Role of Life Insurance Corporation of India in the Government's Divestment of Public Sector Undertakings

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Certificate of Examination

This is to certify that the dissertation titled **"Role of Life Insurance Corporation of India in the Government's Divestment of Public Sector Undertakings"** submitted by **Mr.Kunal Kakade** (Reg. No. MS14009) for the partial fulfilment of BS-MS dual degree programme of the Institute, has been examined by the thesis committee duly appointed by the Institute. The committee finds the work done by the candidate satisfactory and recommends that the report be accepted.

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Dated: April 24, 2019

Declaration

The work presented in this dissertation has been carried out by me under the guidance of Dr. Shane D'mello at the Indian Institute of Science Education and Research Mohali.

This work has not been submitted in part or in full for a degree, a diploma, or a fellowship to any other university or institute. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due acknowledgement of collaborative research and discussions. This thesis is a bonafide record of original work done by me and all sources listed within have been detailed in the bibliography.

Kunal Kakade

(Candidate)

Dated: April 25, 2019

In my capacity as the supervisor of the candidate's project work, I certify that the above statements by the candidate are true to the best of my knowledge.

Dr. Shane D'mello
(Supervisor)

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Kunal Kakade

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Abstract

Wve are trying to study the short term and long term investments made by Life Insurance Corporation of India (LIC) and analyze the possibility of provision of price support to public sector undertakings (PSUs). LIC invests its massive amount of assets into various corporations. One of its major activities is to provide long-term finance to entities through corporate term loans, subscription to bonds and debentures, AIFs and consortium lending. It maintains a portfolio of investments that include both private and public entities. We plan to study the variation in investments made and stakes held by the LIC over time and perform an analysis to support/ reject our theory that LIC supports PSUs, also mentioned by Mr.Vivek Kaul in his article [16].

Chapter 1

Introduction

1.1 History and Theory of Disinvestment

Disinvestment process was started in the year 1992 and is an important step towards the liberalization of our economy.

1.1.1 Privatization vs. Disinvestment

Privatization means opening up the economy to let private entity to participate in certain sectors. In case of public sector it implies the change in the ownership and also the management. Privatization of PSUs will only take place if more than 50% of its stake is sold to the private entity thereby transferring the management rights from Government to private entrepreneur.

Disinvestment implies selling of equity shares of PSUs. Government has been using it as a tool in bringing down the fiscal deficit of the government. Private entity can come up and buy the shares of PSUs only as an investment. If disinvestment is less 50% then government still owns the management rights of the PSUs.

1.1.2 Need for Disinvestment

According to Smriti Chand [14] "The Indian economy had virtually embraced bankruptcy during the period 1990-91. The public sector which was to achieve commanding heights and was taught to be the correct path for India's economic growth, right from independence was characterized by poor

performance. Out of 236 PSUs only 123 were making profits. The top 20 profit making PSU's counted for 80 per cent of the profits, implying that less than 10 percent of the PSU's were responsible for 80 percent of profits. The return on public sector investment for the year 1990-91 was just over 2 percent".

Disinvestment serves some of the following purposes [15]:

Apart from the fact that it is constantly used to reduce the budgetary deficit of the government. Disinvestment process was also supposed to serve some of the following purpose:

1. To reduce the financial burden on the Government.
2. To improve public finances.
3. To encourage wider share of ownership.
4. To introduce competition and market discipline.

1.2 Economics Basics

We will revise a few definitions of macro-economic from [1]:

1.2.1 Basics of macroeconomics

Gross Domestic Product (GDP): The GDP at market price, defined as the value of final goods and service at current market price produced in a given period within the territorial boundaries of a country.

Non-debt capital receipt: Revenue receipts which include grants received and loans recovered by the government, and occasionally disinvestment proceeds earned by selling PSUs.

Fiscal Deficit: It refers to the difference between the government's total expenditure and total non-debt receipt.

Recession: An economic phenomenon where GDP falls for at least two

consecutive quarters.

Stagflation: An economic phenomenon characterized by high inflation and high unemployment.

Animal Spirits:Spontaneous optimism and urge to action among businesses, which is conditioned by the socio-economic and political environment.

Too Big to Fail: The "too big to fail" means that certain corporations are so large and so interconnected that their failure would be disastrous to the greater economic system, and therefore they must be supported by government when they face potential failure.

1.2.2 Creation of PSUs

Factors that lead to market failure are:

1. **Non-excludability** [1]: A market characteristics where a producer cannot prevent an individual-physically or by demanding an appropriate price-from consuming a good or a service.

2. **Non-rivalry in consumption** [1]:A market characteristics where the consumption of a good or a service by an individual does not affect consumption by another individual.

A good or a service characterized by non-excludability and non-rivalry in consumption is known as (Pure) Public goods [1].

Government created many PSUs in order to correct the market failures and also nationalized few private entities which includes sectors such as bakery, watches, hotels, civil aviation, etc. Even today many economist debate over the issue that whether or not Indian government was right in establishing or nationalizing the firms [1].

1.3 Basics of Statistics

1.3.1 Hypothesis Testing

It is a statistical method whether to reject the given hypothesis or not. It is used to find out the whether the sample belongs to the given population or not.

Hypothesis testing is formulated using two hypotheses:

1. H_0 : Null hypothesis
2. H_1 : Alternate hypothesis

To check whether H_1 is likely true or not. We either reject the H_0 or not reject H_0

Not rejecting H_0 does not mean we accept H_0. It just means that we do not have sufficient information to support H_1

There are two types of error in Hypothesis testing:

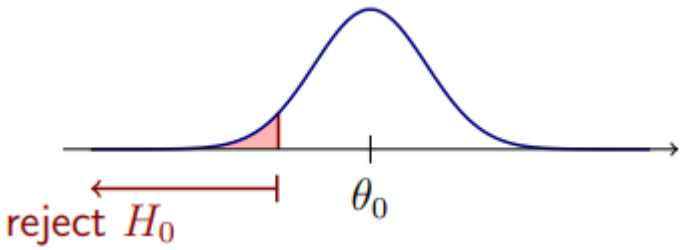
Type I error : The acceptance of H_1 when H_0 is true is a Type I error, denoted by (α).

Type II error : Not rejecting H_0 when H_1 is true is a Type II error, denoted by (β).

	H_0 is true	**H_1 is true**
Do not reject H_0	Correct decision	Type II error
Reject H_0	Type I error	Correct decision

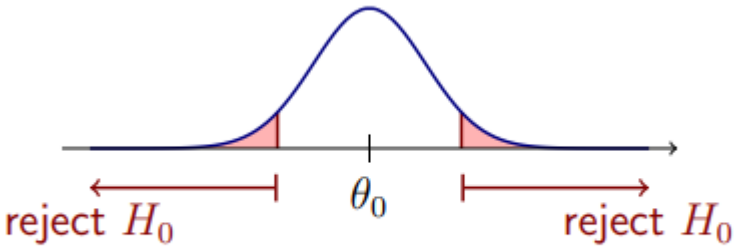
One tailed test:

H_0: $\theta = \theta_0$ (Sample mean is equal to Population Mean)
H_1: $\theta > \theta_1$ ($\theta < \theta_1$) (Sample mean is greater than (or less than) Population Mean)



Two tailed test:

H_0: $\theta = \theta_0$ (Sample mean is equal to Population Mean)
H_1: $\theta \neq \theta_0$ (Sample mean is not equal to Population Mean)



P-value: It is the lowest level of significance at which one rejects H_0 or alternatively it is the minimum probability of a type I error with which H_0 can still be rejected.

1.3.2 Hypothesis testing using unequal variance t-test (Welch's t-test)

Welch's t-test is used when the number of samples in each group is different and the variance of the two data sets is also different.

Welch's t-test is used to determine whether or not the two sets of data is significantly different from each other.

We use the following formula to calculate t-value and degree of freedom for unequal variance T

$$t - value = \frac{mean_1 - mean_2}{sp} \tag{1.1}$$

Where,

$$sp = \sqrt{\frac{var_1^2}{n_1} + \frac{var_2^2}{n_2}} \tag{1.2}$$

And,

$$degrees\ of\ freedom = \frac{(\frac{var_1^2}{n_1} + \frac{var_2^2}{n_2})^2}{\frac{(\frac{var_1^2}{n_1})^2}{n_1 - 1} + \frac{(\frac{var_2^2}{n_2})^2}{n_2 - 1}} \tag{1.3}$$

Based on the t-value and degree of freedom compared against a value obtained from a critical value table. This comparison helps to determine how likely the difference between the means occurred by chance, or whether the data sets really have intrinsic differences.

1.4 Correlation

Correlation, in the finance and investment industries, is a statistic that measures the degree to which two securities move in relation to each other [18].

For example, in finance correlation relation can be used to find out the relation between the stock price and the P/E ratio. Whether a strong strong P/E ratio affects the Market Capitalization of the company. In my thesis I have used the correlation relation to find out the relation between LIC holding in PSUs and the Market Capitalization of the PSUs. It is used to find out the trend in the LIC holdings with respect to Market Capitalization of the PSUs.

Correlation is used to find out the how strong the relationship is and this value is calculated using the below Coefficient Formula:

$$r = \frac{\sum(X - \bar{X})(Y - \bar{Y})}{\sqrt{\sum(X - \bar{X})^2}\sqrt{\sum(Y - \bar{Y})^2}} \tag{1.4}$$

where

$$\begin{gathered} \mathrm{R} = \text{the correlation coefficient} \\ \overline{X} = \text{the average of observations of variable X} \\ \overline{Y} = \text{the average of observations of variable Y} \end{gathered}$$

Positive relationship between two variables implies that if one variable increase other variable also increases and vice versa. Similarly, Negative relationship between two variables implies that if one variable increases other decreases and vice versa. In both Positive and negative correlation, whether the correlation between two variable is strong or weak depends on how close is the value to +1 or -1 respectively

The formula returns a value between -1 and 1, where:

- Any value close to +1 indicates a strong positive relationship while the relationship is weak positive if it is close to 0 but positive.
- Any value close to -1 indicates a strong negative relationship while the relationship is weak negative if it is close to 0 but negative.
- A result of zero indicates no relationship at all.

I have added the correlation values between LIC holdings and Market Capitalization in table 2.

Chapter 2

Investment Regulation for LIC and Its investment in Various Corporation

2.1 About LIC

We quote from [20], The Parliament of India passed the Life Insurance of India Act on 19 June 1956 creating the Life Insurance Corporation of India, which started operating in September of that year. It consolidated the business of 245 private life insurers and other entities offering life insurance services; this consisted of 154 life insurance companies, 16 foreign companies and 75 provident companies.

Life Insurance Corporation (LIC) is the largest insurance company of India with close to 75% of the market share in the Insurance sector. LIC has over the years proved to be a reliable company and its brand name is held in high regards by the customers. LIC also happens to have a high claim settlement ratio of over 90% which is the highest amongst all the insurance companies operating in India.

As stated on the official website [2,3] LIC is also one of the leading financial institutions of India and provides loans to corporates and also makes investments in state-owned and private companies.

We quote from the LIC website [2] - one of the major activities of LIC is to provide long term finance to various entities. It provides Long-term debt finance to:

1. Corporate entities by way of
    a. Corporate term loans
    b. Subscription to Bonds
    c. Subscription to Debentures
2. Towards subscription to Alternative Investment Funds.
3. For Project finance through Consortium lending (Minimum eligibility).

According to their Annual report of 2011 - 12 [4], LIC functions with 2048 fully computerized branch offices, 8 zonal offices, around 113 divisional offices, 2,048 branches and 1408 satellite offices and the Central Office it also has 54 customer zones and 25 metro-area service hubs located in different cities and towns of India. It also has a network of 1,537,064 individual agents, 342 Corporate Agents, 109 Referral Agents, 114 Brokers and 42 Banks for soliciting life insurance business from the public. [20]

2.2 Investment regulation for LIC

2.2.1 National Investment Fund (NIF)

The National Investment Fund (NIF) is a fund created by the government in which all the proceeds from the government's disinvestment in the PSUs are channeled. This fund is used by the government to:

1. Finance certain social sector schemes.
2. To meet the capital investment needs of those state firms which are profitable as well as revivable state firms.

In January 2013, the government authorized the NIF to buy shares of PSUs, including banks and insurance companies. The intention of the government here was to use the funds from the NIF to recapitalize the state-owned banks and insurance companies [5].

2.2.2 Regulations for LIC's investments

Some of the important regulations governing LIC's investments [2] (and those that are relevant to this report and analysis):

1. LIC must invest a minimum of 50% of its corpus fund in central and state government securities.

2. LIC must invest a minimum of 25% of its corpus in central government securities.

As per IRDA Norms, Insurance companies cannot hold more than 15% stake in any company.

2.2.3 Relaxation by IRDA

Although, LIC is not allowed to hold more than 15% of stake in a company but there are cases in which many times LIC has seeked special permission from IRDA for holding more than 15% in a corporation as a part of their strategic investment. In the case of Corporation Bank, LIC was allowed by IRDA to hold more 15% stake.

Although many of their investment has paid well and generated a huge profit for LIC by selling their equities. It is interesting to know what happens in the case of PSUs. Does government use LIC to help fund other state-owned entities by buying their shares during disinvestment process or otherwise supporting the companies during their worst period?

2.3 Infrastructure Leasing and Financial Services (IL & FS)

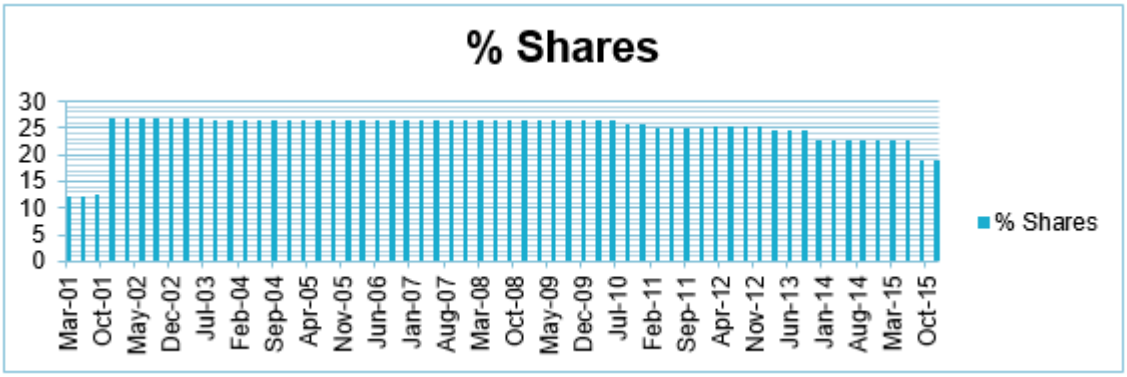
IL & FS used its first mover advantage to acquire Infrastructure projects. The group has at least 24 direct subsidiaries, 135 indirect subsidiaries, six joint ventures and four associated companies. IL & FS is sitting on a debt of about Rs 91,000 crore. IL & FS has acquired debt to equity ratio of 18.7.

As of March 2018, the largest shareholders of IL & FS Investment services were as follows [6, 16]

- LIC : 25%
- ORIX Corporation, Japan (a part of Mitsubishi Keiritsu): 23%
- IL & FS Employees welfare trust : 12%
- Abu Dhabi investment authority : 12%
- Abu Dhabi investment authority : 12%
- HDFC Ltd : 9%
- Central bank of India : 7%
- State Bank of India : 6%

The situation could have a direct bearing on Life Insurance Corporation policyholders in the country as LIC has over 25 per cent stake in IL&FS. LIC, which has people's entire savings parked in it, has gone on to raise its stake in a company which has an evidently flawed model of operation that involves financing long-term infrastructure projects through mostly short-term borrowings, is problematic.

The government was forced to take control of IL&FS as it was possible that it would have caused massive damage to the financial markets and the economy. In very cases, Government take control of Private Corporations.



