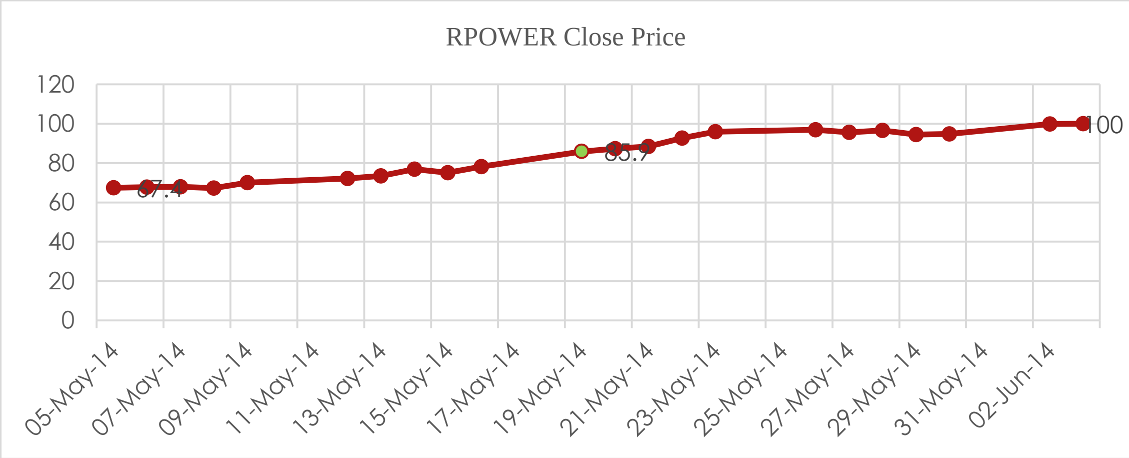
Chart: 5 (ag) Close price plotted before and after 2013 annual report publish date by BSE.




Source: Created by the researcher.

The movement of share price of RPOWER is increasing before the report date and after the report date the share price of RPOWER started to decline. The share price prior to the report date was Rs 73.55 and in the report date the share price was Rs 77.5, post-report publication date the share price was Rs 75.45.

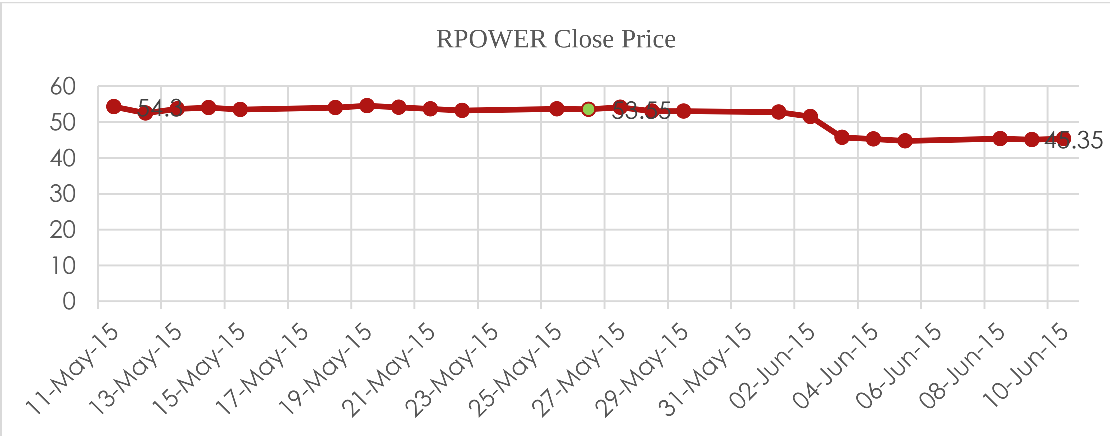
Chart: 5 (ah) Close price plotted before and after 2014 annual report publish date by BSE.




Source: Created by the researcher.

The RPOWER is having a sharp upward trend from the pre-report period to the post-report period. The share price was Rs 67.4 prior to 15 days from the annual report publication date and it rose to the level of Rs 85.90. After the publication of the annual report in the exchange the share price reached to a height of Rs 100.

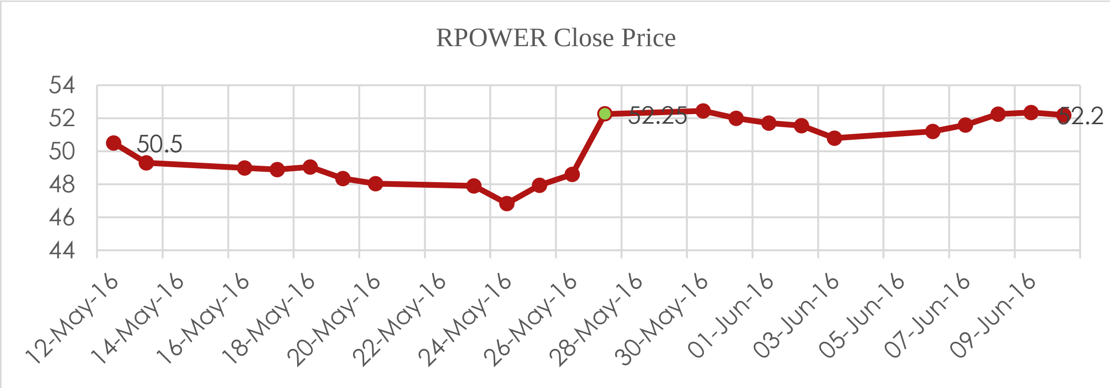
Chart: 5 (ai) Close price plotted before and after 2015 annual report publish date by BSE.




Source: Created by the researcher.

It is noted during the year 2014, the share price of RPOWER was around to Rs 100 but in the year 2015 as depicted in the Chart 5 (ai), the share price is only half the value i.e., it is only in the range of Rs 45–50. The share price of RPOWER, 15 days prior to the annual report publication date was Rs 54.3 and was Rs 53.55 on the report presentation day. It fell to a low of Rs 45.35 after the publication of the annual report within the span of 15 days.

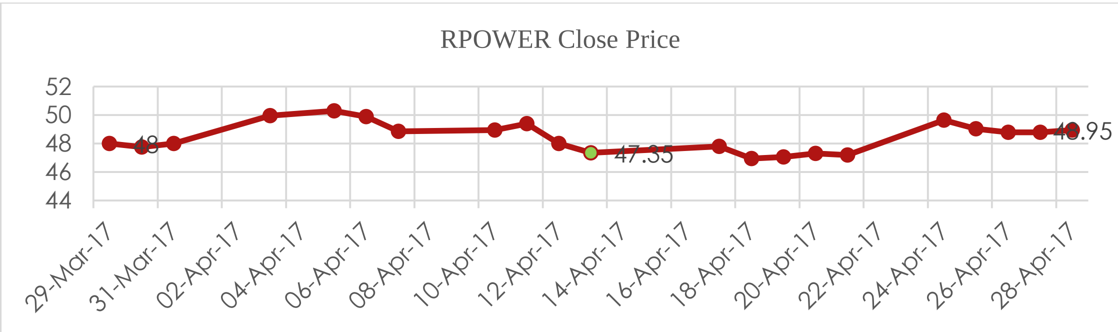
Chart: 5 (aj) Close price plotted before and after 2016 annual report publish date by BSE.




Source: Created by the researcher.

The share price of RPOWER was Rs 50.5 before 15 days from the publication of the annual report and it was Rs 52.25 on the date of the report presentation day, after which it settled in the same level of Rs 52.2 after the annual report presentation date.

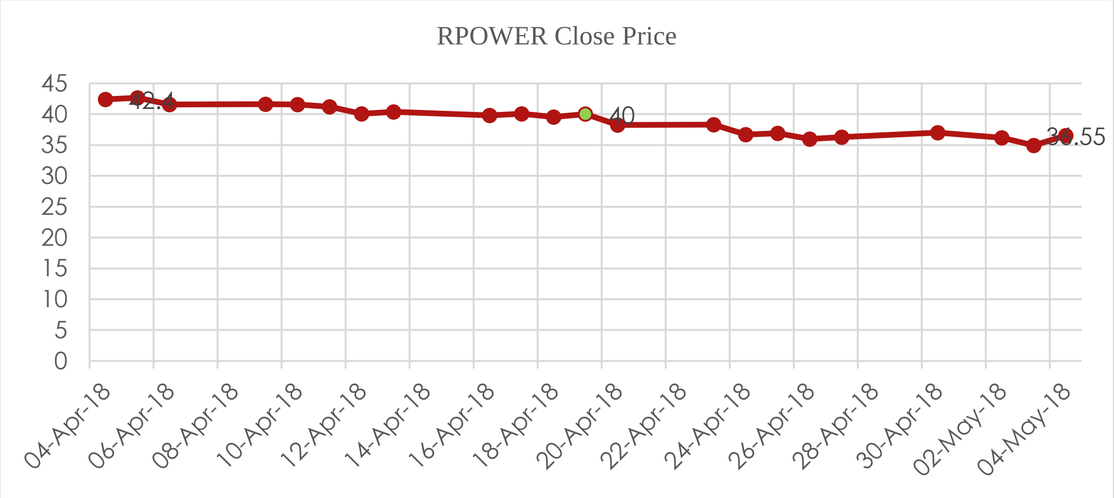
Chart: 5 (ak) Close price plotted before and after 2017 annual report publish date by BSE.




Source: Created by the researcher.

After observing the data in the above Chart 5 (ak), it is found that the share price of RPOWER is Rs 48 and on the publication date the share price was Rs 47.35. There is no drastic change in the share price between the pre-period and on the report publication date. After the annual report was published, the share price post-report publication date was Rs 48.95.

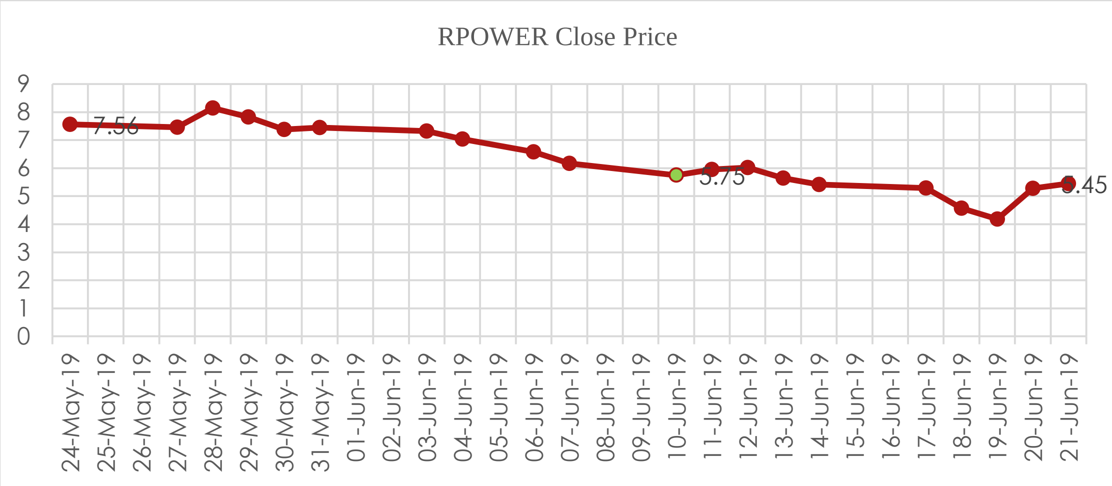
Chart: 5 (al) Close price plotted before and after 2018 annual report publish date by BSE.