Graph1: LIC's investment in Corporation Bank in terms of percentage of share holding

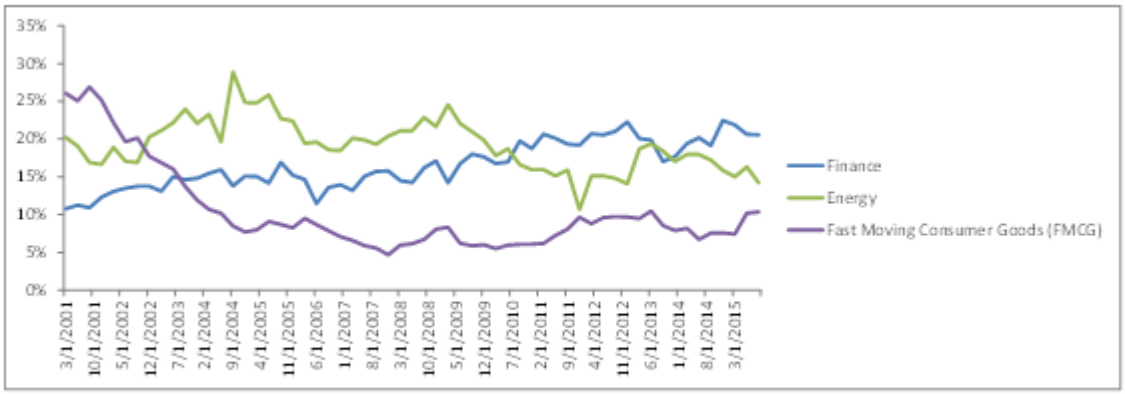
In Appendix 1, we can observe that in many cases in LIC was allowed to increase its stake above 15%.

IRDA has allowed LIC to increase stake in private companies also, like in the case of L&T and ITC. These investment has made a huge profit for LIC. It is interesting to know the returns that PSUs provided where ever LIC has acquired more than 15% stake in a PSUs. I have thoroughly analysed the top 22 PSUs based on their market cap as LIC has been investing in those companies for atleast 5 years.

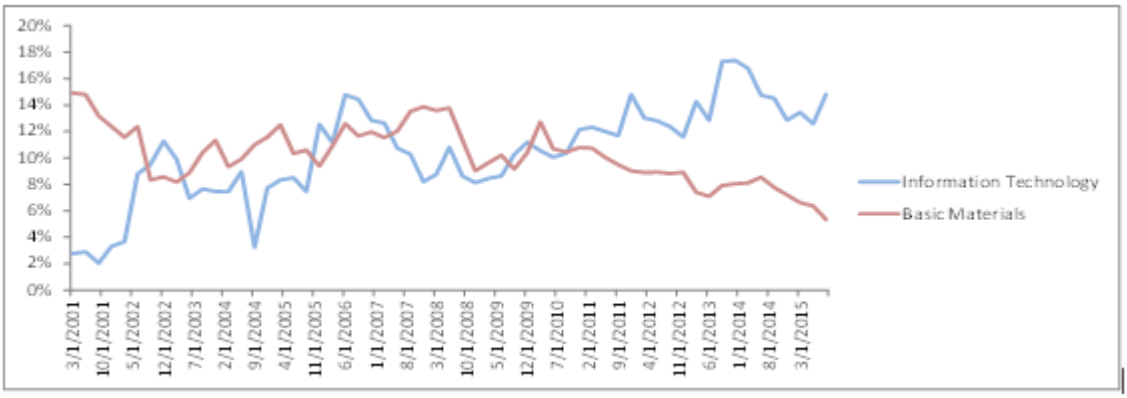
LIC has recently acquired IDBI Bank and we will also discuss the case of IDBI Bank in the subsequent chapters.

2.4 LIC Investment

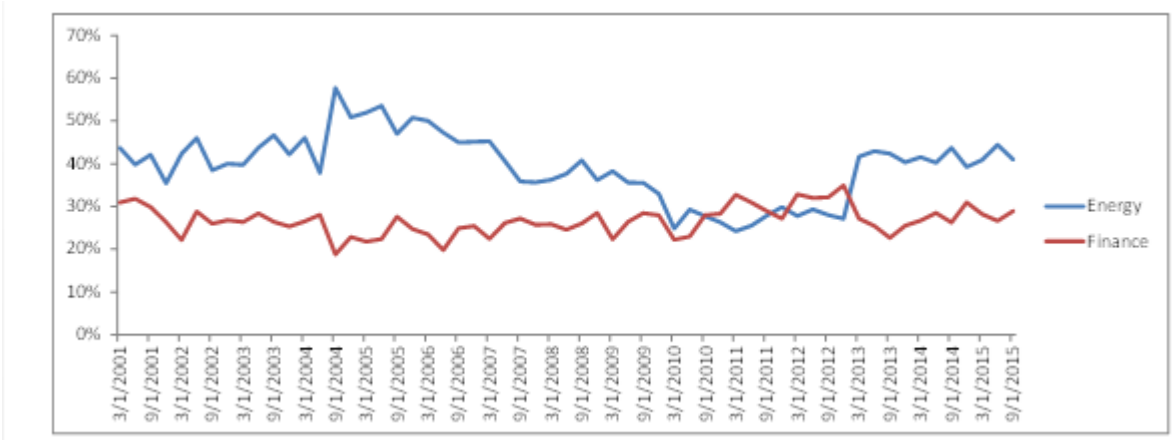
LIC is a major stakeholder in the market and invests a high amount of capital in various companies. Of all the investments made by LIC in the equity markets, the majority have been in Finance, Energy and FMCG sectors. Investments in IT have constantly increased whereas there has been a decrease in the investments in the basic baterials sector.



Graph2: LIC Ownership in top 3 sectors



Graph3: LIC Ownership in IT and Basic Materials as a percentage of total invested capital



Graph4: Energy and Finance sectors as a percentage of total public investments

Around 70% of LIC's investments in the PSUs have been in the Energy and Finance sectors.

LIC's investments in 54 PSUs from 01 January 2001 to 31 December 2015 were studied by gathering data of these investments from the Prowess database. We have selected these companies for analysis because LIC has invested in these companies for a substantial amount of time, allowing us to analyze trends and draw inferences.

Of these 54 companies, we observed that for the companies listed in Table 1,

LIC's investment in their stocks increased when their stock prices dropped. This phenomenon can be explained by two reason:

1. LIC was taking advantage of the low share prices and building up its investment portfolio to make profits by selling the shares later at a higher rate.

2. LIC was providing support to PSU stocks in falling markets and at times bailing out government's disinvestment program by stepping in to buy shares of PSU companies.

The first reason mentioned above seems more likely as that is what the first rule of investing. It is important to find out which is the actual reason as the money which LIC invest is policy holder's money and will affect the common people.

We are interested in analyzing the second reason as many times LIC has been criticized by financial analyst about their continuous investment in PSUs. This seems to be a problem that might affect the LIC in a longer term as it was in the case of IL & FS. LIC has invested in the PSUs stocks for sufficient amount of time and we will analyze the return they have provided for LIC and also compare it with the Return against Private corporations.

Table 2, includes those companies where correlation between LIC Equity & The corresponding Market Cap is negative. As in the Appendix 2, we can see that there has been increase in holding of LIC whenever there is a decrease in their market cap.

2.4.1 From the news articles

The government liberalized the insurance sector in the year 1999 and allowed foreign insurance companies to create joint ventures with Indian partner to offer insurance products in India. The 'Insurance Regulatory and Development Authority (IRDA)' was set up to monitor the sector and the insurance companies operating in India.

Following this, there were a slew of foreign companies that entered into joint ventures with Indian partners and introduced new and innovative insurance

1. Allahabad Bank	2. Balmer Lawrie Invsts. Ltd.
3. Bank Of Baroda	4. Bank Of India
5. Bank Of Maharashtra	4. Bank Of India
7. Bharat Petroleum Corpn. Ltd.	8. Bharat Heavy Electricals Ltd.
9. Canara Bank	10. Central Bank Of India
11. Chennai Petroleum Corpn. Ltd.	12. Container Corpn. Of India Ltd.
13. Dena Bank	14. Dredging Corpn. Of India Ltd.
15. Hindustan Petroleum Corpn. Ltd.	16. Indian Overseas Bank
17. N M D C Ltd.	18. National Aluminum Co. Ltd.
19. Oriental Bank Of Commerce	20. Power Finance Corpn. Ltd.
21. Punjab & Sind Bank	22. Punjab National Bank
23. Rural Electrification Corp Ltd.	24. State Bank Of India
25. Steel Authority Of India Ltd.	26. Syndicate Bank
27. Uco Bank	28. Union Bank Of India
29. United Bank Of India	30. Vijaya Bank

Table 1: List of companies in which LIC's investment increased when their stock price decreased

products to Indian consumers. The government also provided more autonomy to the LIC, which was allowed to invest 50% of its funds in the equity markets in approved investment categories and appoint fund managers to manage its investments [7].

Over the years, it has been observed that the LIC generally buys shares in the equity markets when the stock market is down and the shares of good companies are available at a reasonable price. This can be inferred from the various news reports and by observing the investment patterns of the LIC during market downturns. This has been a fairly regular trend observed in the buying patterns of insurance companies. They can be said to be contrarian players – buying when the markets are down or low and selling when the markets hit a high.

In the year 2011-12, LIC increased its share holdings in public sector banks (in which the government is a majority stake holder) to help the banks to infuse capital as the recession had caused a deficit of capital for some of the

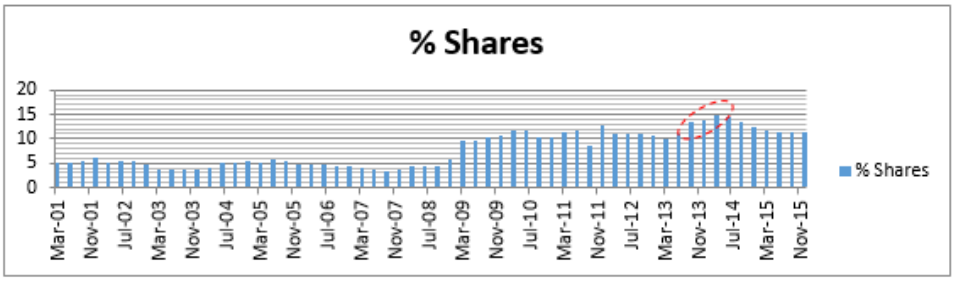
Company names	Correlation between LIC Equity & Market Capitalization
Allahabad Bank	-0.13498
Bharat Electronics	-0.02095
BPCL	-0.42026
BHEL	-0.06781
Canara Bank	-0.09847
Container Corporation	-0.4957
HPCL	-0.36641
Indian Overseas Bank	-0.19586
National Aluminium	-0.6092
Oriental Bank	-0.03986
Power Finance	-0.09171
Rural Electrification	-0.14026
SAIL	-0.09959
Union Bank	-0.08095
Vijaya Bank	-0.26354
Rashtriya Chemicals	-0.11028
MTNL	-0.64565
Indian Bank	-0.56985
Andhra Bank	-0.61563
ONGC	-0.02848
NTPC	-0.88757

Table 2: Correlation Value between LIC Equity & Market Capitalization

banks and financial institutes [8].

During the government's stake sell in PSUs, it is observed that the LIC, in the capacity of an institutional investor, subscribes to the share offerings. The stock offering of some of PSUs is not fully subscribed to by the institutional investors, especially if the investors believe that the stock is not worth investing during the IPO (Initial Public Offering) or the FPO (Follow-on Public Offering). In such cases, the LIC has been observed to subscribe for a large stake in the share purchases.

A good example of this is when the State Bank of India (SBI) offered to sell some of its shares to foreign and domestic financial institutes in January 2014. But when the shares were not picked up by the private institutional investors, the LIC stepped in and picked up close to 41% of the SBI's shares [9]. This can be clearly observed from the graph 2 below where we can see the increased in the LIC's investment in SBI in the quarter January-March 2014.



Graph5: LIC's investment in SBI in terms of percentage of share holding

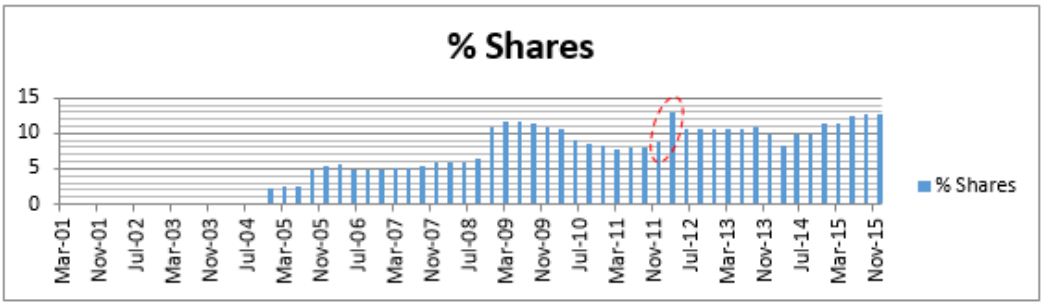
Now, it is not clear whether the SBI or the government requested the LIC to step in or it was the LIC's independent decision of buying into SBI shares because the LIC's managers claim that their investment decisions are based on their own analysis of whether the investment is sound or not and not on instructions from the government. But it is observed that the LIC has time and again stepped in when capital infusion into the state-owned banks was required and private players or investors were reluctant to buy shares of these banks.

Critics and other investors accuse the government of forcing the LIC to subscribe to the shares so as to realize full value from the stake sell. Although the government has denied this, the LIC has been perceived as the last resort for the government to meet its disinvestment targets [10].

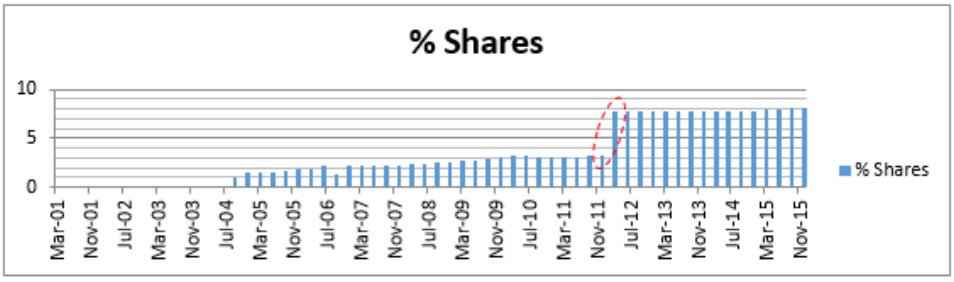
It can be argued that the LIC's fund managers have the autonomy to take independent decisions on their investment portfolio and need not listen to the diktat from the government. But the LIC's purchases in these companies have been strategic and beneficial for the government [8]. Some of the notable examples are:

1. The LIC hiking its total investment in Allahabad Bank from nearly 8% to 13%. (Please refer to Graph 8).

2. The LIC's purchase of ONGC shares during the ONGC's share sale. (Please refer to Graph 9)



Graph6: LIC's investment in Allahabad Bank in terms of percentage of share holding



Graph7: LIC's investment in ONGC in terms of percentage of share holding

Also, the government has regularly tapped the share markets to sell its stakes in the PSUs. But overall, the investor response to share sale of the PSUs has been lukewarm to say the best. In such situations, the LIC has been observed to pick huge stakes in the PSUs and have bailed the government out.

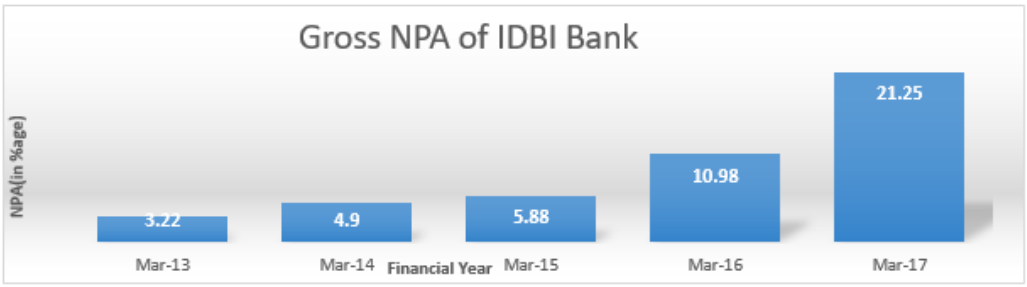
2.5 LIC IDBI Merger

In January, 2019 LIC completed his acquisition of IDBI Bank by controlling the majority stakes in IDBI Bank. LIC infused 13,000 Cr. For acquiring it and this move by LIC has become a topic of debate and was also criticized by many financial analyst in India. LIC investment in IDBI Bank depends on its ability to turn the IDBI bank business around, otherwise it will badly affect the policyholder's money. Many critics believe this move by LIC as bailing out IDBI bank through its worst period. No private investor has shown an interest in IDBI Bank even though the government has been wanting to sell equity for over two years now [11] .

There seems to be a very strong reason for its lack of attractiveness. IDBI Bank accounts is enough to understand that why investment in IDBI Bank is deemed risky for any institutional Investor.

The lender had Rs 55,600 crore in bad loans at the end of the March quarter [12]. According to rating agency ICRA, 36 percent of the bank's total loan book is seen as stressed [19].

IDBI growing NPA has created a huge problem for the government and below graph shows increase in NPA over the years. LIC has chosen to pick up one of the worst performing banks in terms of NPA.



Graph8: NPA of IDBI Bank

Moreover its capital adequacy ratio remains below regulatory requirements. LIC is supposed to infuse more capital just to clean the mess that IDBI has created and to make it regulatory complaint. The bank also reported a net loss of Rs 3,602.49 crore during the September quarter of 2018-19 [11].

While LIC has taken this bet on IDBI Bank, the problem is not the bet that LIC has taken but the manner in which this deal got completed because it is not clear whether LIC was genuinely interested to acquire Bank or is merely following the shareholders order. The transparency behind this deal is very important as LIC uses policy holder's money to invest in stocks and carry out acquisition and LIC poor investment will reflect in the form of reduced bonus.

Since LIC is not publically listed company and using policyholder's money, the motivating factor behind this deal is not known. If LIC would have been a listed company, it would have to give an explanation to its shareholders for his decision of acquiring IDBI Bank.

Chapter 3

Return on LIC Investment & its performance vs. other Insurance Corporation

3.1 Sensex Historical Returns

In this section we will analyses the returns that Sensex has provided from 1991 to 2019. This analyses is important for the very reason that performance of Sensex gives you the idea of the condition of Indian Economy. It provides an accurate gauge of the Indian Economy.

Sensex

It is the benchmark index of the Bombay Stock Exchange in India and it represent the 30 of the largest and most well – capitalized stocks on the exchange.

The constituents of the index are selected based on the following five criteria:

1. The company should be listed in India on BSE
2. The company should be a large-to mega-cap stocks
3. The company should be relatively liquid

4. The company should generate revenue from core activities

5. The company should keep the sector balanced broadly in line with the Indian equity market

We have Sensex returns since its inception. Sensex annual return is absolute return while Sensex 5 and 10 years return is compound return (CAGR).

Year	**Sensex**	**Annual Return**
1979	100	
1980	129	29.0
1981	173	34.1
1982	218	26.0
1983	212	-2.8
1984	245	15.6
1985	345	40.8
1986	574	66.4
1987	510	-11.1
1988	398	-22.0
1989	714	79.4
1990	781	9.4
1991	1168	49.6
1992	4285	266.9
1993	2281	-46.8
1994	3779	65.7
1995	3261	-13.7
1996	3367	3.3
1997	3361	-0.2
1998	3893	15.8
1999	3740	-3.9
2000	5001	33.7

Year	Sensex	Annual Return
2001	3604	-27.9
2002	3469	-3.7
2003	3049	-12.1
2004	5591	83.4
2005	6493	16.1
2006	11280	73.7
2007	13073	15.9
2008	15644	19.7
2009	9709	-37.9
2010	17528	80.5
2011	19445	10.9
2012	17404	-10.5
2013	18836	8.2
2014	22386	18.8
2015	27957	24.9
2016	25342	-9.4
2017	29621	16.9
2018	32969	11.3
2019	38673	17.3

Table 3: Sensex Annual Return

Year	Sensex	5 year return
1979	100	
1980	129	
1981	173	
1982	218	
1983	212	
1984	245	19.6
1985	345	21.7

Year	Sensex	5 year return
1986	574	27.1
1987	510	18.5
1988	398	13.4
1989	714	23.9
1990	781	17.8
1991	1168	15.3
1992	4285	53.1
1993	2281	41.8
1994	3779	39.6
1995	3261	33.1
1996	3367	23.6
1997	3361	-4.7
1998	3893	11.3
1999	3740	-0.2
2000	5001	8.9
2001	3604	1.4
2002	3469	0.6
2003	3049	-4.8
2004	5591	8.4
2005	6493	5.4
2006	11280	25.6
2007	13073	30.4
2008	15644	38.7
2009	9709	11.7
2010	17528	22.0
2011	19445	11.5
2012	17404	5.9
2013	18836	3.8
2014	22386	18.2
2015	27957	9.8
2016	25342	5.4
2017	29621	11.2

Year	Sensex	5 year return
2018	32969	11.8
2019	38673	11.6

Table 4: Sensex Five years returns

Year	Sensex	10 year return
1979	100	
1980	129	
1981	173	
1982	218	
1983	212	
1984	245	
1985	345	
1986	574	
1987	510	
1988	398	
1989	714	21.7
1990	781	19.7
1991	1168	21.0
1992	4285	34.7
1993	2281	26.8
1994	3779	31.5
1995	3261	25.2
1996	3367	19.4
1997	3361	20.8
1998	3893	25.6
1999	3740	18.0
2000	5001	20.4

Year	Sensex	10 year return
2001	3604	11.9
2002	3469	-2.1
2003	3049	2.9
2004	5591	4.0
2005	6493	7.1
2006	11280	12.9
2007	13073	14.5
2008	15644	14.9
2009	9709	10.0
2010	17528	13.4
2011	19445	18.4
2012	17404	17.5
2013	18836	20.0
2014	22386	14.9
2015	27957	15.9
2016	25342	8.4
2017	29621	8.5
2018	32969	7.7
2019	38673	14.8

Table 5: Sensex 10 years returns

	1 year	5 years	10 years
Positive Return occurrences	40	36	31
Negative Return occurrences	13	3	1
Percentage of Negative Return	33%	8%	3%

Table 6: Frequency of positive and negative returns

Year	CAGR
1979 – 1989	22%
1989 – 1999	18%
1999 – 2009	10%
2009 – 2019	15%

Table 7: Sensex Return of 10 year period

In table 4, we can observe that as you probability of losing money increases as you decrease your time of investment. The probability is very low if you invest for 10 years and risk and volatility also decreases as investment duration increases and vice versa. In the long term, Sensex outpaces Inflation.

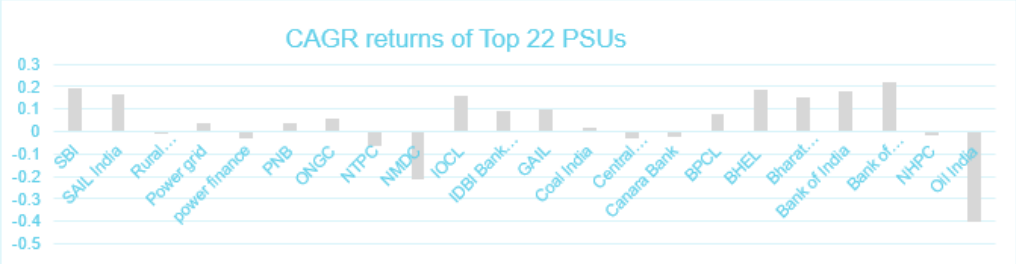
3.2 Return on LIC Investment

In the first chapter, we have mentioned that two possible reason for its investment in PSUs whenever their stock prices decreases. First one being the LIC is taking advantage of buying it at lower prices so as to sell it at higher price later and book the profit. In this section we will analyze the return on LIC investment in top 22 PSUs based on their market and also compare it with the return on Private Corporation to check whether there is a statistical difference between for a considerable amount of time. So as LIC has invested in PSUs for a longer period of time, it is interesting to find out the profit that LIC has booked so far in those companies. As it is clear from the Table 4 that if you invest for the longer period of time the return on investment increases.

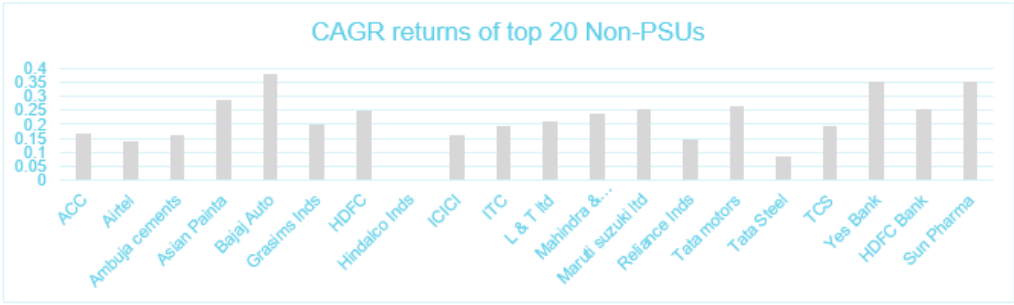
Company Name	Type of company	% holding	Returns
SBI	Public	11.5	0.1892
SAIL India	Public	10.7	0.164
Rural electrification	Public	7.94	-0.013
Power grid	Public	2.72	0.0383
power finance	Public	9.08	-0.0336
PNB	Public	9.75	0.0362
ONGC	Public	8.36	0.0564
NTPC	Public	10.03	-0.0675
NMDC	Public	9.63	-0.2133
IOCL	Public	9.95	0.159
IDBI Bank merged	Public	7.25	0.0923
GAIL	Public	10.73	0.0996
Coal India	Public	5.86	0.0155
Central Bank of India	Public	12.88	-0.0313
Canara Bank	Public	13.75	-0.0264
BPCL	Public	2.32	0.0758
BHEL	Public	14.31	0.1848
Bharat electronica	Public	5.31	0.1544
Bank of India	Public	12.54	0.182
Bank of Baroda	Public	10.92	0.2189
NHPC	Public	3.44	-0.0151
Oil India	Public	4.05	-0.4051
ACC	Private	11.81	0.1682
Airtel	Private	4.62	0.1407
Ambuja cements	Private	8.16	0.1594
Asian Paints	Private	5.37	0.2879
Bajaj Auto	Private	5.26	0.3775
Grasims Inds	Private	7.33	0.2004
HDFC	Private	2.99	0.2507
Hindalco Inds	Private	14.6	0.0064
ICICI	Private	13.48	0.1618
ITC	Private	14.41	0.194
L & T ltd	Private	16.08	0.2112

Company Name	Type of company	% holding	Returns
Mahindra & Mahindra	Private	13.53	0.2378
Maruti suzuki ltd	Private	6.01	0.2533
Reliance Inds	Private	9.4	0.1431
Tata motors	Private	5.17	0.2659
Tata Steel	Private	14.59	0.0882
TCS	Private	2.78	0.193
Yes Bank	Private	8.36	0.3538
HDFC Bank	Private	2.65	0.2559
Sun Pharma	Private	3.36	0.3502

Table 8: CAGR return as on December, 2015 of top 22 PSUs and top 20 Non-PSUs (based on their market cap).



Graph 9: CAGR returns of Top 22 PSUs



Graph 10: CAGR returns of Top 20 Non – PSUs

As on December 2015,

The average return of the top 22 PSUs is 0.039 or 3.91%

The average return of top 20 Private Corporation is 0.214 or 21.4%

It is evident from Graph 1 that many PSUs has given very minimal return so far While graph 2 shows that Private corporation had given a very good returns so far. Apart from Hindalco, Tata steel, Airtel and Reliance Industries all other companies has given more than 15% return. No company has given negative return to LIC. While in case of PSUs as 8 Corporation has given negative returns and 7 PSUs has given more than 10% return to LIC. The risk and volatility associated with PSUs stocks is much higher than Private Corporations. The fact that LIC is investing in PSUs to book profit later doesn't hold true as the CAGR return that PSUs provide is very low and LIC is investing it for a sufficient amount of time to book profit. But most of the PSUs stock is performing below par and LIC is continuously investing in it.

3.3 Two sample t test

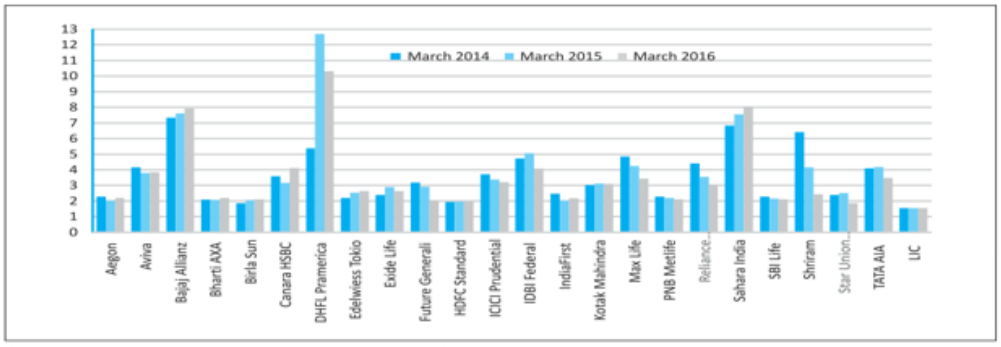
```
Null hypothesis: Difference of means = 0

Sample 1:
 n = 22, mean = 0.0391409, s.d. = 0.144921
 standard error of mean = 0.0308973
 95% confidence interval for mean: -0.0251136 to 0.103395

Sample 2:
 n = 20, mean = 0.21497, s.d. = 0.0907097
 standard error of mean = 0.0202833
 95% confidence interval for mean: 0.172517 to 0.257423

Test statistic: t(40) = (0.0391409 - 0.21497)/0.0377568 = -4.65689
Two-tailed p-value = 3.509e-005
(one-tailed = 1.754e-005)
```

Figure 1: Two sample T-test for finding out the statistical significance between the return by top 22 PSUs and top 20 Non – PSUs based on their market capitalization Sample 1: PSUs and Sample 2: Private Corporation

We did two sample t-test hypothesis to find out whether or not there is a statistical difference in their returns between PSUs and Non – PSUs. The above result shows that 95% of the sample in PSUs lies between -0.0251136 and 0.103395. Which shows that although the returns in PSUs varies a lot but there cumulative mean is still low. Similarly for Private Corporation, 95% of the population lies between 0.172517 and 0.257423 which shows that return that Private Corporation provides is much better than PSUs.

In our t-test, our null hypothesis is that there is no significance difference in their returns between two samples or both the sample comes from the same population. Figure 1 shows the result of the test conducted in GRETL and we found the p – value to be less than 0.05 for both two tailed and one tailed t test. In both the cases, we reject our null Hypothesis and found out that there is a significant difference between the two samples. The reason being the significance in their returns of those two samples is maybe because of the inefficiency of the government to run the PSUs.

3.4 Performance of LIC vs. other Insurance Corporations



Source: *IRDAI Handbook on Indian Insurance Statistics F.Y. 2015-16*

Figure 2: Solvency ratio of Insurance Companies in India [13]

The solvency ratio of an insurance company is the size of its capital relative to all the risk it has taken, which is all liabilities subtracted from total assets [17].

This ratio is used to check the financial stability of an Insurance Corporation in case of financial crisis and Insurance companies are supposed to maintain a minimum solvency ratio of 1.50 so as to pay off their debts in case of Bankruptcy.

As evident from Figure 1. LIC has maintained the minimum solvency ratio required for the three consecutive years as per the Insurance Regulatory Authority of India (IRDA) guidelines. Also, other insurance corporations has maintained a minimum solvency ratio of at least 2. Other Insurance corporations has far better solvency ratio than LIC. Figure 1. Shows that LIC is not financially sound as compared to their competitors.

Higher solvency ratio implies that companies has more assets than liabilities and is usually considered good for the policyholders.

Chapter 4

Summary and Future Work

4.1 Summary

1. If we analyze figure 5 and figure 6, we can see the considerable difference between the return on Investment of LIC in PSUs and Non-PSUs. This striking difference indicates that investment strategy made by LIC in both PSUs and Non – PSUs might be different.

2. Table 1, indicates that Investment in PSUs seems risky and toxic for any investor (both retail and Institutional) and also the holdings by LIC in PSUs stocks is very significant considering the return they have provided to their shareholders.

3. Figure 7 shows the solvency ratio of different life insurer and LIC has maintained the minimum solvency ratio and lowest compared to its competitor. Although, LIC has the highest claim settlement ratio and also the trusted life insurance company in India. But solvency ratio of LIC forces us to question the ability of LIC to settle its claim in case of financial crisis.

4. Considering one of the biggest Institutional investor in India, investment in PSUs stock forces us to question whether government is using LIC to meet their disinvestment targets or LIC is bailing out the PSUs.

5. LIC investment in PSUs seems to be toxic and investment in PSUs might hurt LIC in the future.

6. Further to quote Mr. Vivek Kaul [16], "it is also important to state here that the money that LIC has is not government's money. LIC manages the hard earned savings of the people of India and given that these savings need to be treated with a little more respect".