Source: Created by the researcher.

In the year 2018, the share price of RPOWER was Rs 42.4 before 15 days from the annual report publication date and it reached to Rs 40 on the report publication date. The share price fell to a low of Rs 36.55 after 15 days from the date of the annual report publication date.

Chart: 5 (am) Close price plotted before and after 2019 annual report publish date by BSE.




Source: Created by the researcher.

The down trend of the share price of RPOWER is clearly visible after checking the above Chart 5 (am). The share price of RPOWER reached to value of only Rs 7.56 from a onetime value of around Rs 100 per share in the year 2014. Since then every year the share price of RPOWER has been gradually declining. This may be due to the weaker financial performance by the RPOWER.

### 5.6.2 Share price volatility (RPOWER)

Table 5.m Year wise volatility data.

| Year | Pre-report share price volatility (15 days) | Post-report shares price volatility (15 days) |
|---|---|---|
| 2011 | 3.34% | 0.98% |
| 2012 | 2.81% | 0.81% |
| 2013 | 8.84% | 0.78% |
| 2014 | 0.48% | 1.09% |
| 2015 | 6.73% | 0.45% |
| 2016 | 1.33% | 0.62% |
| 2017 | 1.12% | 4.14% |
| 2018 | 6.21% | 4.12% |

Source: Computed by the researcher.

5.6.3 Hypothesis (Financial metrics and share price volatility)

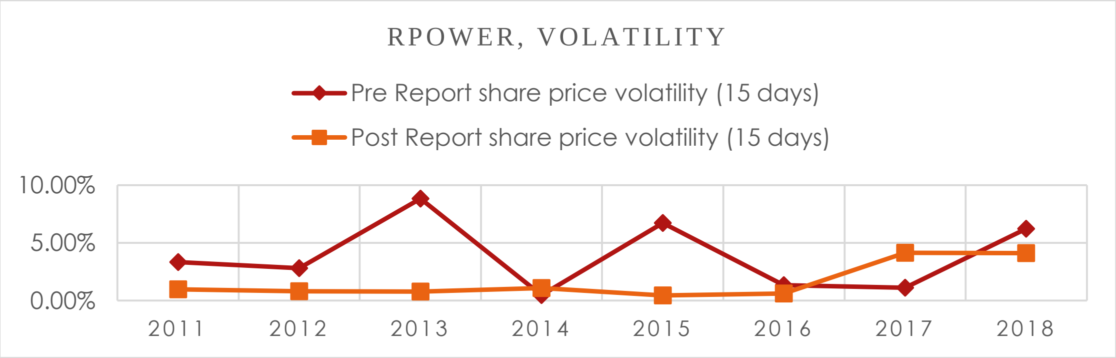
Ho: There is no significant impact of financial metrics as reported in annual reports on the share price volatility of RPOWER.

H1: There is significant impact of financial metrics as reported in annual reports on the share price volatility of RPOWER.

In order to accept or reject the null hypothesis as formed, considering the main objective of the study, Wilcoxon signed rank test will be conducted. Before that the sequential plotting of the data series relating to the volatility will be plotted.

5.6.4 RPOWER, Share price volatility sequential plot (pre & post annual report date)

Chart 5 ao, RPOWER, Share price volatility sequential plot




Source: Created by the researcher.

From the year 2011 to 2013, the trend is very clear, the volatility of the share price of RPOWER is higher in the pre-report period as compared to the post-report period. After that the pattern is not present and the data series is quite random.

5.6.5 Wilcoxon signed rank test (RPOWER share price volatility)

Wilcoxon signed rank test
Table 5.n (RPOWER share price volatility)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | 2.36% | 1 | 0.0236 | 5 | 5 |
| 2012 | 2.00% | 1 | 0.02 | 3 | 3 |
| 2013 | 8.06% | 1 | 0.0806 | 6 | 6 |
| 2014 | -0.61% | -1 | 0.0061 | 1 | -1 |
| 2015 | 6.28% | 1 | 0.0628 | 4 | 4 |
| 2016 | 0.71% | 1 | 0.0071 | 1 | 1 |
| 2017 | -3.02% | -1 | 0.0302 | 2 | -2 |
| 2018 | 2.09% | 1 | 0.0209 | 1 | 1 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 20 | -3 | 3 | 3 |

Source: Computed by the researcher.

The test statistics is equal to the critical value. The value of both the test statistics and the critical value is 3. Still there is no significant evidence to reject the null hypothesis, as the test statistics value is not greater than the critical value. Hence, it is accepted that there is no significant impact of financial metrics on the share price volatility of RPOWER.

5.6.6 Share price return (RPOWER)

Table 5.o Year wise share return data (RPOWER.)

| Year | Pre-return (15 days) | Post return (15 days) |
|---|---|---|
| 2011 | 0.76% | 5.09% |
| 2012 | 5.37% | -2.65% |
| 2013 | 27.45% | 16.41% |
| 2014 | -1.38% | -15.31% |
| 2015 | 3.47% | -0.10% |
| 2016 | -1.35% | 3.38% |
| 2017 | -5.66% | -8.63% |
| 2018 | -23.94% | -5.22% |

Source: Computed by the researcher.

5.6.7 Hypothesis (financial metrics and share price return)

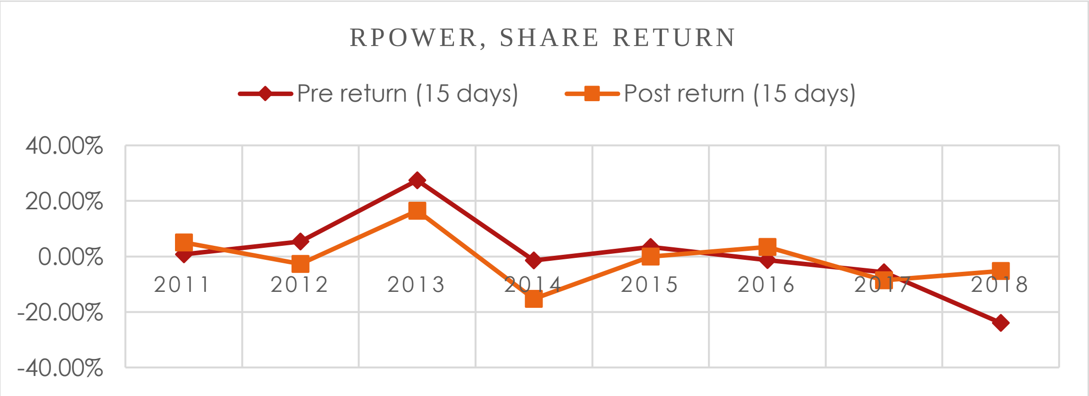
Ho: There is no significant impact of financial metrics as reported in annual report on the share price return of RPOWER.

H1: There is significant impact of financial metrics as reported in annual report on the share price return of RPOWER.

Wilcoxon signed rank test is used to reject or accept the null hypothesis. The null hypothesis developed for this study is that there is no significant impact of financial metrics on the share price return of RPOWER. Sequential plotting of the data series is also created to have a clearer view before using the statistical techniques.

5.6.8 NTPC, Share price return sequential plot (pre & post annual report date)

Chart 5 ap, NTPC, Share price return sequential plot




Source: Created by the researcher.

There is no specific pattern present in the above data set related to the share price return of the RPOWER, pre- and post-report presentation date. The data is much more random, so the inference can be that the presentation of annual report is not affecting the share price return of RPOWER.

5.6.9 Wilcoxon signed rank test (RPOWER share price return)

Wilcoxon signed rank test
Table 5.p (RPOWER share price return.)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | -4.33% | -1 | 0.043328 | 3 | -3 |
| 2012 | 8.02% | 1 | 0.080157 | 4 | 4 |
| 2013 | 11.03% | 1 | 0.110336 | 4 | 4 |
| 2014 | 13.93% | 1 | 0.139316 | 4 | 4 |
| 2015 | 3.56% | 1 | 0.03561 | 2 | 2 |
| 2016 | -4.73% | -1 | 0.047333 | 2 | -2 |
| 2017 | 2.96% | 1 | 0.029646 | 1 | 1 |
| 2018 | -18.72% | -1 | 0.187244 | 1 | -1 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 15 | -6 | 6 | 3 |

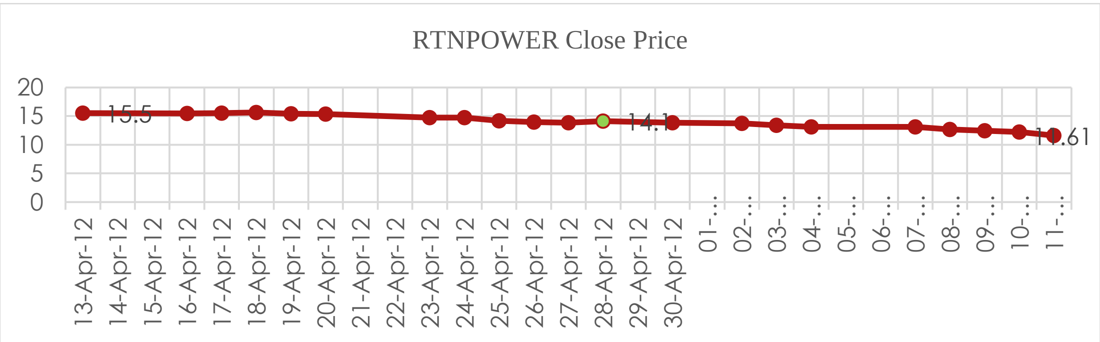
Source: Computed by the researcher.

There is very less evidence to reject the null hypothesis as the test statistics is higher than the critical value. The test statistics have the value of 6 which is higher than the critical value of 3, so the null hypothesis is accepted. Hence, it is confirmed that there is no significant impact of financial metrics on the share price return of RPOWER.

## 5.7 RTNPOWER

5.7.1 Sequential plot pre and post annual report publication date (RTNPOWER)

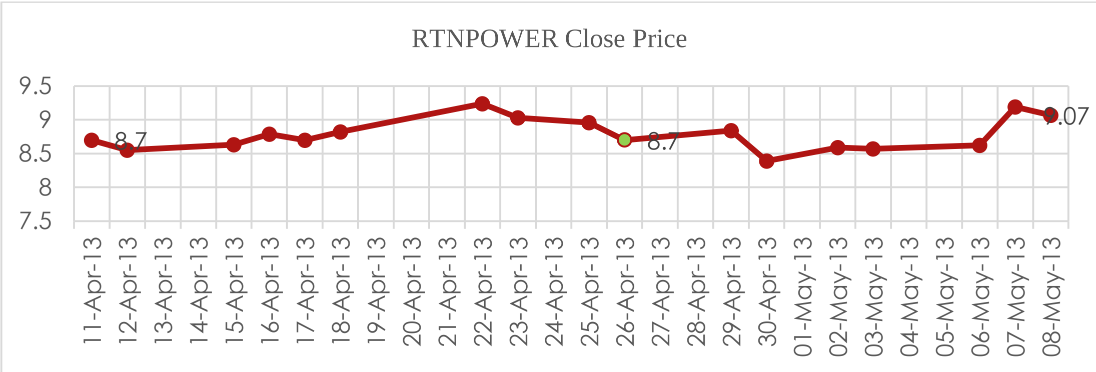
Chart: 5 (aq) Close price plotted before and after 2012 annual report publish date by BSE.