7. The reason behind relaxing the IRDA norms for LIC is something which is not yet clear.

8. After conducting the t-test i.e. Fig. 1 we can see that there is a significant difference between the two samples. The possible reason could be that the investment strategy made for PSUs and Non-PSUs could be different and thereby creating a statistical significance in both the samples.

9. If the investment strategy of the LIC is to book profit then they are successfully doing it in Private corporations but since PSUs are giving them bare minimum returns the interest of LIC in PSUs is a very curious question to ask.

10. Since LIC is not listed on any stock exchange and it trades on Policyholders Money, they are not obliged to give a rationale behind their investment and LIC do take advantage of that.

4.2 Future Work

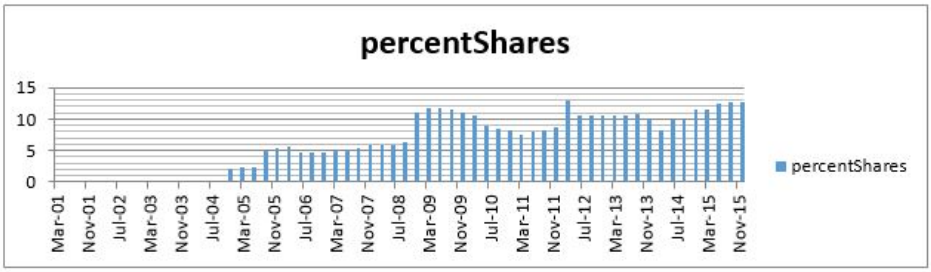
Since we have shown that Profit booking is not the reason for LIC to invest in PSUs stock. It will be interesting to see how IDBI performs over the next few years and how much more money does LIC infuses and does this investment affect the Policyholder in the long run.

We can also analyze the investment of other insurance corporation in India and compare it with LIC. Since proper disinvestment data is not available but LIC investment in disinvestment from 2000 can also be studied and whether or not Private Investor also take part in the buying of PSUs share during Disinvestment process.

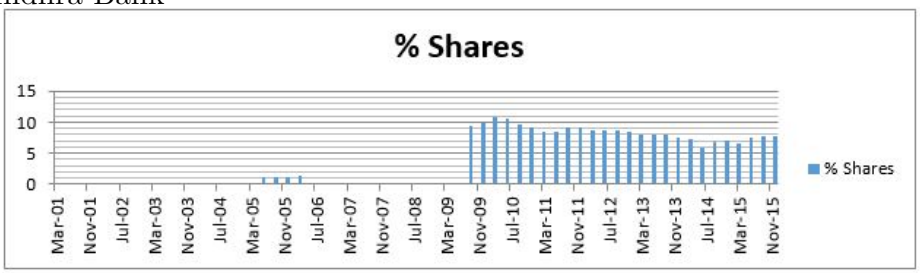
Appendix -1; Trends analyzed from the data collected from the Prowess Database

The following are the graphs of the trends that were derived from the 15 years' historical data extracted from the Prowess database for LIC's investment in 54 companies in that period. The first graph shows the percentage of shares that LIC owned in that particular company over the period of time. The second graph shows the closing share price of that company over the same period of time. One to one comparison of the percentages of shares owned by LIC in the company versus the share closing price of that company can be observed for any period.

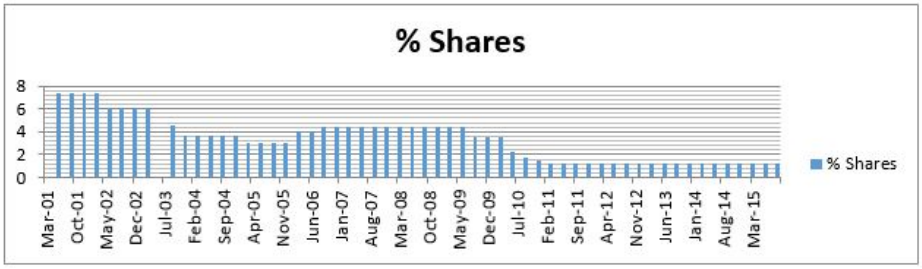
1. Allahabad Bank



2. Andhra Bank

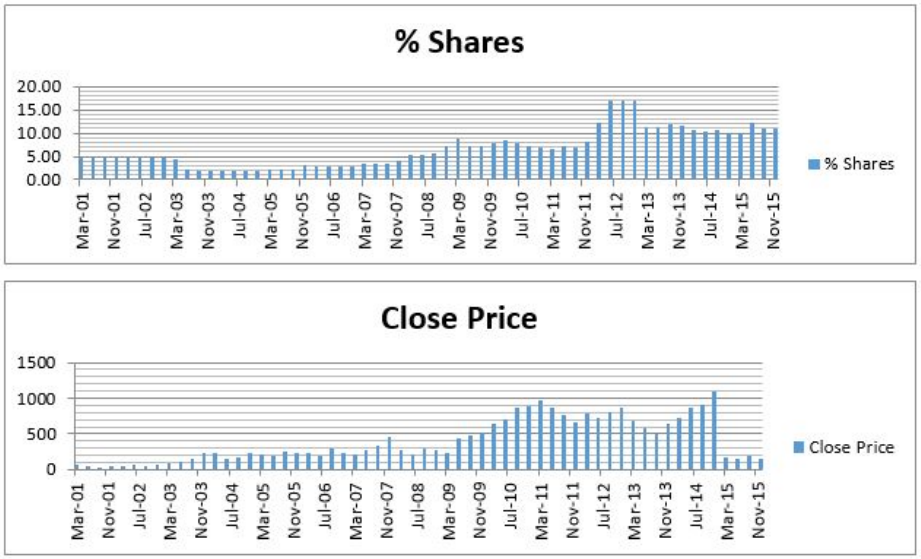


3. Balmer Lawrie & Co. Ltd.

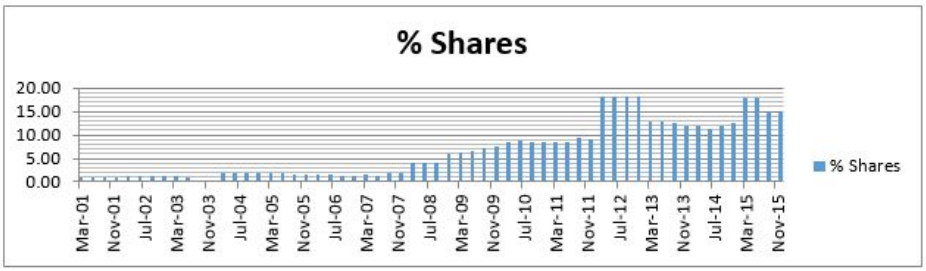


4. Balmer Lawrie Invsts. Ltd.

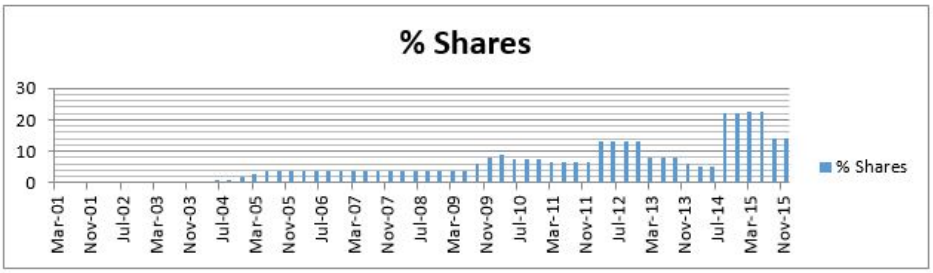
5. Bank Of Baroda



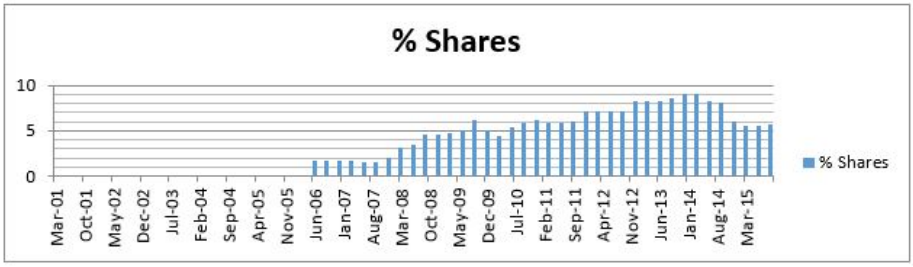
6. Bank Of India



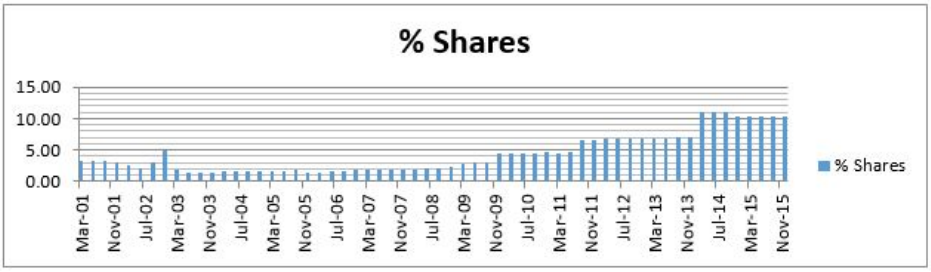
7. Bank Of Maharashtra



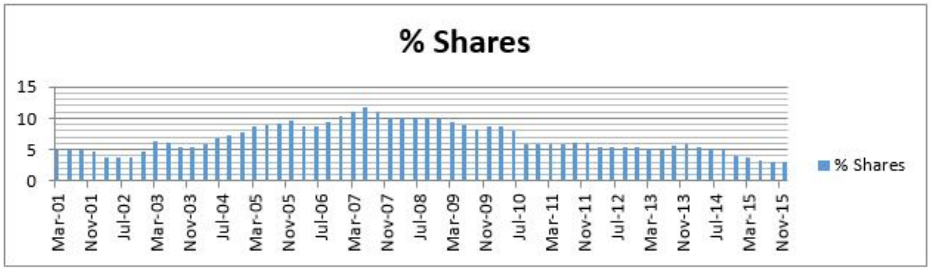
8. Bharat Electronics Ltd.



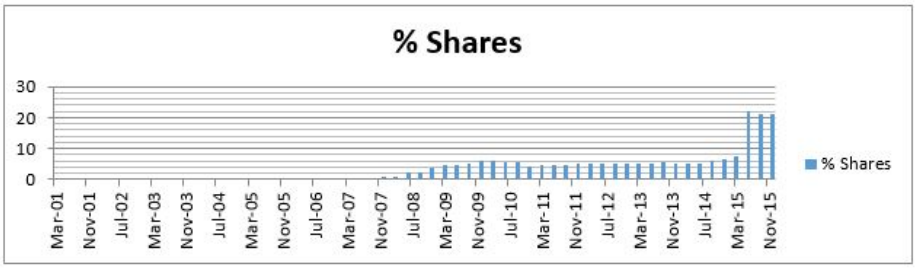
9. Bharat Heavy Electricals Ltd.



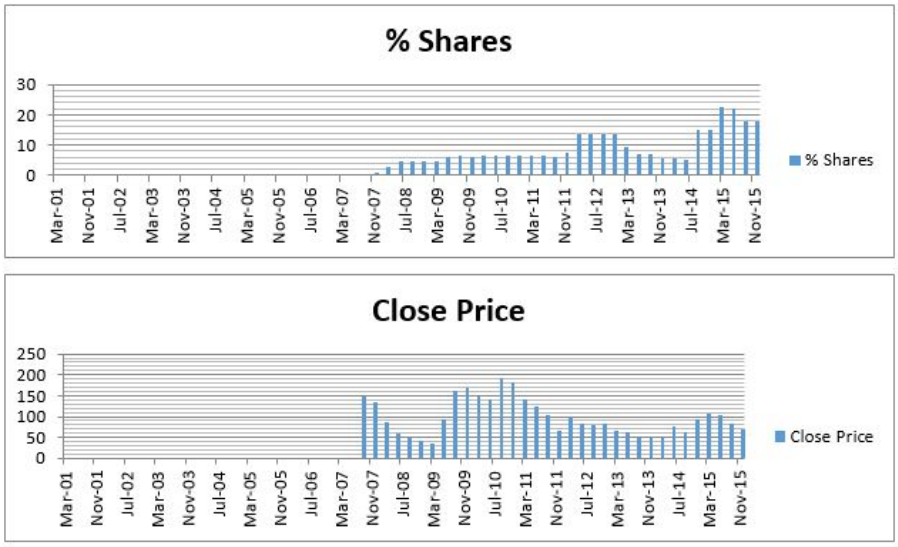
10. Bharat Petroleum Corpn. Ltd.



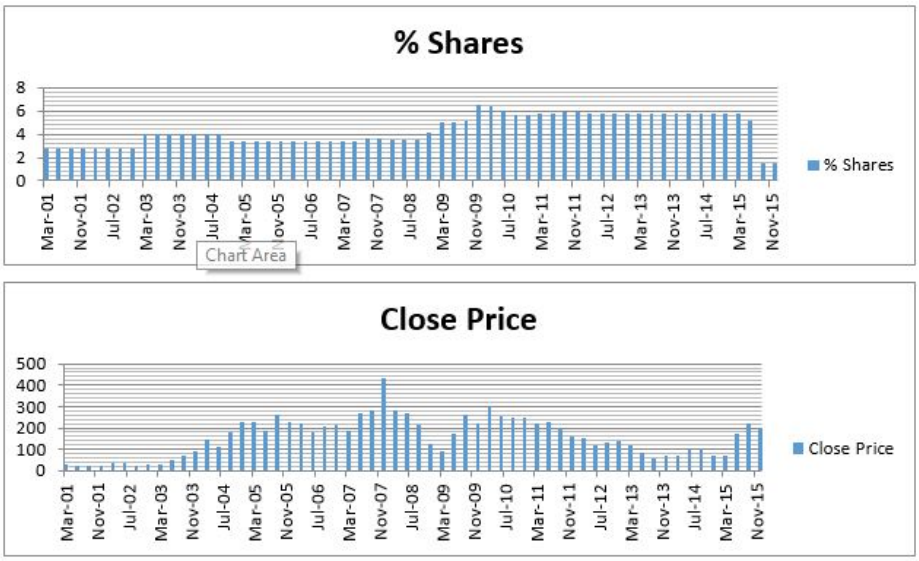
11. Canara Bank



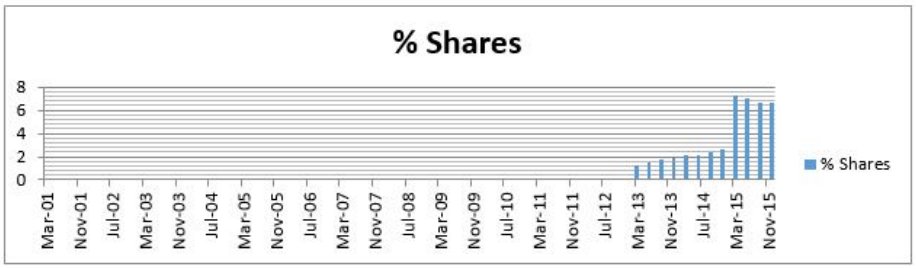
12. Central Bank Of India



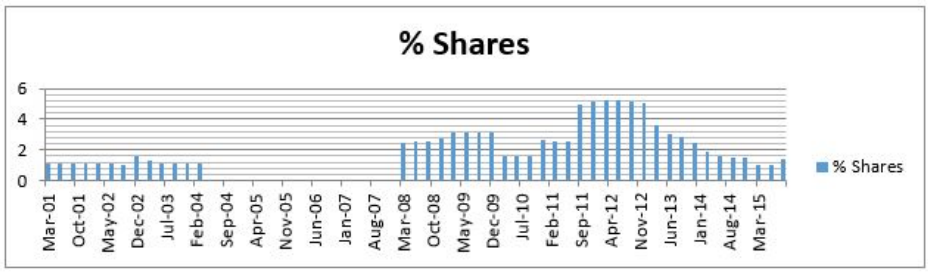
13. Chennai Petroleum Corpn. Ltd.



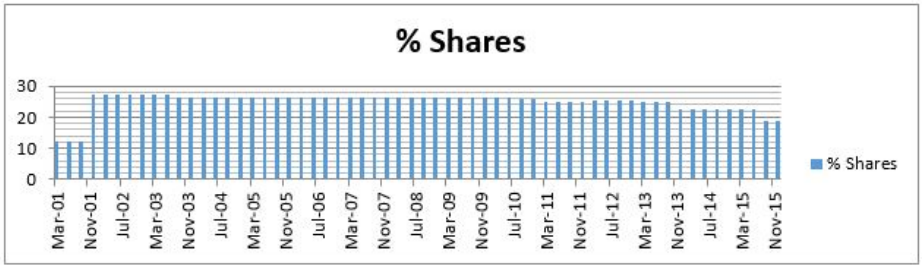
14. Coal India Ltd.



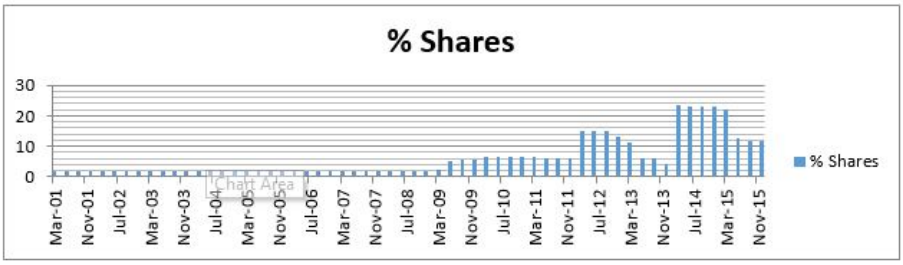
15. Container Corpn. Of India Ltd.



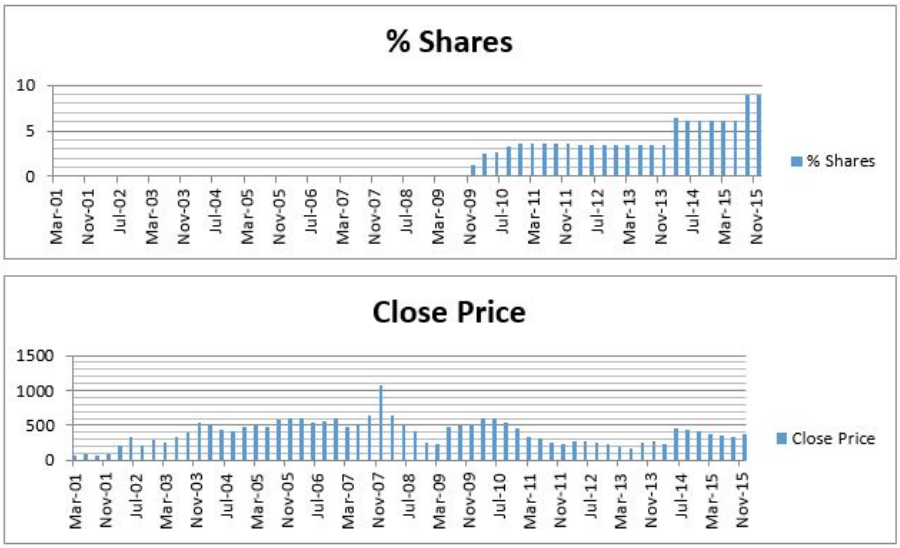
16. Corporation Bank



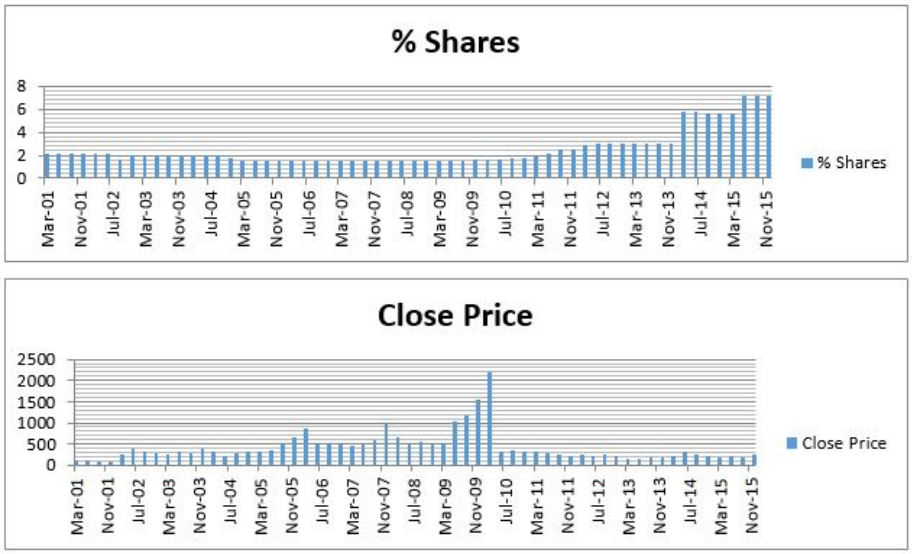
17. Dena Bank



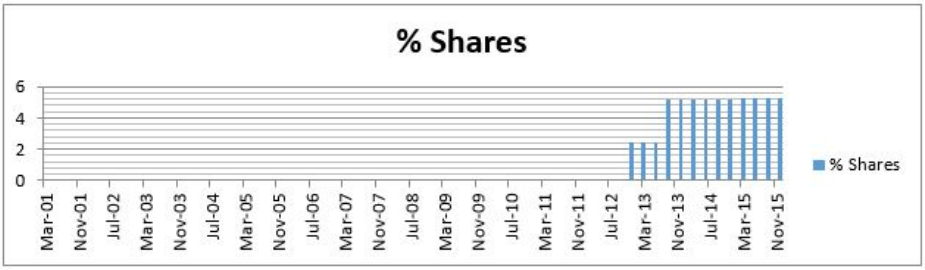
18. Dredging Corpn. Of India Ltd.



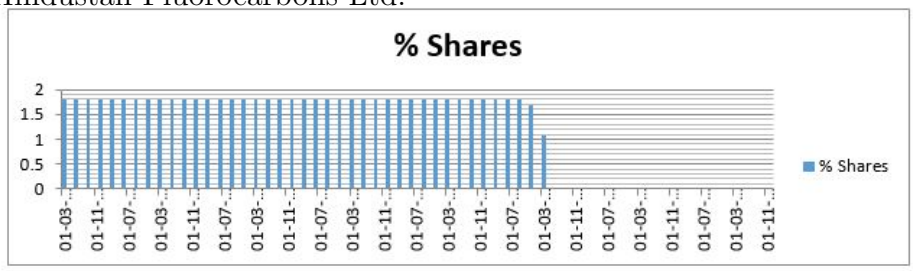
19. Engineers India Ltd.



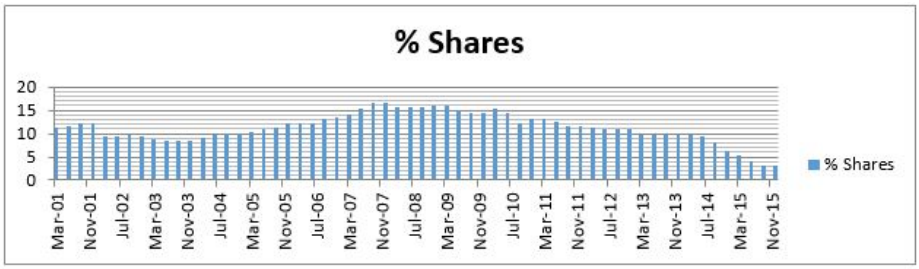
20. Hindustan Copper Ltd.



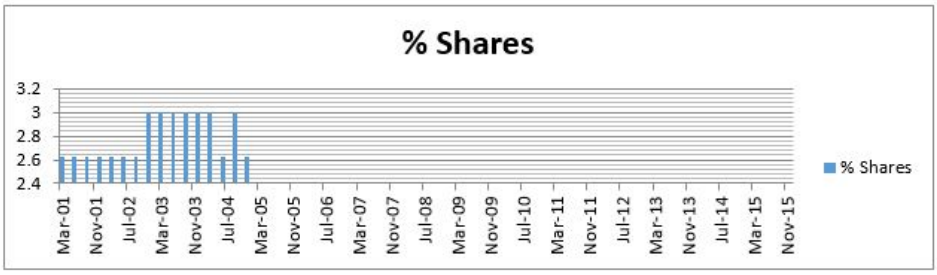
21. Hindustan Fluorocarbons Ltd.



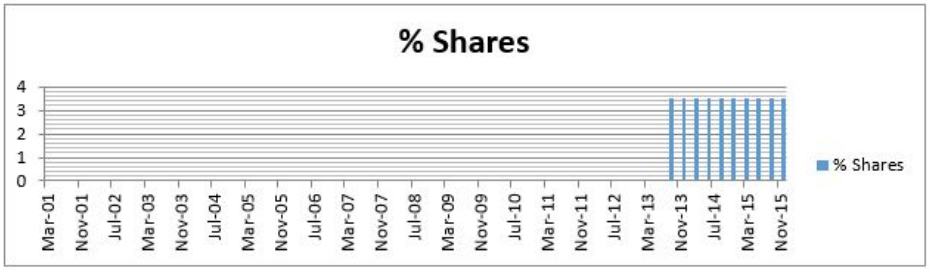
22. Hindustan Petroleum Corpn. Ltd.

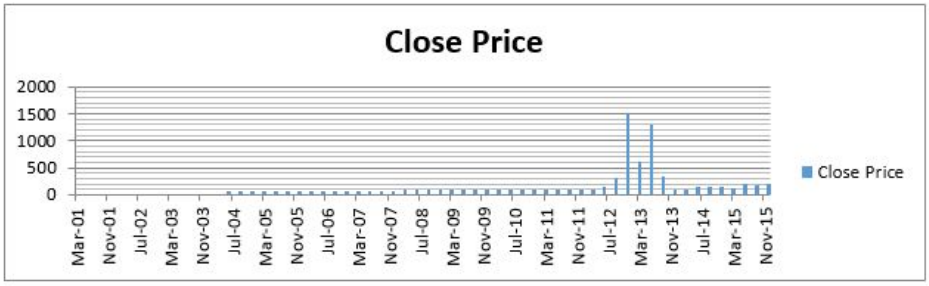


23. I T I Ltd.

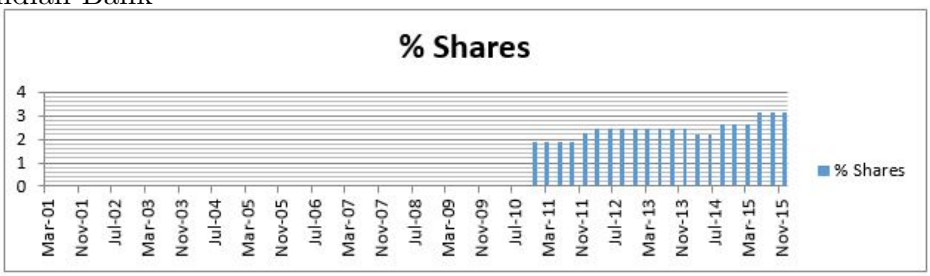


24. India Tourism Devp. Corpn. Ltd.

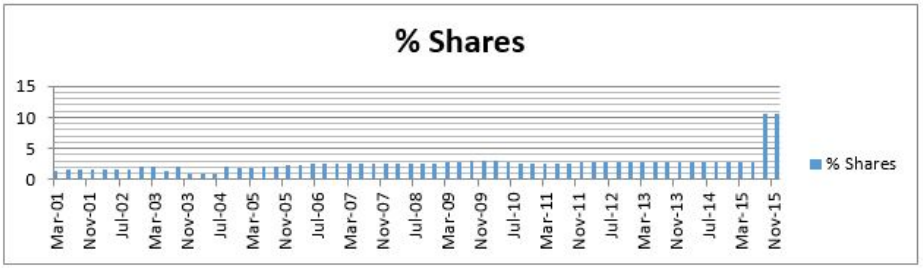




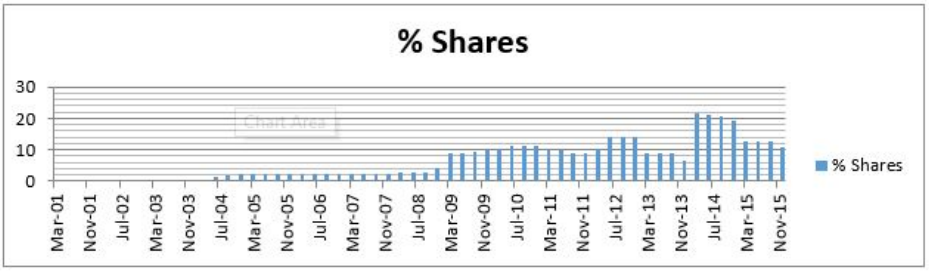
25. Indian Bank



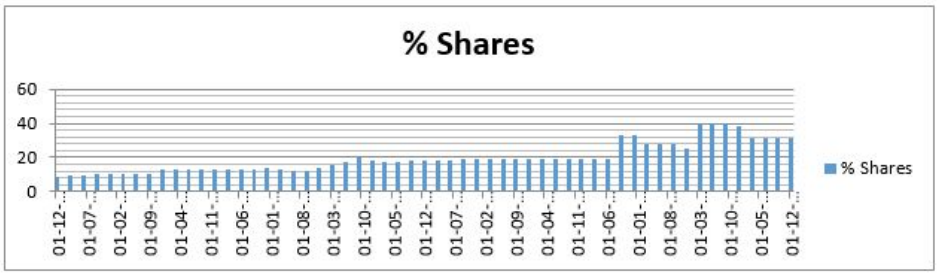
26. Indian Oil Corpn. Ltd.



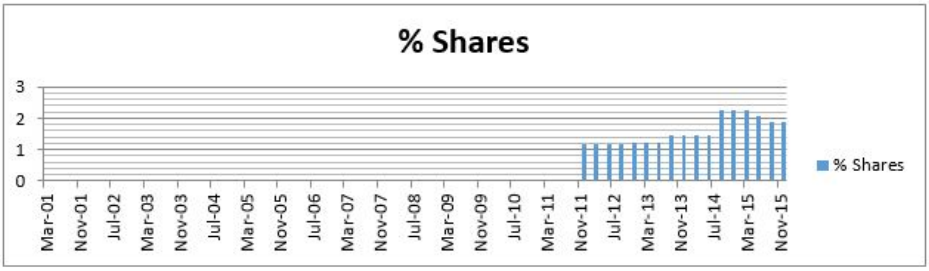
27. Indian Overseas Bank



28. Mahanagar Telephone Nigam Ltd.



29. Mangalore Refinery & Petrochemicals Ltd.



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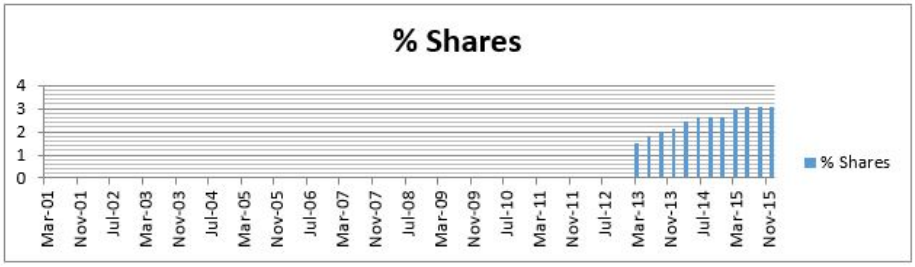