Source: Created by the researcher.

The share price of RTNPOWER has been falling from Rs 15.5 pre-annual report publication date to Rs 11.61 post 15 days from the annual report publication date. The share price on the annual report publication days was Rs 14.1. It is noted from the above Chart 5 (aq), the data set of share close price has been plotted for the year 2012.

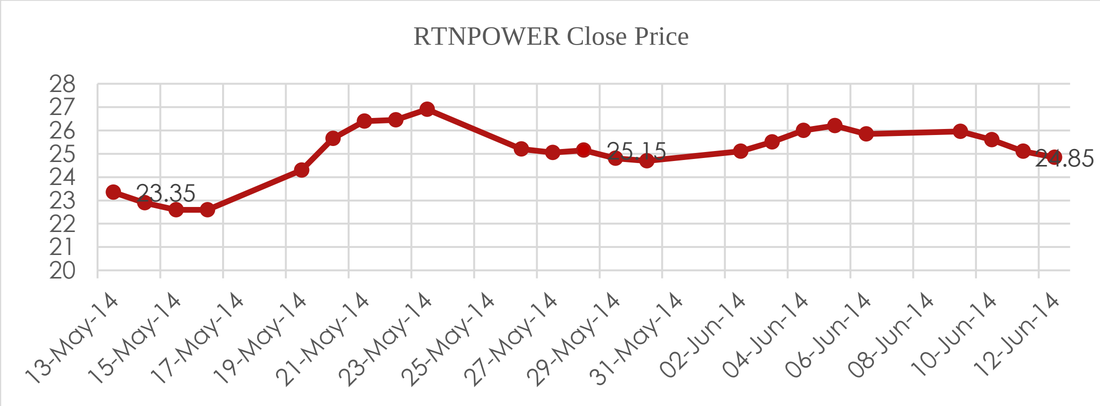
Chart: 5 (ar) Close price plotted before and after 2013 annual report publish date by BSE.




Source: Created by the researcher.

There is no drastic change in the share price of RTNPOWER in the year 2013 for the pre and post annual report presentation period. The share price was at a level of Rs 8.7 prior to 15 days from the annual report presentation date and it was Rs 9.07 after 15 days from the annual report presentation day by the RTNPOWER. There is no drastic change in the share price as depicted in the above Chart 5 (ar).

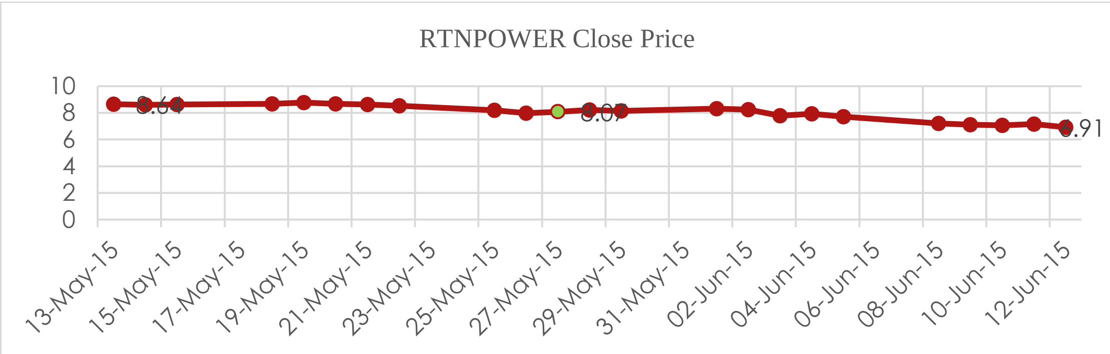
Chart: 5 (as) Close price plotted before and after 2014 annual report publish date by BSE.




Source: Created by the researcher.

As observed from the above Chart 5 (as), during the year 2014, the share price of RTNPOWER on the annual report publication days was Rs 25.15 and 15 days pre and 15 days post the share price was at the level of Rs 23.35 and 24.85. It is noted that there is no drastic movement in the share price during the selected period of the study.

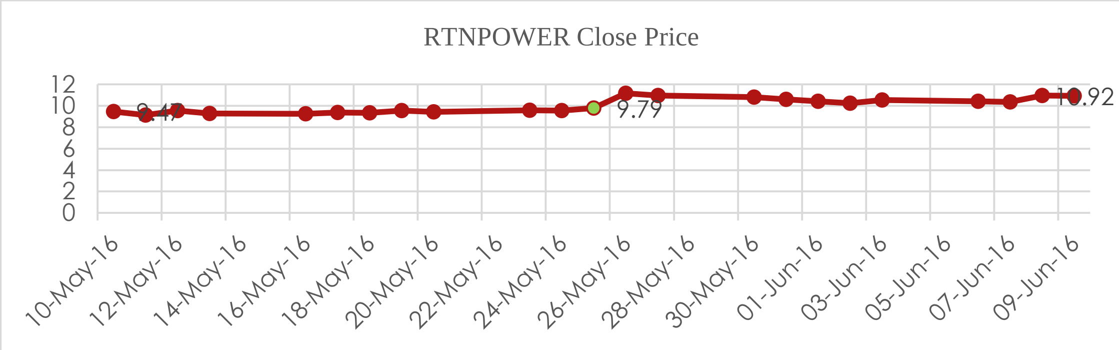
Chart: 5 (at) Close price plotted before and after 2015 annual report publish date by BSE.




Source: Created by the researcher.

It is observed that in the year 2014, the share price of RTNPOWER was trading in the range of Rs 23–25 but in the year 2015 the share price of RTNPOWER is only trading at the range of Rs 6–8. There is no drastic change in the share price of RTNPOWER before and after the annual report presentation date.

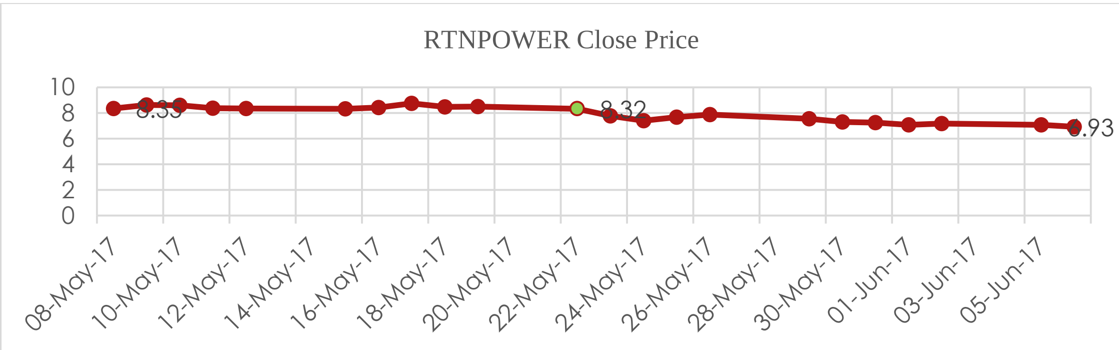
Chart: 5 (au) Close price plotted before and after 2016 annual report publish date by BSE.




Source: Created by the researcher.

The trend of the share price movement of RTNPOWER in the year 2016 is same as in the year 2015. There is no drastic movement, as it is clearly depicted in the above Chart 5 (au) the share price of RTNPOWER in the annual report presentation date was Rs 9.79 and 15 days pre and post annual report presentation date the share price was recorded at Rs 9.47 and Rs 10.92.

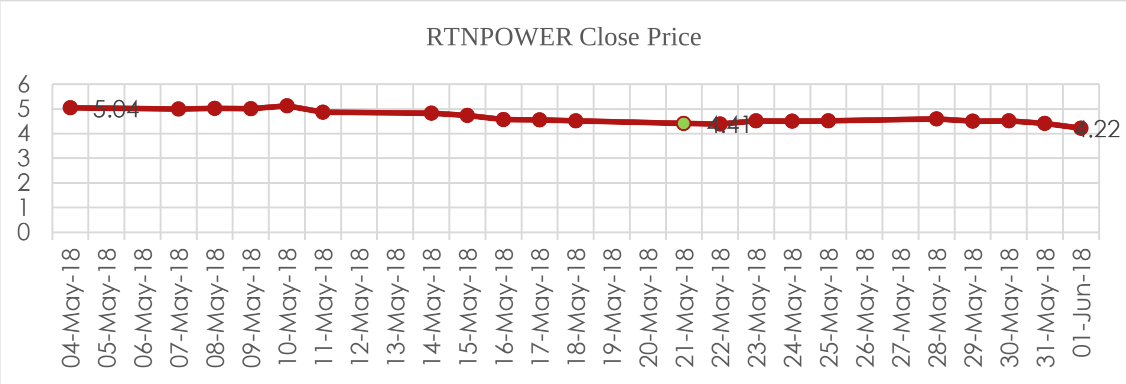
Chart: 5 (av) Close price plotted before and after 2017 annual report publish date by BSE.




Source: Created by the researcher.

The share price 15 days prior to the annual report presentation date was Rs 8.35 and with not much change the share price was Rs 8.32 in the annual report presentation day by the exchange. The share decreased to a level of Rs 6.93 after 15 days from the publication of the annual report by RTNPOWER.

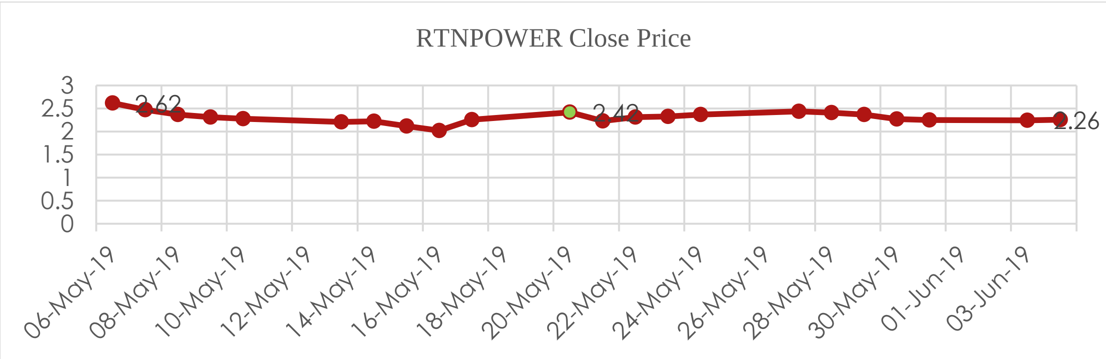
Chart: 5 (aw) Close price plotted before and after 2018 annual report publish date by BSE.




Source: Created by the researcher.

It is observed that the share price of RTNPOWER is continuously falling since 2014, in the year 2018 as depicted by the above Chart 5 (aw), the share price of RTNPOWER is trading at a range of Rs 4–5. There is very little movement in the share price of RTNPOWER during the selected time period of the study.

Chart: 5 (ax) Close price plotted before and after 2018 annual report publish date by BSE.




Source: Created by the researcher.

The share price of RTNPOWER has gone to a lowest level of just Rs 2.26 in the year 2019, as depicted by the above Chart 5 (ax). There is no movement in the share price of RTNPOWER during the selected period of the study.

5.7.2 Share price volatility (RTNPOWER)

Table 5.q Year wise volatility data.

| Year | Pre-report share price volatility (15 days) | Post-report shares price volatility (15 days) |
|---|---|---|
| 2011 | 1.72% | 4.64% |
| 2012 | 2.67% | 1.44% |
| 2013 | 1.40% | 3.47% |
| 2014 | 1.64% | 3.23% |
| 2015 | 2.14% | 0.85% |
| 2016 | 1.99% | 2% |
| 2017 | 2.26% | 3.89% |
| 2018 | 6.49% | 0.98% |

Source: Computed by the researcher.

5.7.3 Hypothesis (financial metrics and share price volatility)

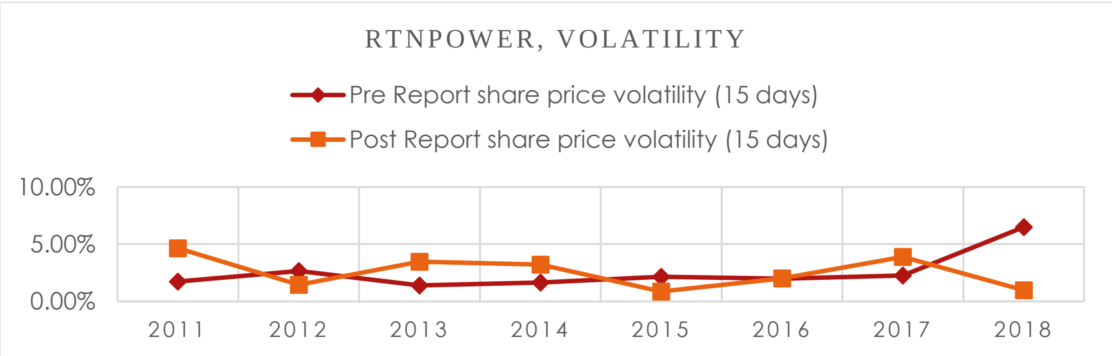
Ho: There is no significant impact of financial metrics as reported in annual report on the share price volatility of RTNPOWER.

H1: There is significant impact of financial metrics as reported in annual report on the share price volatility of RTNPOWER.

The null and alternate hypothesis is formed considering the objective of the study. In order to reject and accept the null hypothesis, non-parametric test has been used. The Wilcoxon signed rank test has been used to reject or accept the hypothesis.

5.7.4 RTNPOWER, Share price volatility sequential plot (pre & post annual report date)

Chart 5 ay, RTNPOWER, Share price volatility sequential plot




Source: Created by the researcher.

The sequential plot of the data series related to the volatility of RTNPOWER is created in order to have a clear view and to check whether the annual report presentation by the selected company is having effect in its share price volatility. It is observed that the post share price volatility was higher in the year 2011 as compared to the pre-report share price volatility, and again, it is just opposite in the year 2012. There is no continuous pattern to support the significant impact on the share price volatility.

5.7.5 Wilcoxon signed rank test (RTNPOWER share price volatility)

Wilcoxon signed rank test
Table 5.r (RTNPOWER share price volatility)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | -2.92% | -1 | 0.0292 | 7 | -7 |
| 2012 | 1.23% | 1 | 0.0123 | 2 | 2 |
| 2013 | -2.07% | -1 | 0.0207 | 5 | -5 |
| 2014 | -1.59% | -1 | 0.0159 | 3 | -3 |
| 2015 | 1.29% | 1 | 0.0129 | 2 | 2 |
| 2016 | -0.01% | -1 | 1E-04 | 1 | -1 |
| 2017 | -1.63% | -1 | 0.0163 | 1 | -1 |
| 2018 | 5.51% | 1 | 0.0551 | 1 | 1 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 5 | -17 | 17 | 3 |

Source: Computed by the researcher.

There is no enough evidence to reject the null hypothesis, as the test statistics in the above Table 9.a is 17 which is higher than the critical value of 3. As the test statistics is higher than the critical value, the null hypothesis is accepted, hence, it is confirmed that there is no significant impact of financial metrics on the share price volatility of RTNPOWER.

### 5.7.6 Share price return (RTNPOWER)

Table 5.s Year wise share return data (RTNPOWER.)

| Year | Pre-return (15 days) | Post-return (15 days) |
|---|---|---|
| 2011 | -9.03% | -17.66% |
| 2012 | 0.00% | 4.25% |
| 2013 | -2.49% | 69.30% |
| 2014 | -4.98% | -15.83% |
| 2015 | 3.38% | 11.54% |
| 2016 | -0.36% | -16.71% |
| 2017 | -12.50% | -4.31% |
| 2018 | -7.63% | -6.61% |

Source: Computed by the researcher.

### 5.7.7 Hypothesis (financial metrics and share price return)

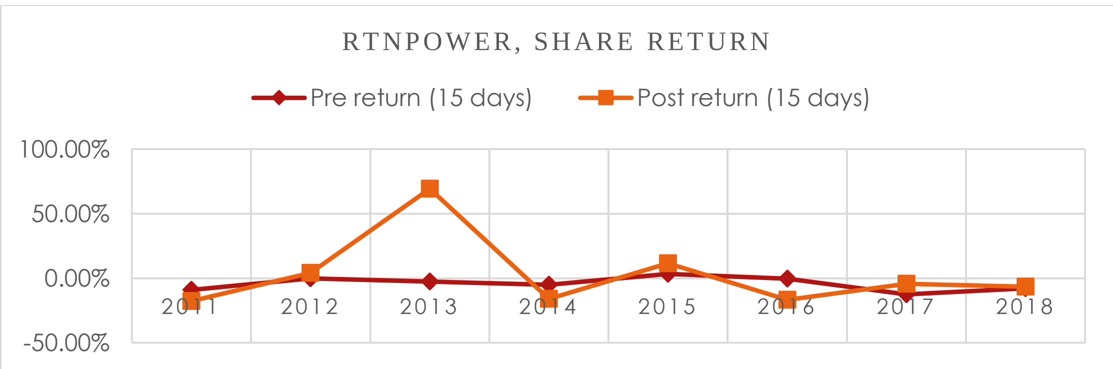
Ho: There is no significant impact of financial metrics as reported in annual report on the share price return of RTNPOWER.

H1: There is significant impact of financial metrics as reported in annual report on the share price return of RTNPOWER.

The hypothesis is representing the objective of the study, and Wilcoxon signed rank test is used to accept or reject the null hypothesis.

### 5.7.8 RTNPOWER, Share price return sequential plot (pre & post annual report date)

Chart 5 az, RTNPOWER, Share price return sequential plot




Source: Created by the researcher.

The share price return is plotted above in the Chart 5.az. The data series above is not reflecting any significant difference in the share price return before and after the presentation of the annual report by RTNPOWER.

5.7.9 Wilcoxon signed rank test (RTNPOWER share price return)

Wilcoxon signed rank test
Table 5.t (RTNPOWER share price return)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | 8.63% | 1 | 0.086273 | 5 | 5 |
| 2012 | -4.25% | -1 | 0.042529 | 2 | -2 |
| 2013 | -71.78% | -1 | 0.717813 | 6 | -6 |
| 2014 | 10.86% | 1 | 0.108575 | 4 | 4 |
| 2015 | -8.16% | -1 | 0.081633 | 2 | -2 |
| 2016 | 16.35% | 1 | 0.163474 | 3 | 3 |
| 2017 | -8.19% | -1 | 0.081916 | 2 | -2 |
| 2018 | -1.02% | -1 | 0.01022 | 1 | -1 |

| Positive sum | Negative sum | Test statistics | Critical value (8,.05) |
|---|---|---|---|
| 12 | -13 | 13 | 3 |

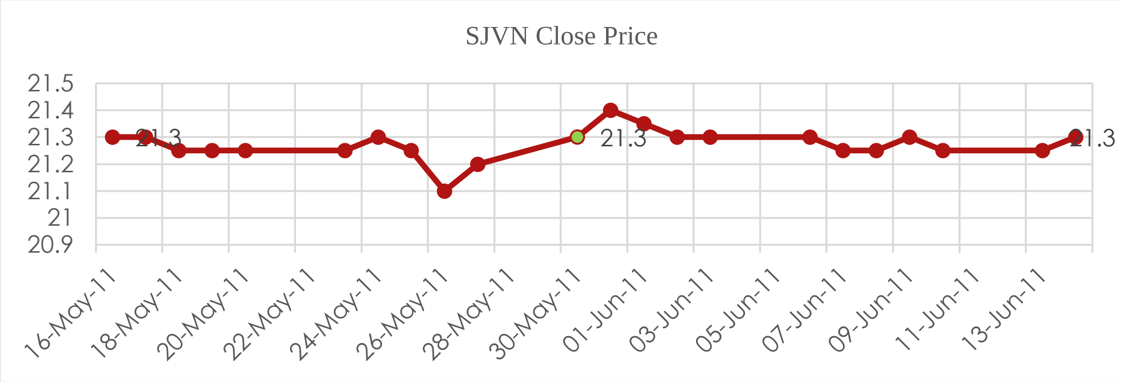
Source: Computed by the researcher.

The value of test statistics is 13 which is higher than the critical value of 3. As depicted in the above Table 5.t, the critical value is lower than the test statistics, hence, there is not enough evidence to reject the null hypothesis, thus the null hypothesis is accepted, and that means there is no significant impact of financial metrics on the share price return of RTNPOWER.

## 5.8 SJVN

5.8.1 Sequential plot pre and post annual report publication date (SJVN)

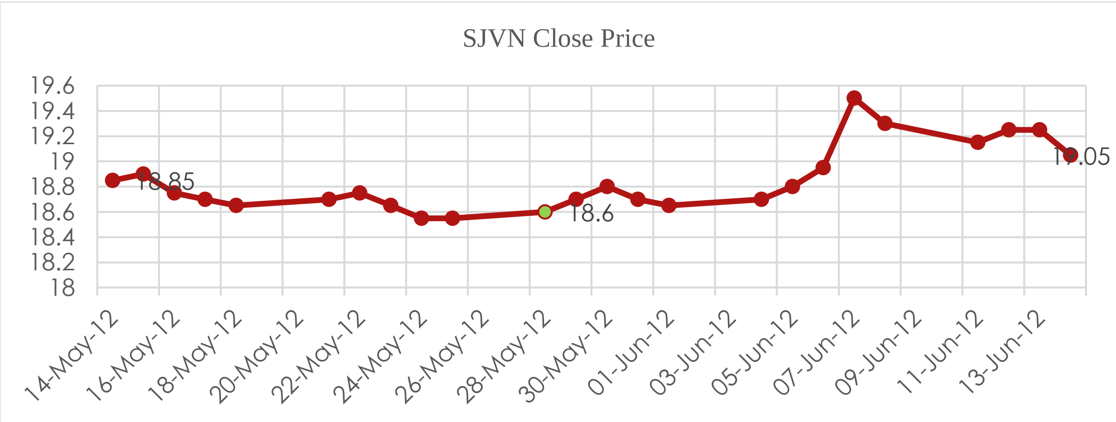
Chart: 5 (ba) Close price plotted before and after 2011 annual report publish date by BSE.