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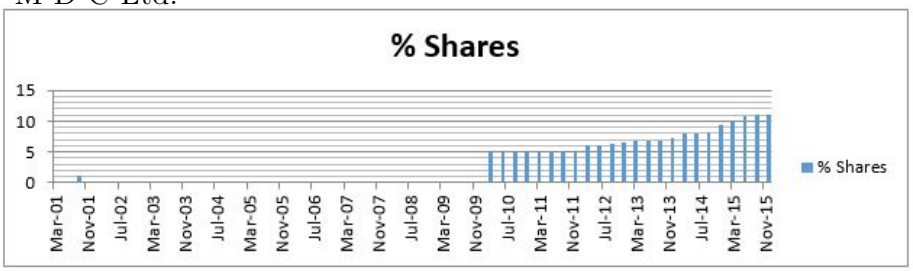
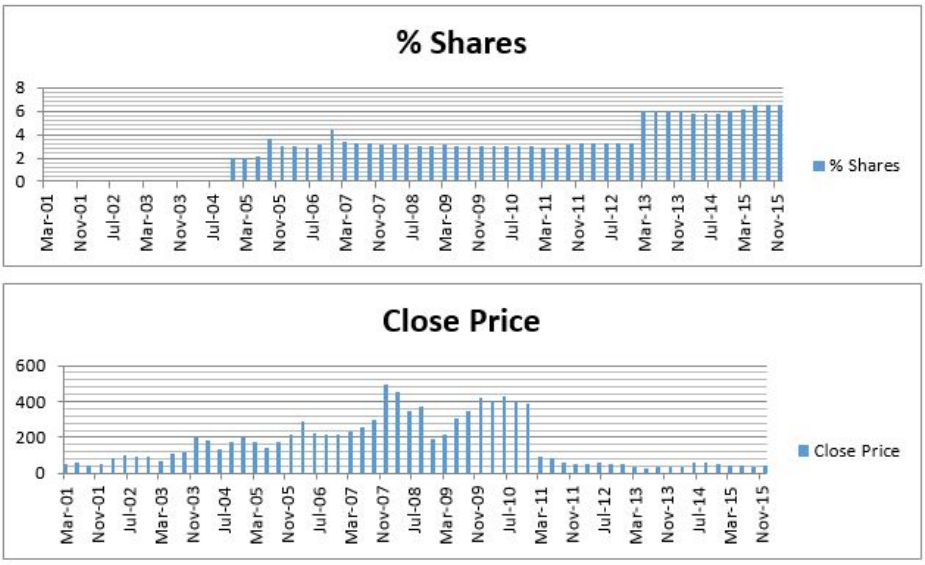
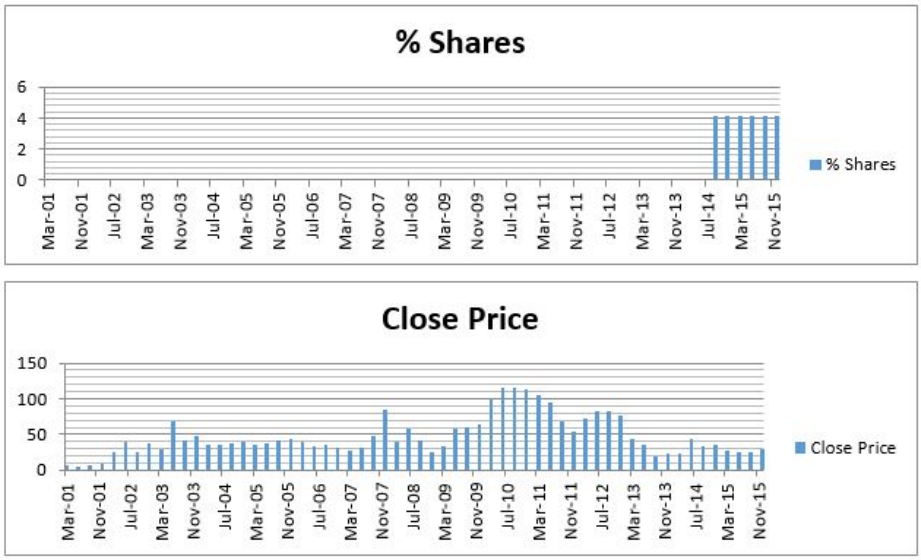


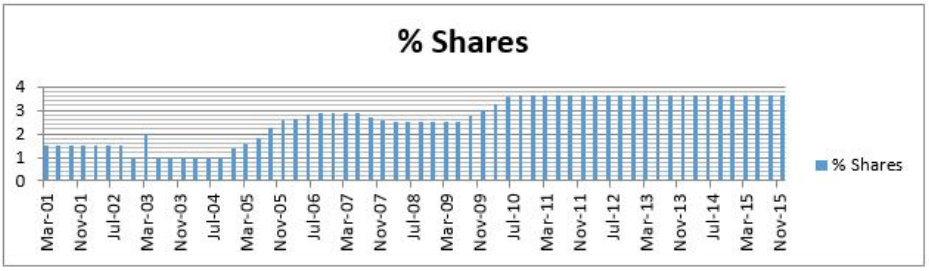
32. National Aluminium Co. Ltd.



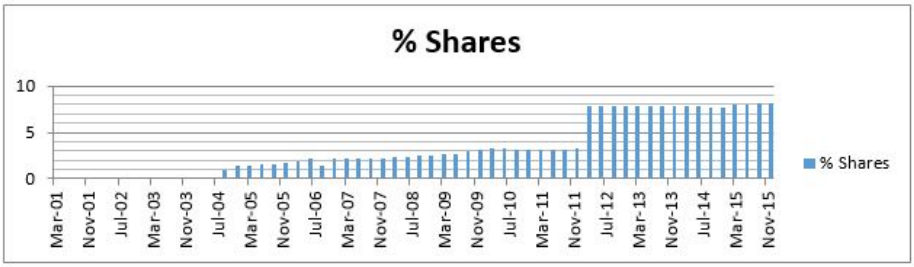
33. National Fertilizers Ltd.



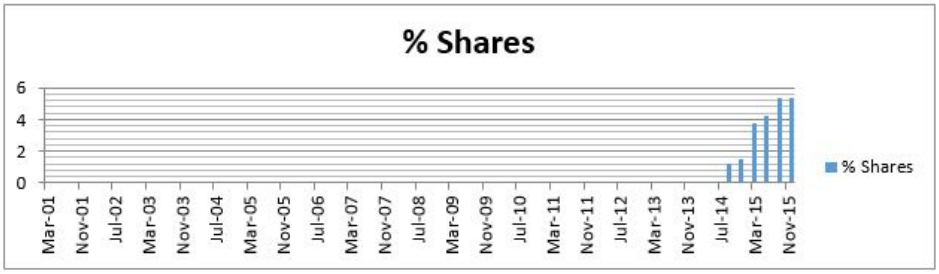
34. Neyveli Lignite Corpn. Ltd.



35. Oil & Natural Gas Corpn. Ltd.



36. Oil India Ltd.



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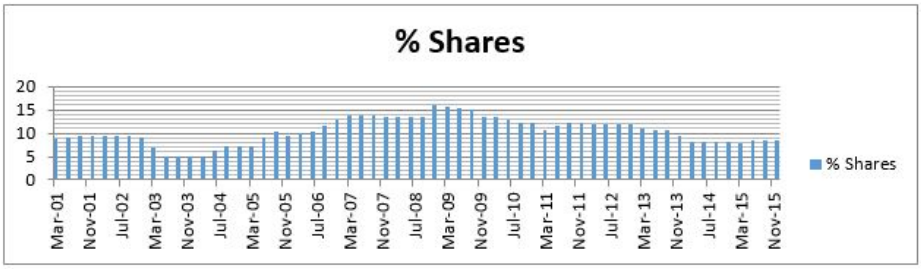
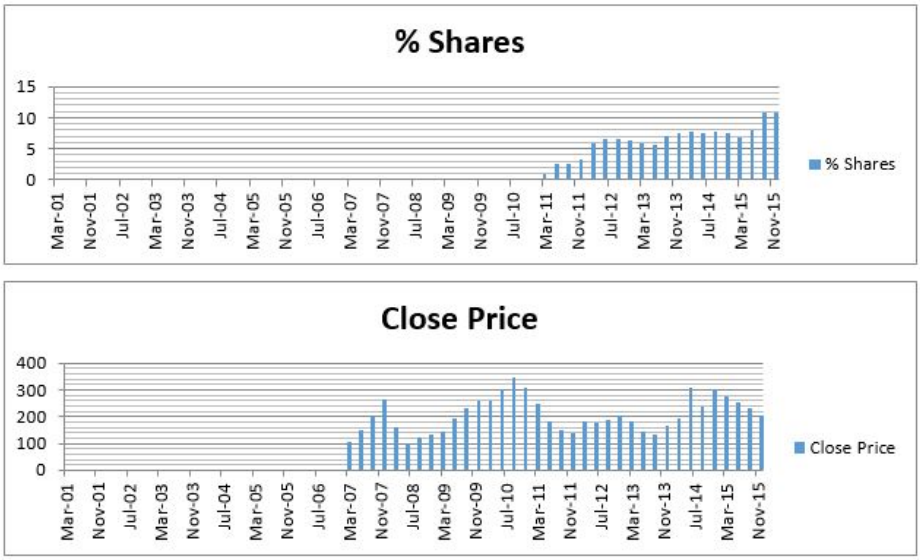
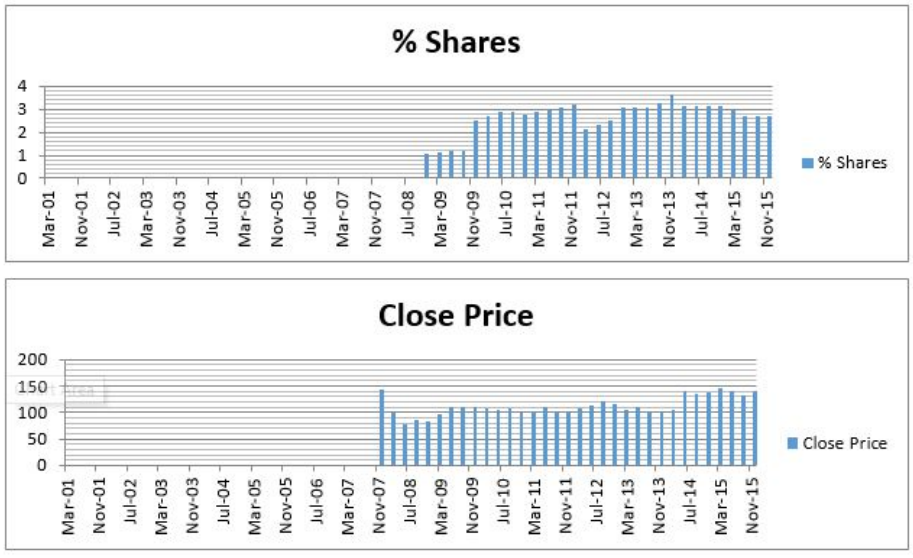


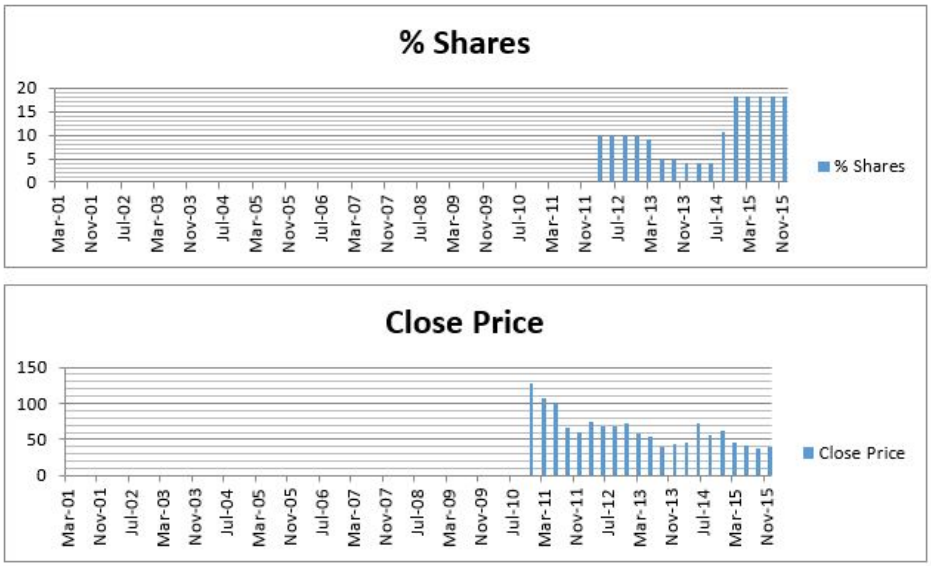
38. Power Finance Corpn. Ltd.



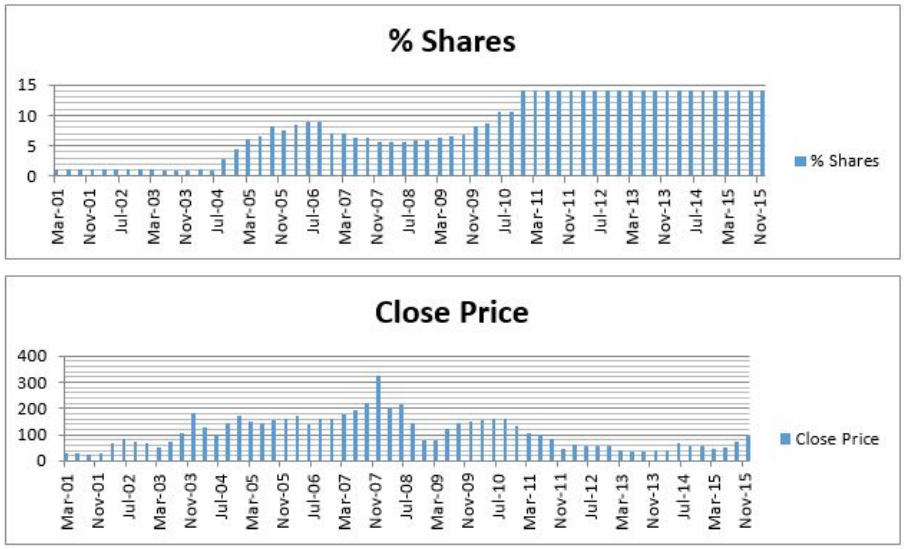
39. Power Grid Corpn. Of India Ltd.