Source: Created by the researcher.

It is observed from the above Chart 5 (ba) that the share price of SJVN on the annual report publication date, 15 days pre and post annual report publication date was Rs 21.3, Rs 21.3 and Rs 21.3. It is noted that in three different dates the share price was in the same level, even though in between there were different ranges of share price.

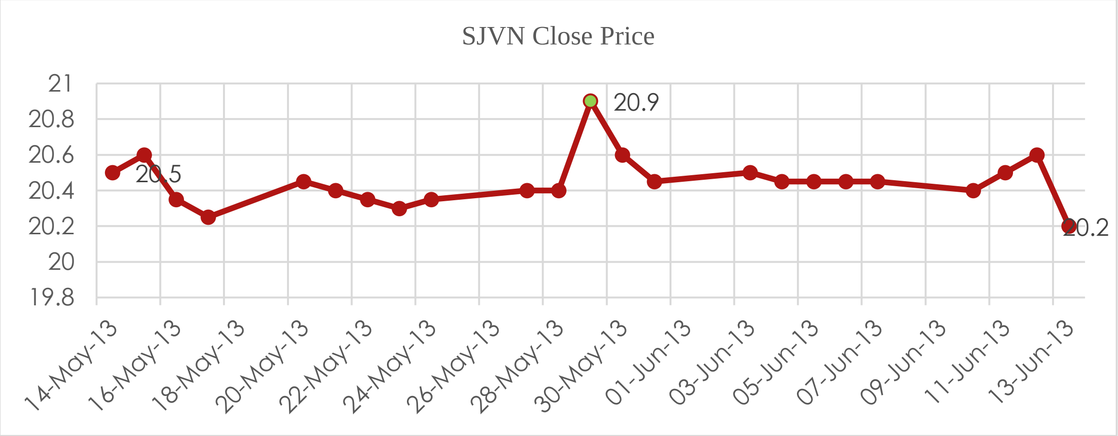
Chart: 5 (bb) Close price plotted before and after 2012 annual report publish date by BSE.




Source: Created by the researcher.

In the year 2012 too, like 2011 there was no drastic change in the share price movement before and after the annual report publication date. As depicted in the above chart, there was no significant differences in the share price of SJVN prior to and subsequent to the annual report publication date.

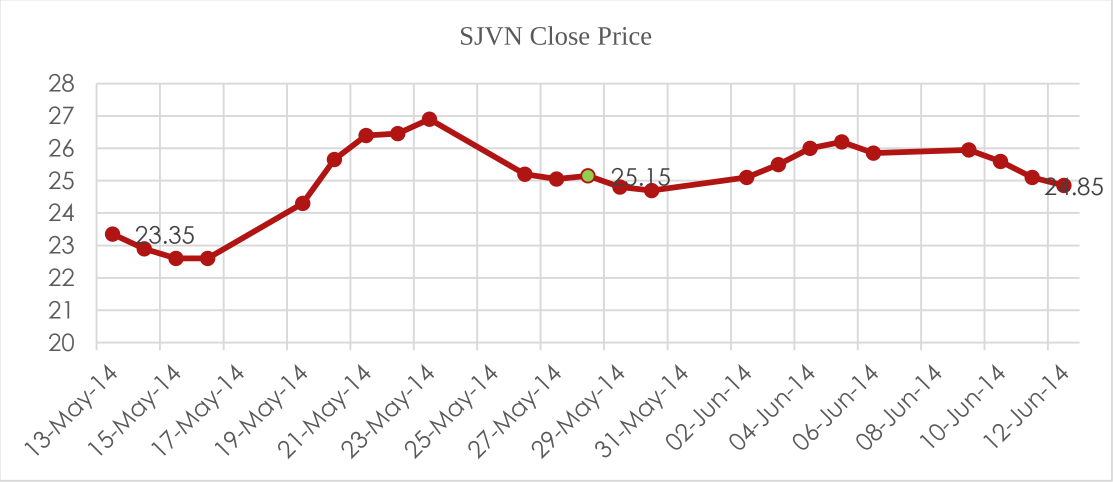
Chart: 5 (bc) Close price plotted before and after 2013 annual report publish date by BSE.




Source: Created by the researcher.

It is again observed the second time that the share price of SJVN was in the same level of Rs 20 in three different periods, i.e., on the annual report publication date and 15 days prior and subsequent to the annual report publication day. The same pattern was followed in the year 2011 as depicted in the above Chart 5 (bc).

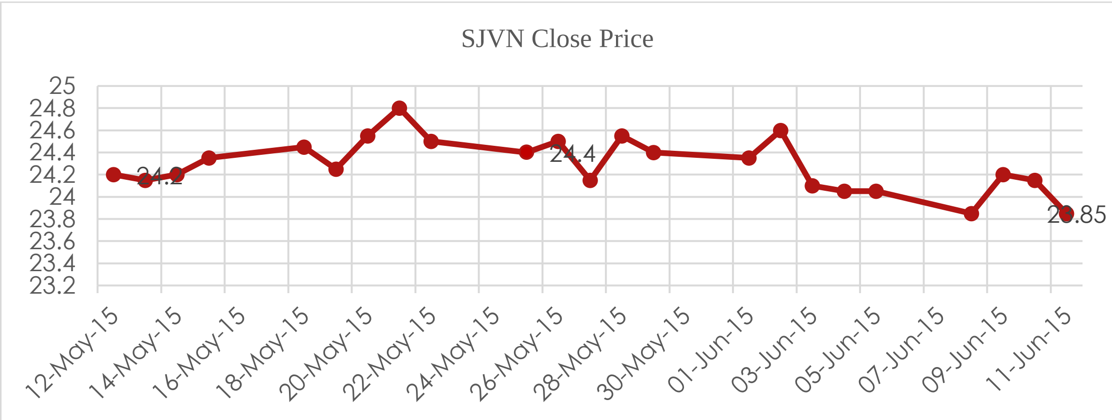
Chart: 5 (bd) Close price plotted before and after 2014 annual report publish date by BSE.




Source: Created by the researcher.

Also in the year 2014, there was no drastic difference in the movement of share price for SJVN. As depicted in the above Chart 5 (bd), the share price on the annual reporting day was Rs 25.15 and 15 days prior to and 15 days subsequent to the annual report publication date was Rs 23.35 and Rs 24.85.

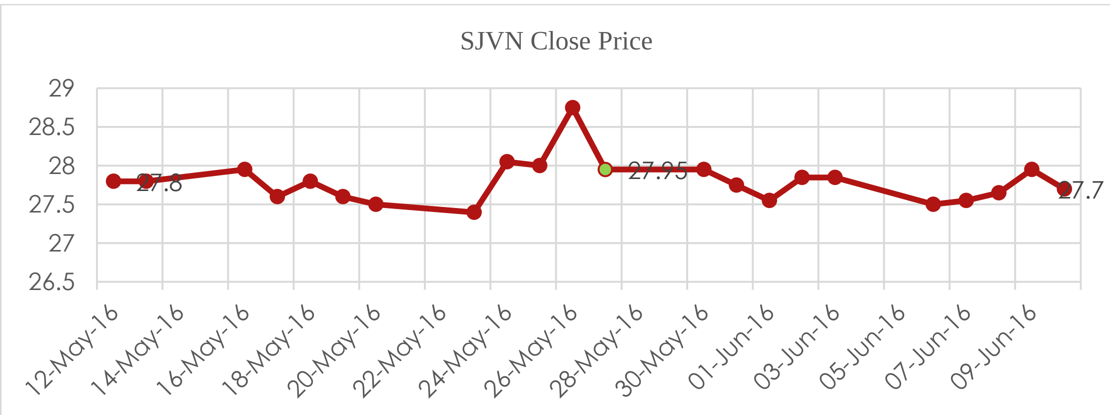
Chart: 5 (be) Close price plotted before and after 2015 annual report publish date by BSE.




Source: Created by the researcher.

It is noted that the SJVN does not have a drastic movement in its share price, the movement in the share price is more stable ranging from 24.2 pre-report period to Rs 24.40 on the report publication date and Rs 23.85 post-report period. This is clearly reflected in the above Chart 5 (be).

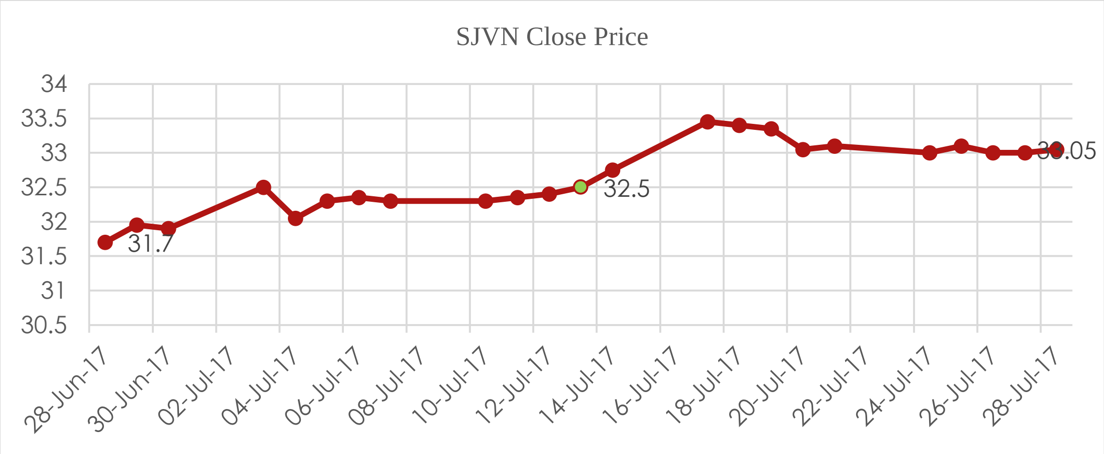
Chart: 5 (bf) Close price plotted before and after 2016 annual report publish date by BSE.




Source: Created by the researcher.

Similar to the other years, again the same trend is following in the year 2016 but it is also noted that even though the movement in the share price is not much in a particular year, the share price of SJVN is increasing gradually every different year. It is clearly evident from the above Charts 5 (ba)–5 (bf).

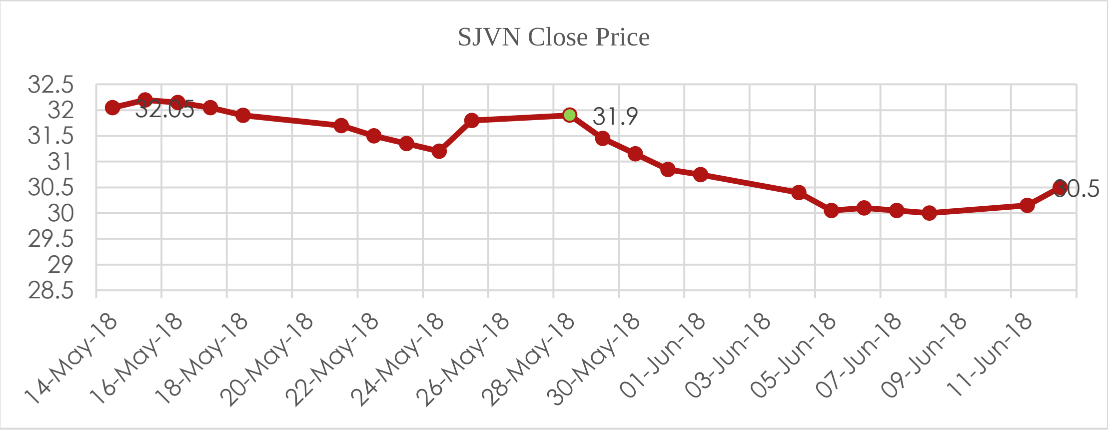
Chart: 5 (bg) Close price plotted before and after 2017 annual report publish date by BSE.




Source: Created by the researcher.

The share price of SJVN has increased to a level of Rs 33.05 post-report period from a lower price of Rs 31.7 pre-report period. The share price on the report publication day was Rs 32.5. It is confirmed from the plotting of data series from so many years that the share price of SJVN is gradually increasing every year.

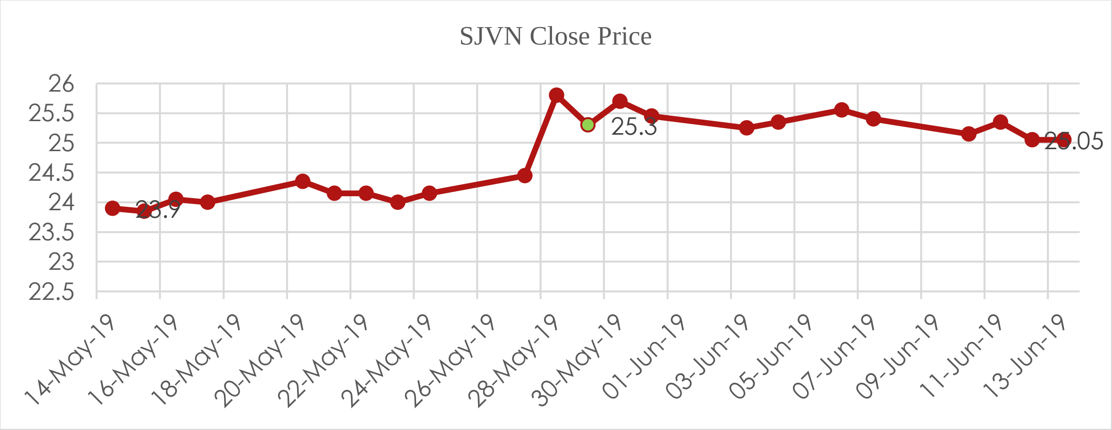
Chart: 5 (bh) Close price plotted before and after 2018 annual report publish date by BSE.




Source: Created by the researcher.

As observed in the above Chart 5 (bh), it is seen that the share price has been moving downwards from a high of Rs 32.05 pre-report period to a low of Rs 30.5 post-report period. The share price on the annual report publication date was Rs 31.9.

Chart: 5 (bi) Close price plotted before and after 2019 annual report publish date by BSE.




Source: Created by the researcher.

The share price of SJVN is showing little upward trend from the pre-report period till the report publication date. The share price on the pre-report period was Rs 23.9 which increased to a level of Rs 25.3 and finally closed to a level of Rs 25.05. It is clearly depicted in the above Chart 5 (bi).

5.8.2 Share price volatility (SJVN)

Table 5.u Year wise volatility data.

| Year | Pre-report share price volatility (15 days) | Post-report shares price volatility (15 days) |
|---|---|---|
| 2010 | 0.53% | 0.38% |
| 2011 | 0.41% | 1.02% |
| 2012 | 2.22% | 1.77% |
| 2013 | 1.04% | 1.01% |
| 2014 | 1.33% | 1.18% |
| 2015 | 2.53% | 0.88% |
| 2016 | 0.46% | 0.35% |
| 2017 | 0.47% | 1.10% |
| 2018 | 1.85% | 0.37% |

Source: Computed by the researcher.

5.8.3 Hypothesis (financial metrics and share price volatility)

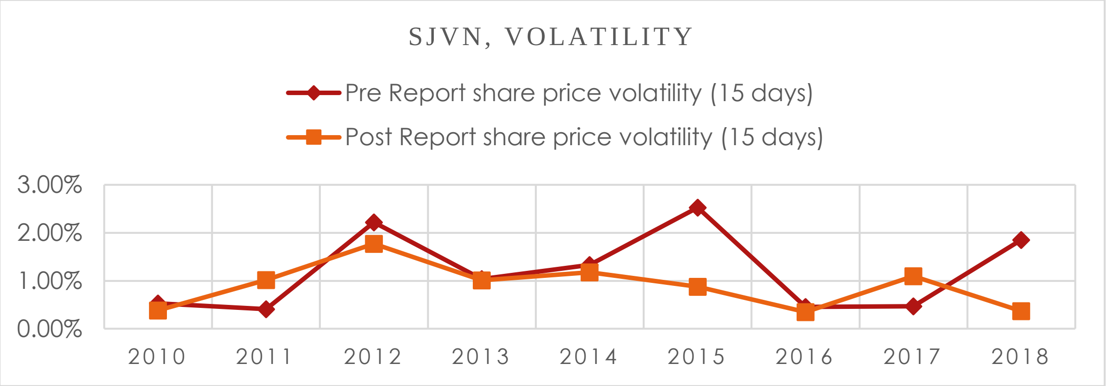
Ho: There is no significant impact of financial metrics as reported in annual report on the share price volatility of SJVN.

H1: There is significant impact of financial metrics as reported in annual report on the share price volatility of SJVN.

The hypothesis has been framed considering the objective of the study. The non-parametric test, Wilcoxon signed rank test is used to reject or accept the null hypothesis, before this test, the sequential plotting has been created to have a clearer view.

5.8.4 SJVN, Share price volatility sequential plot (pre & post annual report date)

Chart 5 bj, SJVN, Share price volatility sequential plot




Source: Created by the researcher.

The plotting of data set in the above Chart 5.bj is also not showing the particular pattern, the pre-report share price volatility is higher in the year 2010, 2012, 2014, 2015, 2016 and 2018, in the rest of the years the post-report share price volatility is higher. In order to confirm whether there exists a significant different between the share price volatility with the two periods, a Wilcoxon signed rank test has been conducted.

5.8.5 Wilcoxon signed rank test (RTNPOWER share price volatility

Wilcoxon signed rank test
Table 5.v (SJVN share price volatility)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | 0.15% | 1 | 0.0015 | 4 | 4 |
| 2012 | -0.61% | -1 | 0.0061 | 5 | -5 |
| 2013 | 0.45% | 1 | 0.0045 | 4 | 4 |
| 2014 | 0.03% | 1 | 0.0003 | 1 | 1 |
| 2015 | 0.15% | 1 | 0.0015 | 2 | 2 |
| 2016 | 1.65% | 1 | 0.0165 | 4 | 4 |
| 2017 | 0.11% | 1 | 0.0011 | 1 | 1 |
| 2018 | -0.63% | -1 | 0.0063 | 1 | -1 |

| Positive sum | Negative sum | Test statistics | Critical value (9,.05) |
|---|---|---|---|
| 17 | -6 | 6 | 5 |

Source: Computed by the researcher.

The test statistics value of 6 and the critical value of 5, also in this case there is no strong evidence to reject the null hypothesis as the critical value is lower than the test statistics value. Hence the null hypothesis is accepted, there is no significant impact of financial metrics on the share price volatility of SJVN.

5.8.6 Share price return (SJVN)

Table 5.w Year wise share return data. (SJVN)

| Year | Pre-return (15 days) | Post-return (15 days) |
|---|---|---|
| 2010 | 0.00% | 0.00% |
| 2011 | -1.33% | 2.42% |
| 2012 | 1.95% | -3.35% |
| 2013 | 7.71% | -1.19% |
| 2014 | -0.21% | -1.24% |
| 2015 | 0.54% | -0.89% |
| 2016 | 2.52% | 1.69% |
| 2017 | -0.47% | -4.39% |
| 2018 | 5.86% | -0.99% |

Source: Compiled by the researcher.

5.8.7 Hypothesis (financial metrics and share price return)

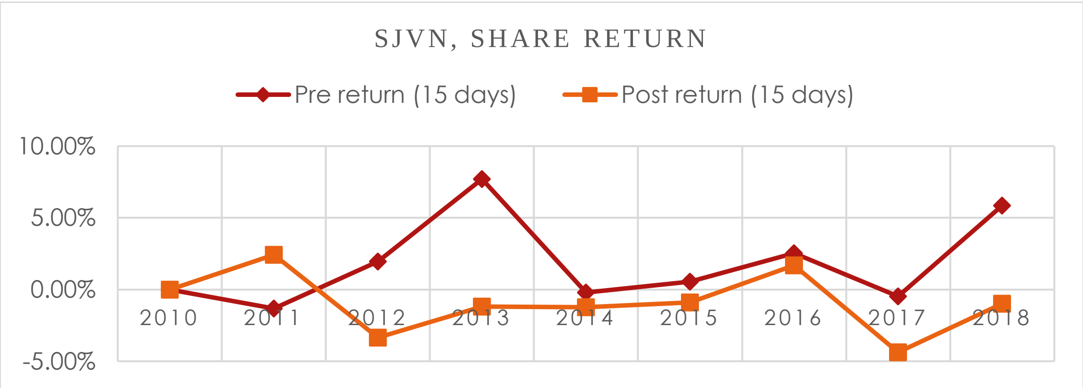
Ho: There is no significant impact of financial metrics as reported in annual report on the share price return of SJVN.

H1: There is significant impact of financial metrics as reported in annual report on the share price return of SJVN.

The objective of the study is to check whether there exists the impact of the financial metrics as reported in the annual reports on the share price return. Accordingly, the null and alternate hypothesis are formed. The sequential plotting of the data series relating to the post period and pre-period share price returns are plotted and after that the Wilcoxon signed rank test has been conducted to reject or accept the null hypothesis.

5.8.8. SJVN, Share price return sequential plot (pre & post annual report date)

Chart 5 bk, SJVN, Share price return sequential plot




Source: Created by the researcher.