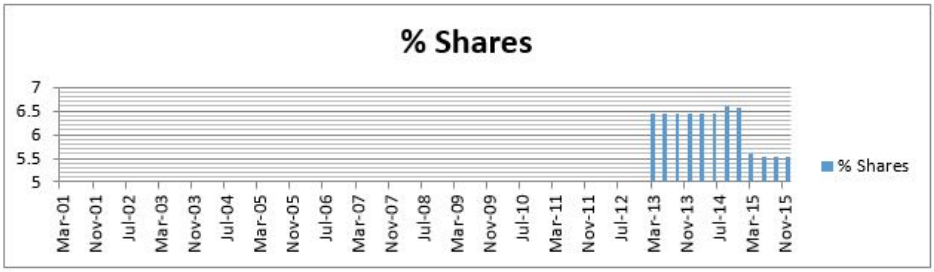
40. Punjab & Sind Bank



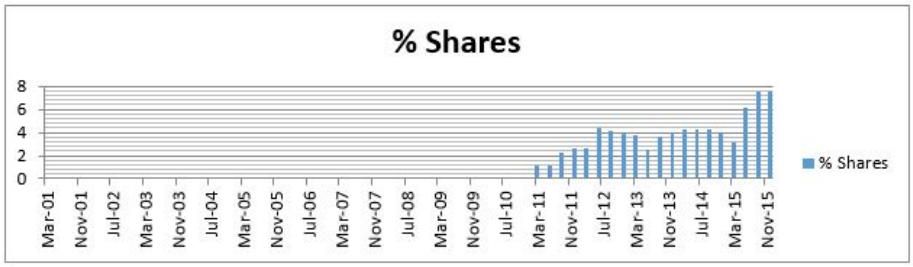
41. Punjab National Bank



42. Rashtriya Chemicals & Fertilizers Ltd.

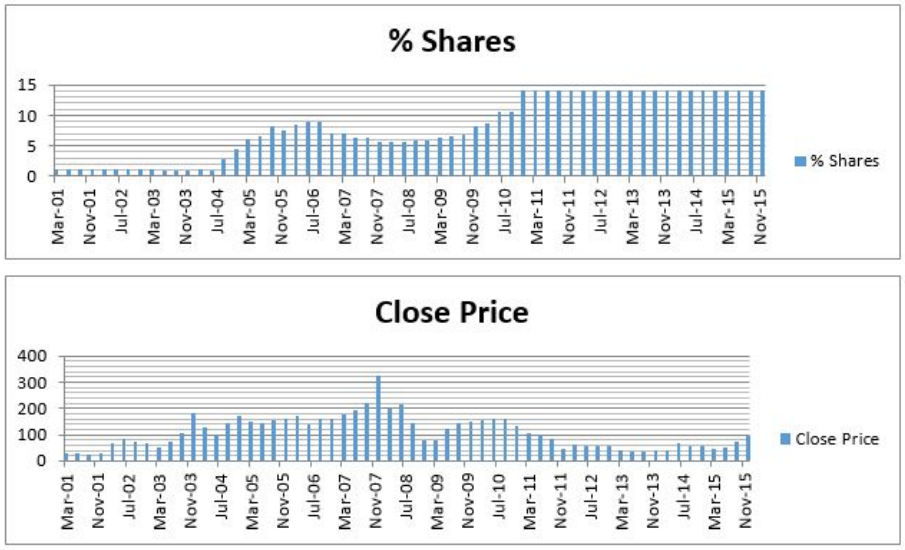


43. Rural Electrification Corpn. Ltd.

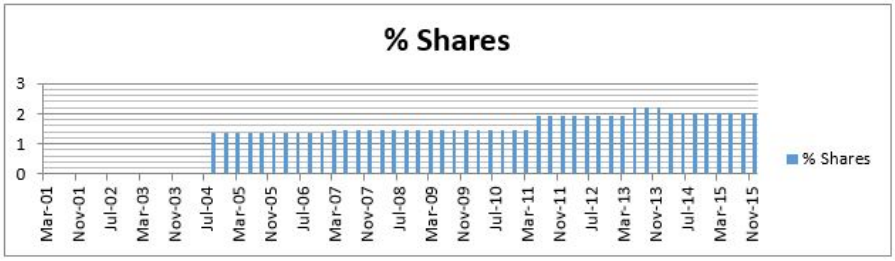


44. S J V N Ltd.

45. Shipping Corpn. Of India Ltd.



46. State Bank Of Bikaner & Jaipur



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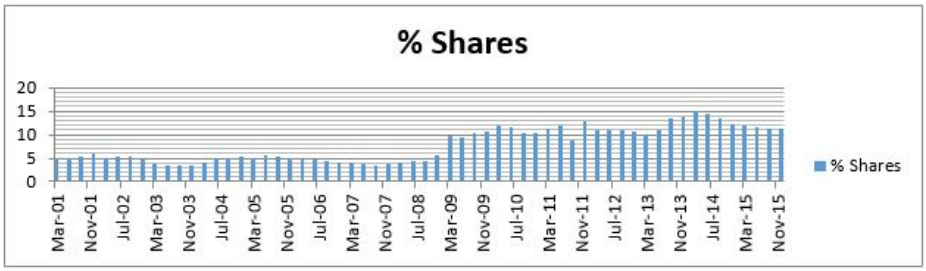
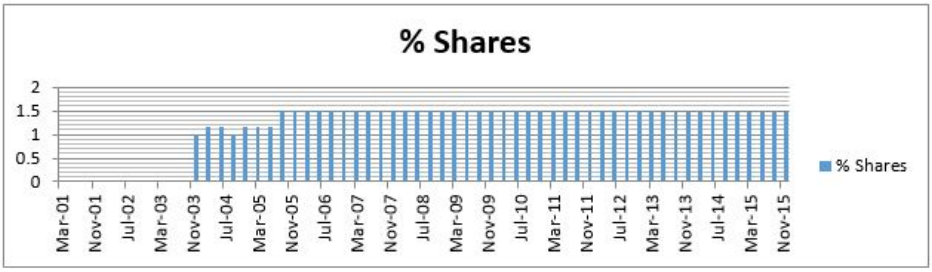
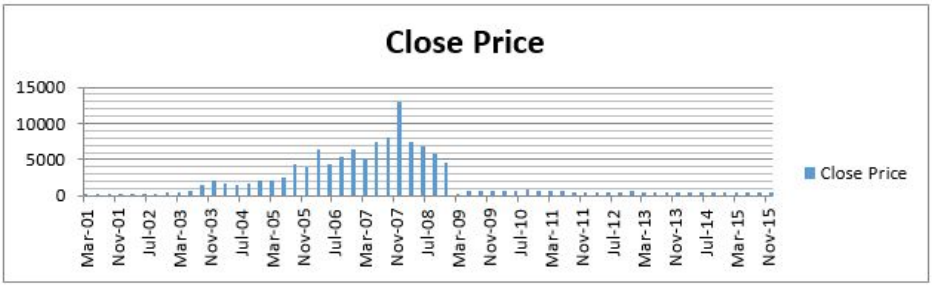
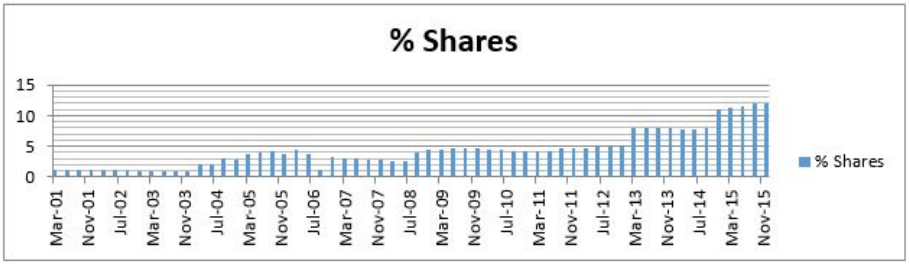


48. State Bank Of Mysore

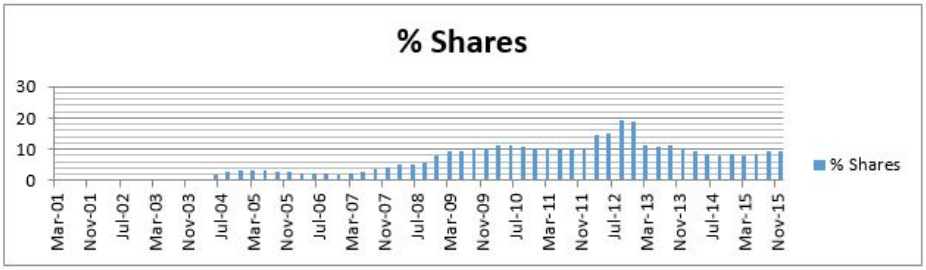




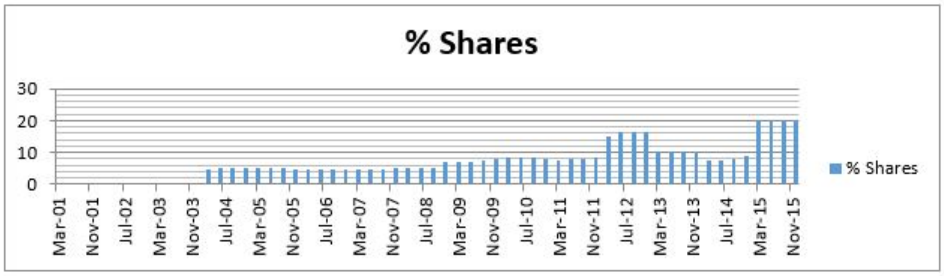
49. Steel Authority Of India Ltd.



50. Syndicate Bank

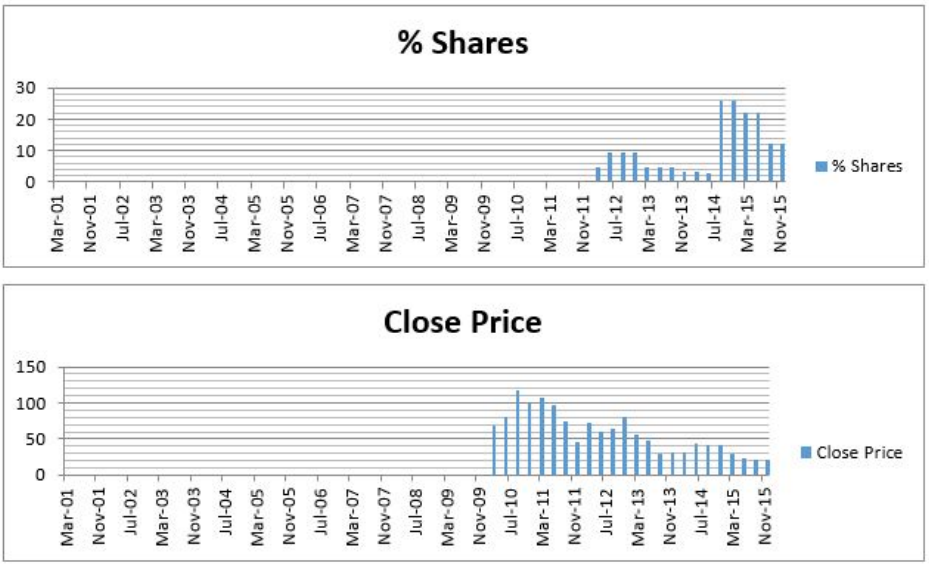


51. Uco Bank

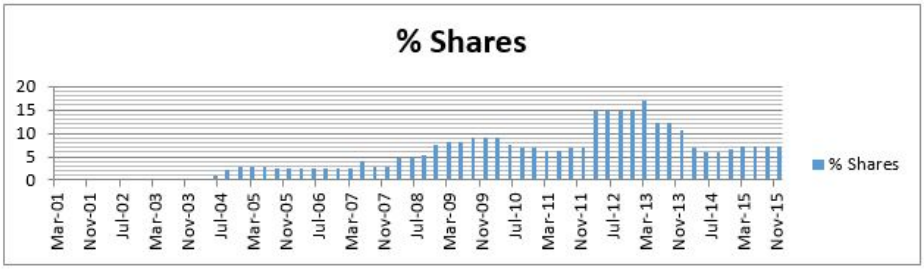


52. Union Bank Of India

53. United Bank Of India



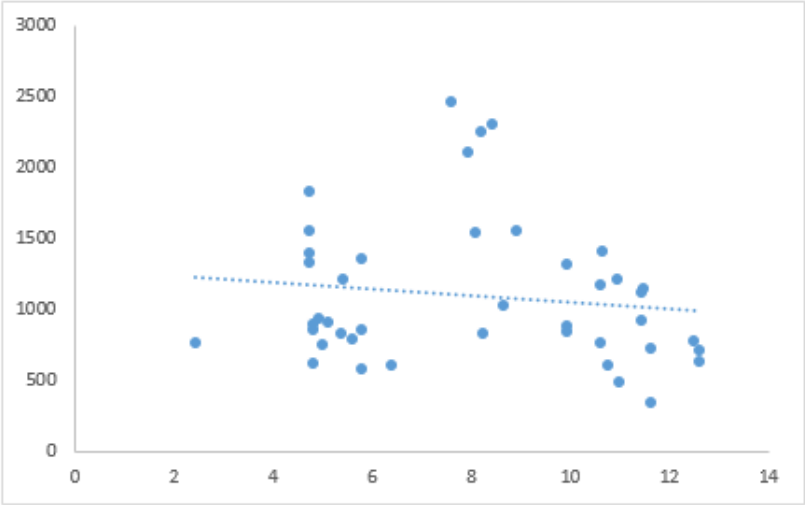
54. Vijaya Bank


% Shares
20
15
10
5
0
Mar-01
Nov-01
Jul-02
Mar-03
Nov-03
Jul-04
Mar-05
Nov-05
Jul-06
Mar-07
Nov-07
Jul-08
Mar-09
Nov-09
Jul-10
Mar-11
Nov-11
Jul-12
Mar-13
Nov-13
Jul-14
Mar-15
Nov-15
% Shares

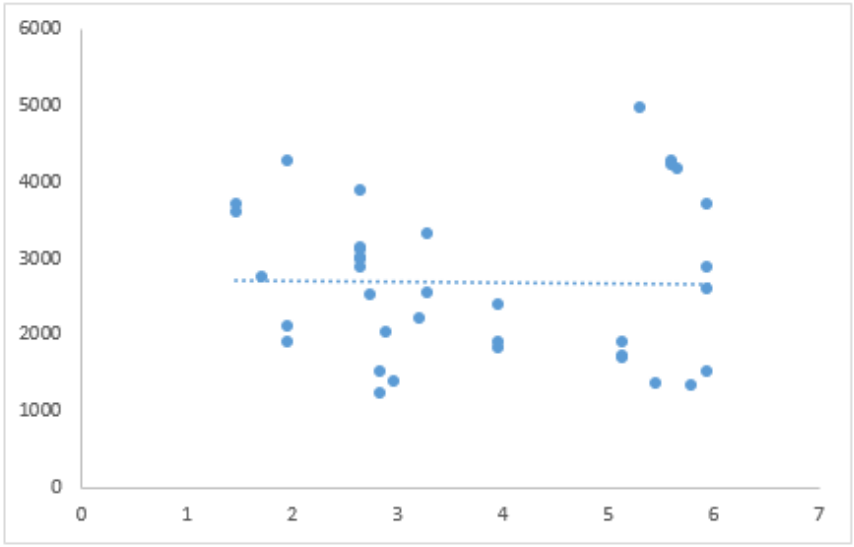

Close Price
150
100
50
0
Mar-01
Nov-01
Jul-02
Mar-03
Nov-03
Jul-04
Mar-05
Nov-05
Jul-06
Mar-07
Nov-07
Jul-08
Mar-09
Nov-09
Jul-10
Mar-11
Nov-11
Jul-12
Mar-13
Nov-13
Jul-14
Mar-15
Nov-15
Close Price

Appendix - 2; Correlation analysis between percent holding of LIC and market Capitalization

1. Allahabad Bank



2. Bharat Electronics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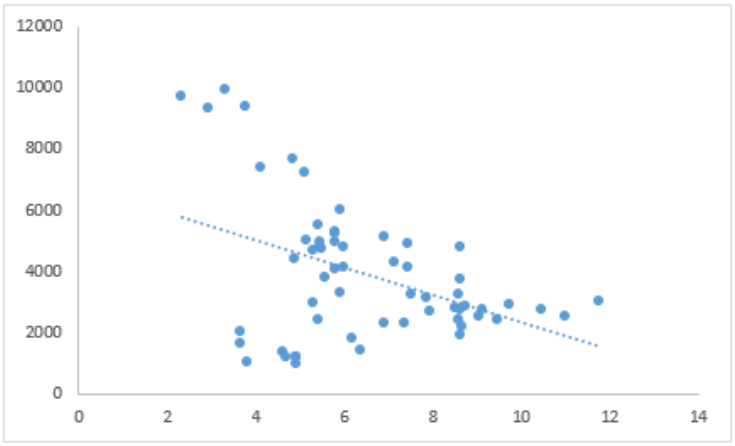
5000
4000
3000
2000
1000
0
0
1
2
3
4
5
6
7

3. BPCL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10000
8000
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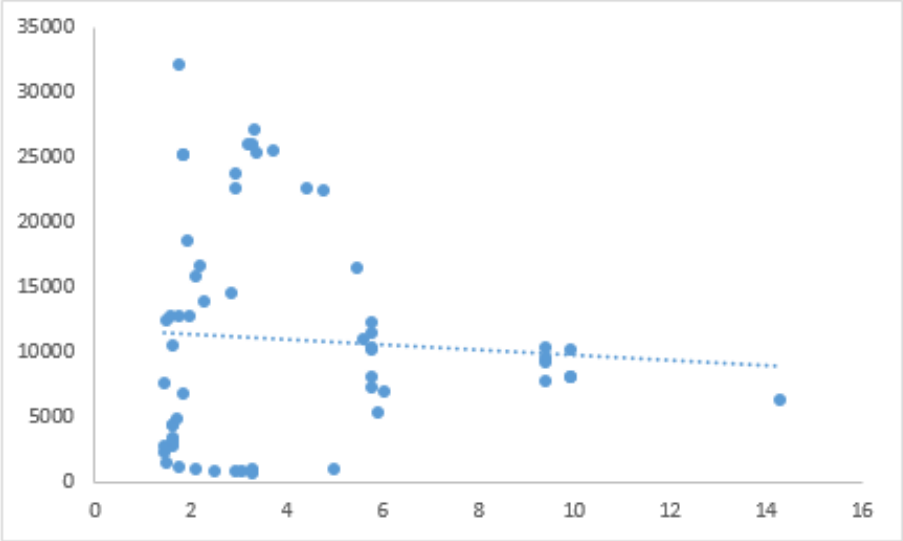
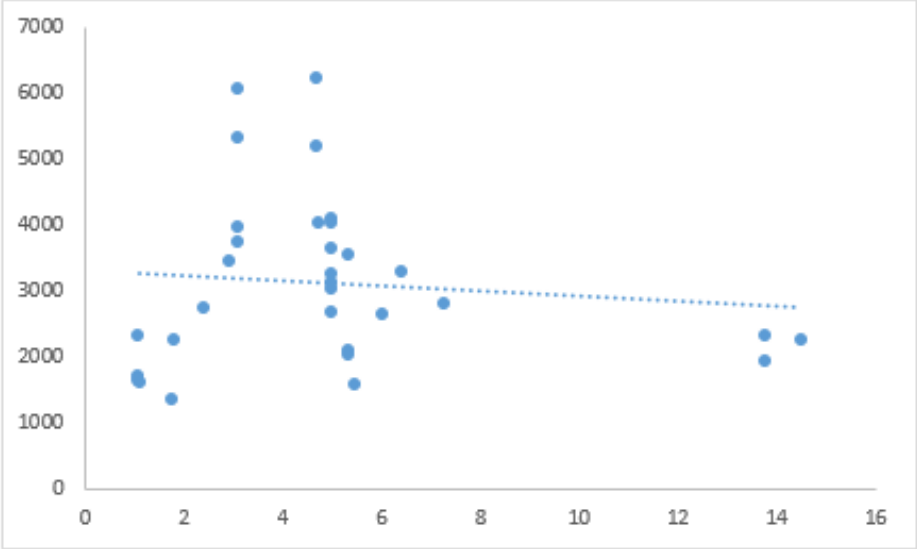
4000
2000
0
0
2
4
6
8
10
12
14