It is noted that the pre-period share return is lower in the year 2011 but after 2012 the pre-period share return is continuously higher till 2018. But whether the difference is significant or not will be tested with the help of the non-parametric test, namely Wilcoxon signed rank test.

5.8.9. Wilcoxon signed rank test (SJVN share price return)

Wilcoxon signed rank test
Table 5.x (SJVN share price return)

| Year | Difference | Positive | I Diff I | Rank | Signed rank |
|---|---|---|---|---|---|
| 2011 | 0.00% | -1 | 0 | 1 | -1 |
| 2012 | -3.75% | -1 | 0.037456 | 4 | -4 |
| 2013 | 5.30% | 1 | 0.053005 | 5 | 5 |
| 2014 | 8.90% | 1 | 0.089016 | 6 | 6 |
| 2015 | 1.04% | 1 | 0.010356 | 2 | 2 |
| 2016 | 1.43% | 1 | 0.01434 | 2 | 2 |
| 2017 | 0.83% | 1 | 0.008314 | 1 | 1 |
| 2018 | 3.92% | 1 | 0.039207 | 1 | 1 |

| Positive sum | Negative sum | Test statistics | Critical value (9,.05) |
|---|---|---|---|
| 18 | -5 | 5 | 5 |

Source: Computed by the researcher.

It is observed from the above Table 5.x that the test statistics is equal to the critical value. Both the test statistics and the critical value is 5. Hence, there is not enough evidence to reject the null hypothesis. So, the null hypothesis has been accepted i.e., there is no significant impact of financial metrics on the share price return of SJVN.

5.8.10 Conclusion

Finally, after a long and elaborative observation, it is noted that the financial metrics as reported in the annual reports does not affect the share price volatility of the power generating companies in India. It is also observed that the power generating companies like SJVN, NHPC, NTPC and GIPCL which have a good financial performance comparatively, the share price is increasing gradually over different years. In the other hand the share price of power generating companies like RTNPOWER and RPOWER which have a very bad financial performance is decreasing every year within the selected period of study. This means there is a change in price according to the performance of the power generating companies within a span of one year, but there is no significant impact in the share price volatility and share price return within a span of 15 days pre and post period from the date of the annual report publication date.

The same has been reflected in the table below: -

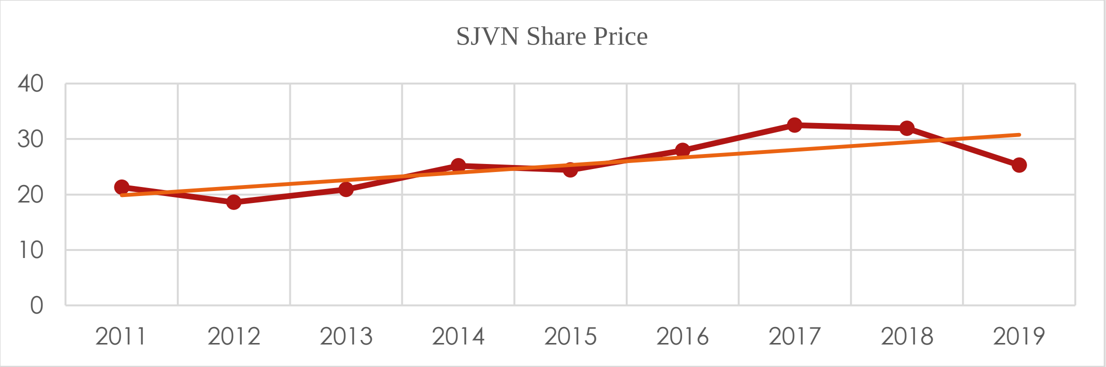
Table 5.y one year share price (Power generating companies)

| | SJVN | NHPC | NTPC | GIPCL | RTNPOWER | RPOWER |
|---|---|---|---|---|---|---|
| | Share price | Share price | Share price | Share price | Share price | Share price |
| 2011 | 21.3 | | | 85 | | |
| 2012 | 18.6 | 18.8 | 149.6 | 57.45 | 14.1 | 93.35 |
| 2013 | 20.9 | 20 | 155.15 | 75.5 | 8.7 | 77.5 |
| 2014 | 25.15 | 24.8 | 129.25 | 83.55 | 25.15 | 85.9 |
| 2015 | 24.4 | 20.15 | 136.7 | 85 | 8.07 | 53.55 |
| 2016 | 27.95 | 22.7 | 143.1 | 83.65 | 9.79 | 52.25 |
| 2017 | 32.5 | 30.1 | 156.35 | 104.75 | 8.32 | 47.35 |
| 2018 | 31.9 | 27.05 | 167.35 | 98 | 4.41 | 40 |
| 2019 | 25.3 | 23.6 | 133.35 | 72.55 | 2.42 | 5.75 |

Source: Compiled by the researcher.

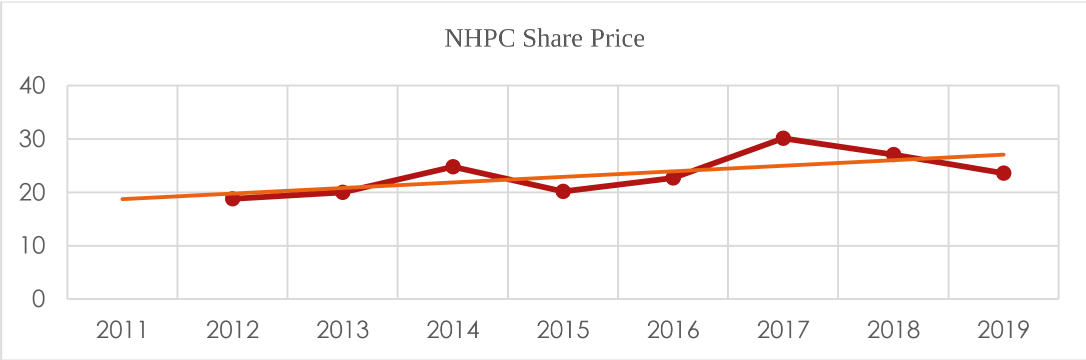
<u>Best financial performing companies (Chart 5(bl), 5(bm), 5(bn), 5(bo)</u>

Chart 5 (bl) SJVN, one year share price



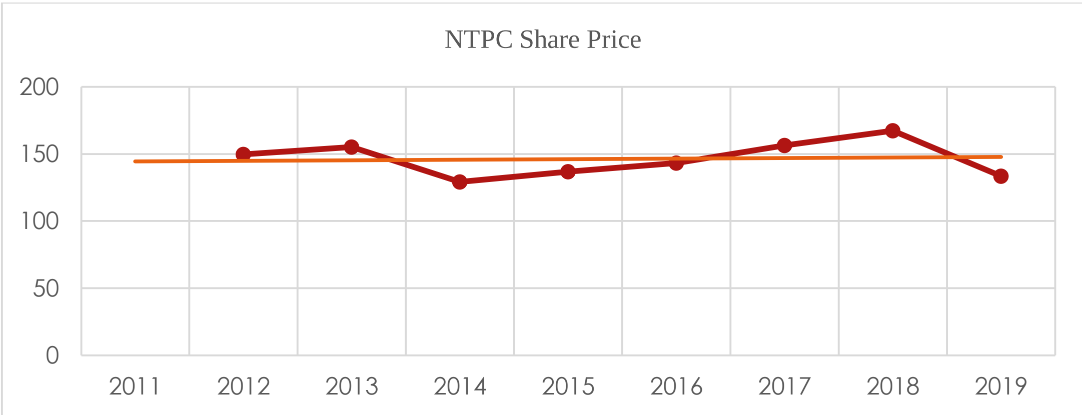

Source: Created by the researcher.

Chart 5 (bm) NHPC, one year share price



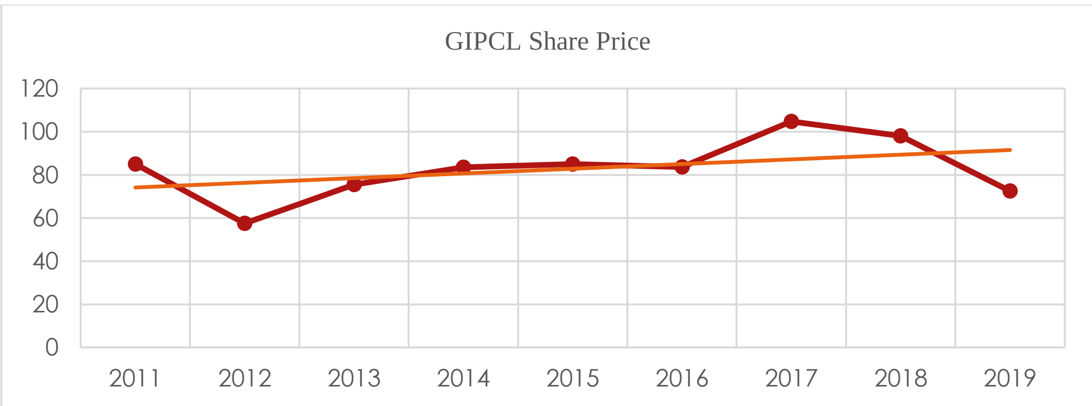

Source: Created by the researcher.

Chart 5 (bn) NTPC, one year share price




Source: Created by the researcher.

Chart 5 (bo) GIPCL, one year share price



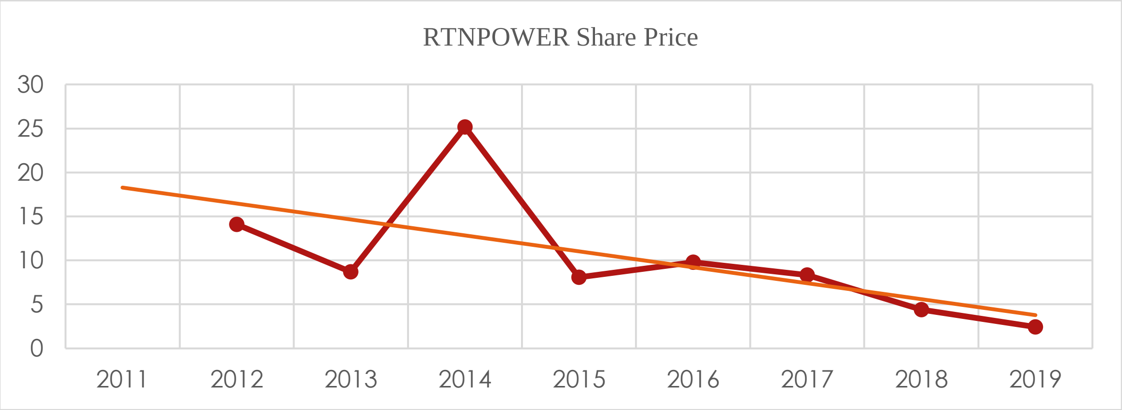

Source: Created by the researcher.

The power generating companies having the best financial performance are SJVN, NHPC, NTPC and GIPCL. Observing the Charts 5 (bl)–5 (bo), it is clearly noted that all the best performing companies share price have an uptrend from 2011 to 2019. It is also noted that all the best performing power generating companies share price is falling in the year 2019 from the year 2018. All the four best performing power generating

Companies have a sharp decline in their share prices from the year 2018 to 2019.

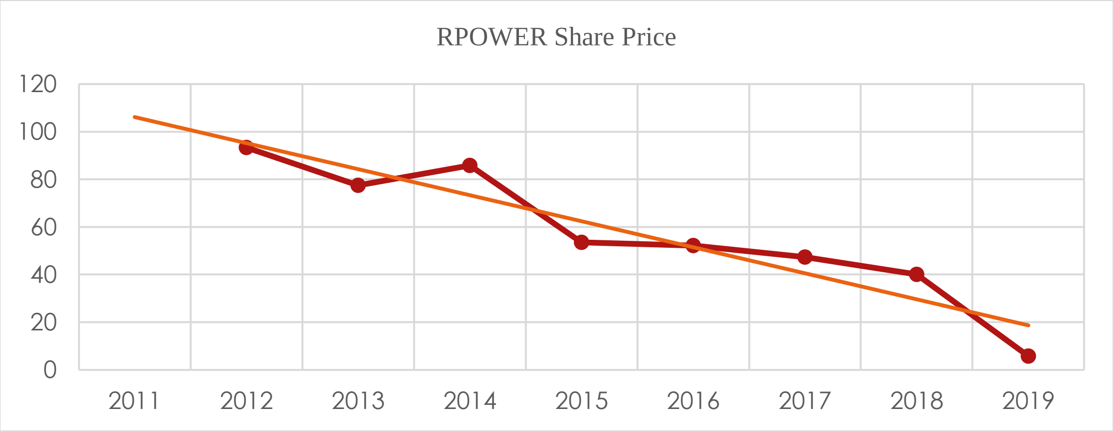
<u>Weak financial performing companies (Chart 5 (bp) and 5 (bq)</u>

Chart 5 (bp) RTNPOWER, one year share price




Source: Created by the researcher.

Chart 5 (bq) RPOWER, one year share price




Source: Created by the researcher.

According to the findings of the study, financially weak performing power generating companies are RTNPOWER and RPOWER. Within the span of 15 days pre and post period from the date of publication of the annual report it was found that the financial metrics as reported in the annual reports have no impact on the share price volatility and share price return on the selected power generating companies in India. But there is a different finding when the data series of the share price of power generating companies are plotted within a time frame of one year from the annual report publication date. As it is clearly depicted in the above Charts 5 (bp) and 5 (bq) that the two power generating companies whose financial performance is not good has a sharp decline in their share price from the year 2011 to 2019.

# Chapter VI

## Findings, conclusions and suggestions

### 6.1 Findings

- SJVN is the power generating company having the best financial performance, followed by GIPCL, NHPC and NTPC.
- RPOWER has weak financial performance as compared to all the other selected power generating companies in India followed by RTNPOWER.
- SJVN has the best liquidity ratio among the selected power generating companies.
- GIPCL has the weak liquidity ratio among its peers
- SJVN is the most profitable power generating company as compared to the other selected power generating companies in India
- RTNPOWER is the lowest profit earning power generating company as compared to its peers.
- GIPCL, SJVN & NHPC manages the assets efficiently in generating high returns while RTNPOWER is the poor performer and does not has the efficiency in managing the assets.
- SJVN has the lowest debt as compared to its peers.
- NTPC has huge debts among the selected power generating companies in India.
- SJVN has a very less chance of insolvency while RTNPOWER has a high chance of solvency.
- GIPCL is reducing the debt capital in a faster rate as considered to the other selected power generating companies.

- SJVN has the lowest generation expenses among its peers while NTPC has the highest generation expenditure among its peers.
- SJVN and NHPC has the lowest cost of energy source in the other hand RTNPOWER has the highest cost of energy source.
- SJVN has the lesser credit sales as compared to the other peers while RPOWER has the highest credit sales.
- The government owned power generating companies (central & state) have a better financial performance as compared to that of privately-owned power generating companies.
- NHPC, NTPC and SJVN have the presence of seasonality in their data series relating to income from operation, EBIT, net profit and EPS.
- NHPC's and SJVN's, financial metric namely, total expenditure does not have the presence of seasonality and is not affected by any seasons.
- NHPC and SJVN which focuses in hydro energy to produce electricity, both have higher income from operation, EBIT, net profit and EPS during the periods from July to September and is lower during the periods from January to March.
- Both the power generating companies (SJVN and NHPC) does not have the presence of seasonality in their total expenditure.
- NTPC which uses thermal energy to produce electricity has the higher income from operation, total expenditure, EBIT, net profit and EPS during the periods from January to March.
- There is a presence of seasonality for the selected financial metrics in the power generating companies under the central government ownership and there is no presence of seasonality for the selected financial metrics in the power generating companies under private ownership and state government ownership.

- Considering one-month period i.e. 15 days pre and post period from the date of publication of the annual report it was found that the financial metrics as reported in the annual reports have no significant impact on the share price volatility and share price return on the selected power generating companies in India.
- when the data series of the share price of power generating companies are plotted within a time frame of one year from the annual report publication date it is observed that the two power generating companies whose financial performance is not good has a sharp decline in their share price and all the best performing companies share price have an uptrend from 2011 to 2019.

## 6.2 Conclusion

There are four main objectives of the study i.e., 1) to conduct financial performance analysis for the power generating companies in India listed in the Bombay Stock Exchange (BSE), 2) to segregate the financial performance on the basis of ownership, 3) to check the presence of seasonality on the data points of few important financial metrics namely income from operation, total expenditure, earnings before interest and tax, net profit and EPS for the selected power generating companies in India and 4) to test the impact of financial metrics as reported in the annual report by the power generating companies on its share price volatility of the selected power generating companies listed in Bombay Stock Exchange (BSE).

The findings of the study relating to chapter 3 can be summed up as the performance of SJVN is in a better position as compared to the other power generating companies. GIPCL, NHPC and NTPC have the same level of financial performance which is much better as compared to RTNPOWER and RPOWER. After analysing the financial data, it is found that the financial performance of the power generating companies owned by government is much better as compared to that with the private power generating companies. Out of six power generating companies, NTPC, NHPC and SJVN are under the central government, GIPCL is under the state government of Gujarat and RTNPOWER and RPOWER is under the private ownership. According to ranking SJVN has the best financial performance among the power generating companies which is under the central government ownership, in the second position is GIPCL which is under the state government of Gujarat, NHPC and NTPC both under the central government are in the third and fourth position. RTNPOWER and RPOWER have the worst financial performance among the selected power generating companies and both the power generating companies are private power generating companies. The inference from the above point is that the financial performance of government owned power generating companies is much better as compared to that with the privately-owned power generating companies listed in Bombay Stock Exchange in India.

The chapter four's main objective is to determine the presence of seasonality in the data set of power generating companies relating to important financial metrics. The quarterly data has been used to determine the presence and impact of seasonality in the financial metrics of the selected power generating companies listed in the Bombay Stock Exchange of India. The findings of the study are that there is a presence of seasonality in the data set relating to financial metrics for the power generating companies owned by the central government and there is no presence of seasonality in the power generating companies owned by the private and state government of Gujarat. It is also found that out of the selected financial metrics namely income from operation, total expenditure, earnings before interest and tax (EBIT), net profit and earnings per share (EPS), only NTPC has the presence of seasonality relating to the total expenditure while no other power generating companies have the presence of seasonality relating to the total expenditure. The most important observation is that NTPC is generating higher income from operation in quarter four, whereas NHPC and SJVN is generating lower income from operation in quarter four. The pattern is similar in other financial metrics too, like in earnings before interest and tax (EBIT), net profit and earnings per share (EPS) too. The reason for this may be due to NHPC and SJVN's main source of energy which is hydro while the main source of energy for NTPC is thermal.

The findings of the chapter four portrays that there are no significant differences in the share price volatility and return before and after the publication of the annual reports containing the important financial metrics within a time frame of 15 days before and after the publication of the annual reports. This means that there is no impact of the financial metrics on the share price volatility and return of the power generating companies listed in the Bombay Stock Exchange, India. There is no significant impact in the share price volatility and share price return irrespective of whether the financial performance of a particular power generating company is good or bad. Even though the power generating companies like SJVN, GIPCL, NHPC and NTPC have a very good financial performance there is no significant difference in the share price volatility before and after the publication of the quarterly reports within the time span of 15 days. But it is observed that within a time frame of one year, there is a continuous increase in the share price of power generating companies having a better financial performance and the share price of power generating companies having a bad financial performance, the share price is decreasing continuously within the period of one year. The inference of this is that the share price gets affected over a longer period of time frame as compared to shorter time frame.

According to the findings of the study, it is proved that the financial performance of the government owned power generating companies is better as compared to the privately-owned power generating companies. There has been a lot of restructuring and amendments in the electricity acts of India. Electricity Act 2003 is important as it clearly encourages the participation from the private players. It is evident from the present study that private players have made a considerable contribution in the power generation in India. But it should also be remembered that the other most important agenda of this act was to make the power sector commercially viable. According to the findings of the study, the performance of the privately-owned power generating companies are in a very pathetic condition. The chances of insolvency are very high for the privately-owned power generating companies. The risk is higher as the government of India is converting government owned entities into the private entities. The data is very clear in supporting that the performance of government owned power generating companies are much better than the privately-owned power generating companies. It is very important to think from an angle that how can the private power generating companies be made commercially viable rather than just attracting private power generating companies in the play as this will only attract more non-performing assets in the books of Indian banks. Power generating companies are already the highest contributors of non-performing assets in the books of various lending banks.

It is very much important to create new regulations that specifically focuses in improving the financial conditions of the private power generating companies, without adding extra burden to the end users.

### 6.3 Suggestion

SJVN

The company is doing pretty well when compared to other peers in the industry. If the company could focus on their expenditure and reduce them, the company's profit margin would widen.

GIPCL

This company's financial performance is best after SJVN comparatively, but it needs to focus on improving the liquidity position. The company should focus in developing better working capital management strategy.

NHPC

NHPC's performance is better in all aspects on an average. The power generating company need to focus in diversifying its portfolio of energy sources, as setting of larger dams can be unmanageable technologically increasing capital expenditure.

NTPC

The power generating company uses coal as the main source of energy, due to which it has the highest generation expenditure among its peers, it is due to the high import cost of coal as a source of energy. NTPC can diversify into other cheaper sources of energy in order to reduce the costs. It needs to focus in reducing its total leverage.

RTNPOWER

RTNPOWER has to improve on the profit earning capacity and should focus in increasing the efficiency in managing the assets. The power generating company have a very low interest coverage ratio, it really needs to develop a proper strategy in order to improve on its interest coverage ratio. The company can achieve this by reducing the cost of energy source.

RPOWER

RPOWER is in a very pathetic financial situation, it really needs to plan and work in the following areas, and first the company need to focus in collection of dues from the debtors. The company should focus in increasing the profitability and improve on increasing the interest coverage ratio. The power generating company needs to build a strategy focusing on wealth maximization.

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