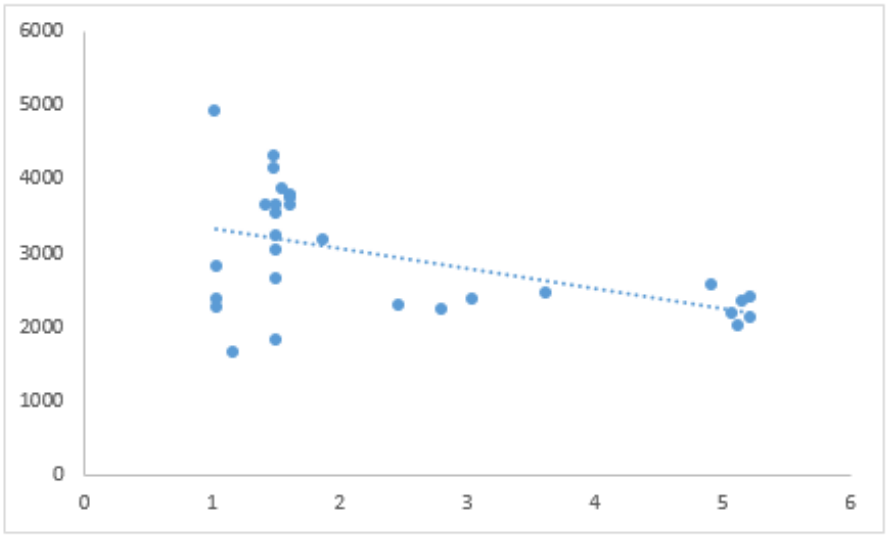
4. BHEL



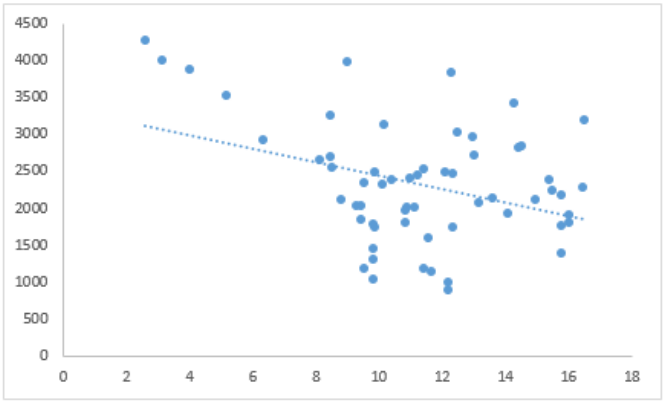
5. Canara Bank



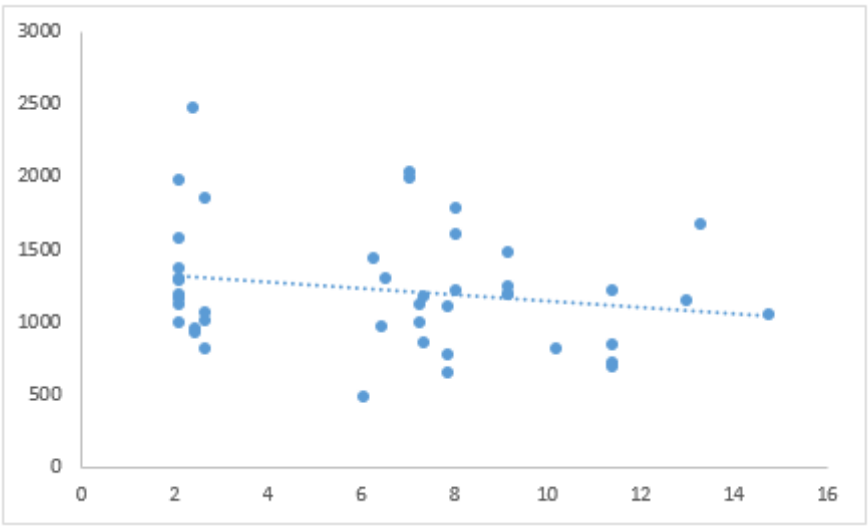
6. Container Corporation



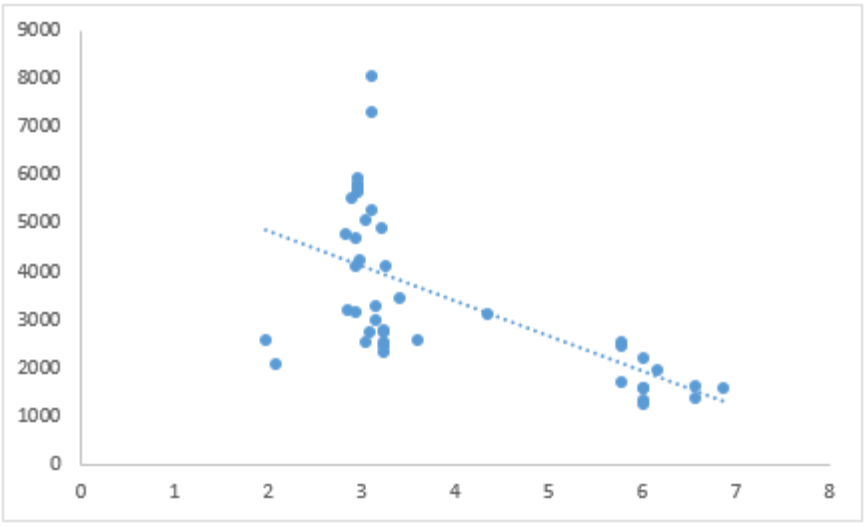
7. HPCL



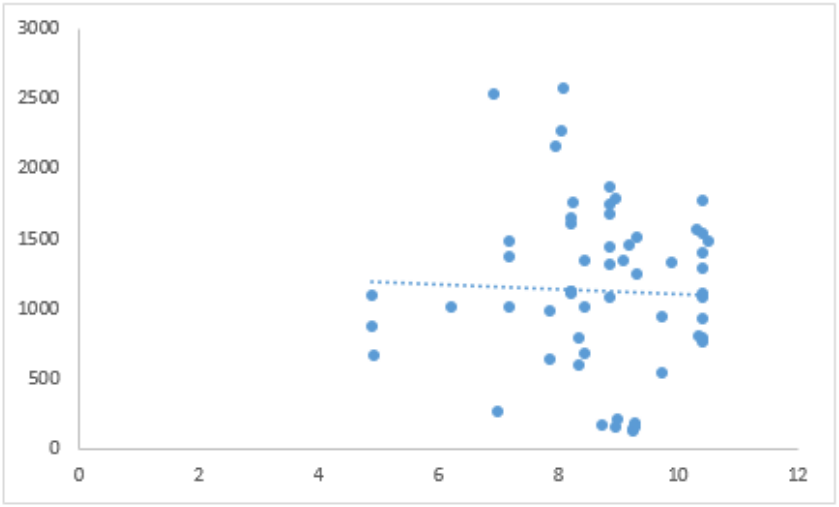
8. Indian Overseas Bank



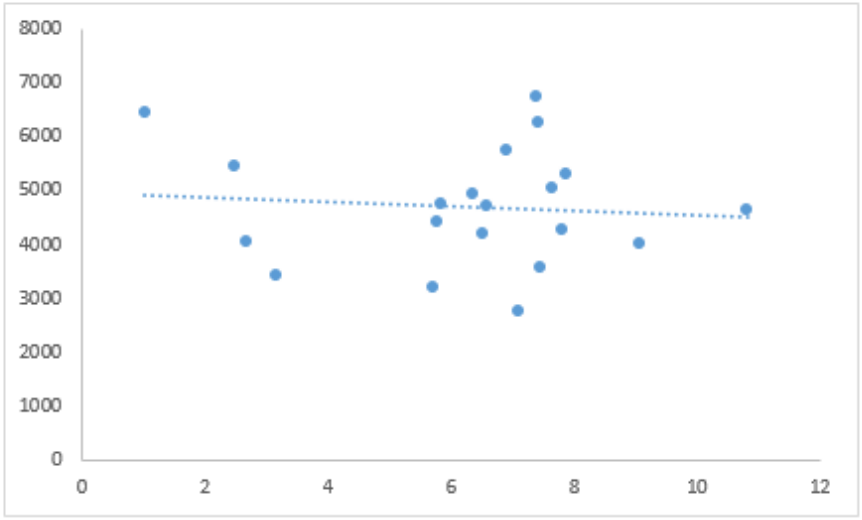
9. National Aluminium



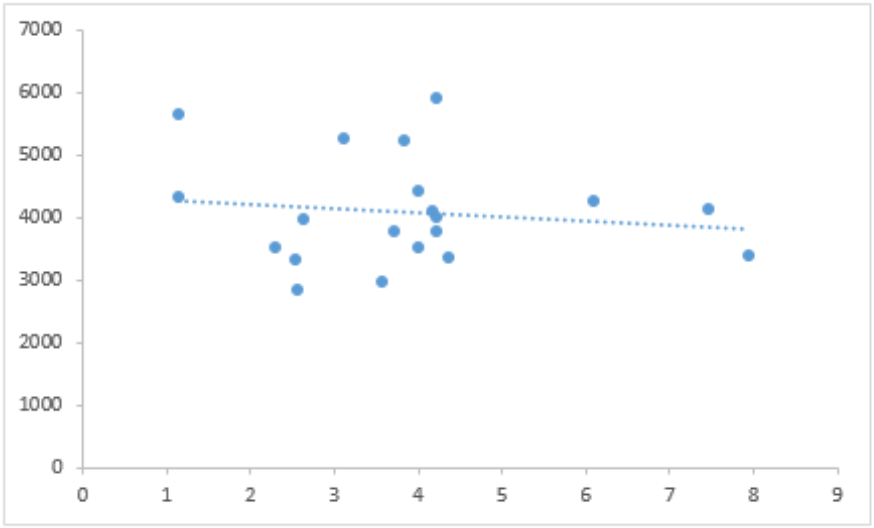
10. Oriental Bank



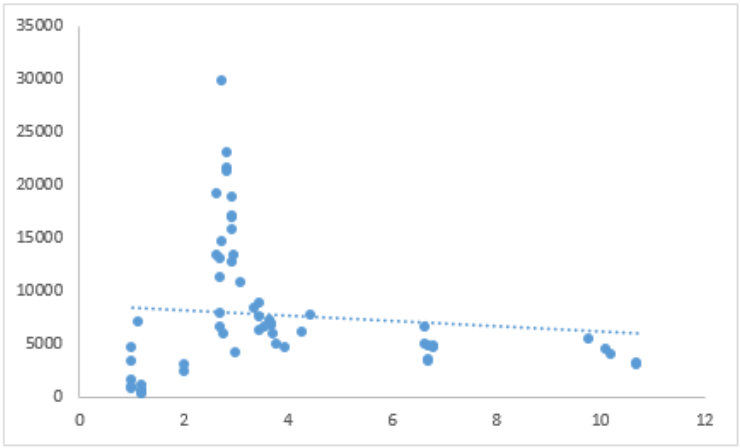
11. Power Finance



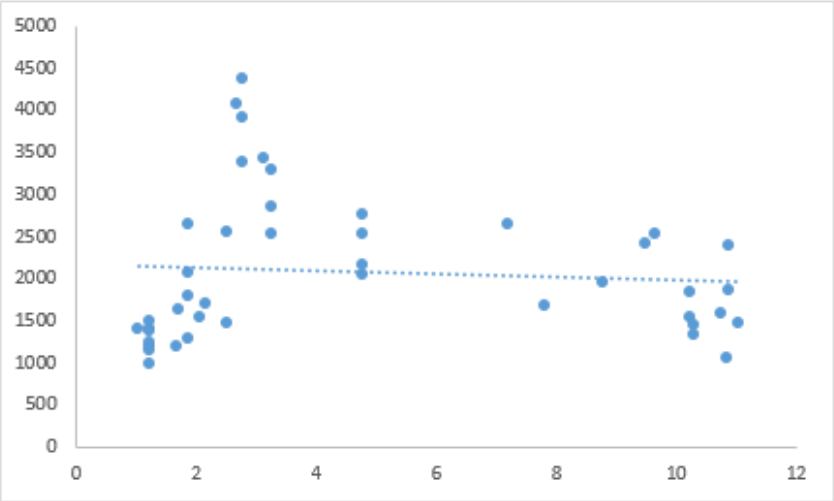
12. Rural Electrification



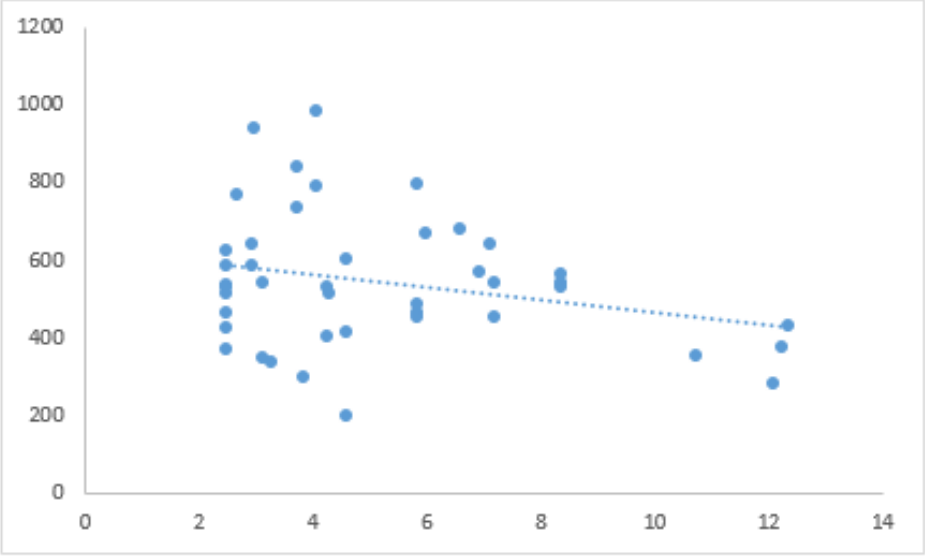
13. SAIL



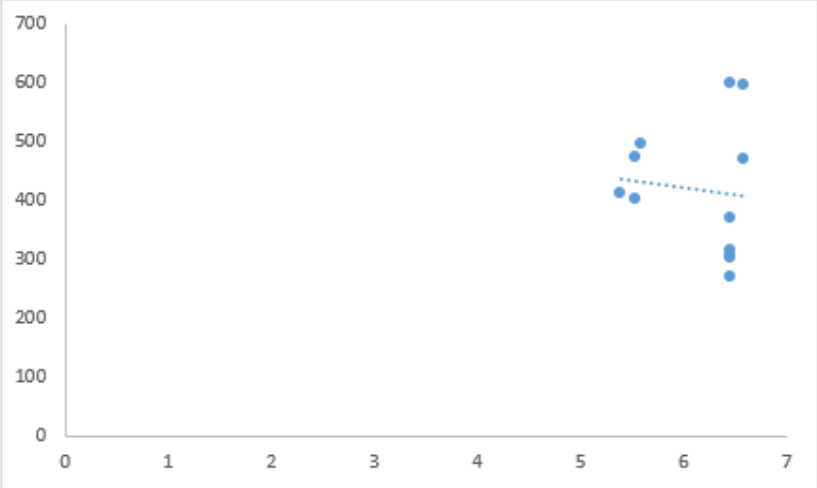
14. Union Bank



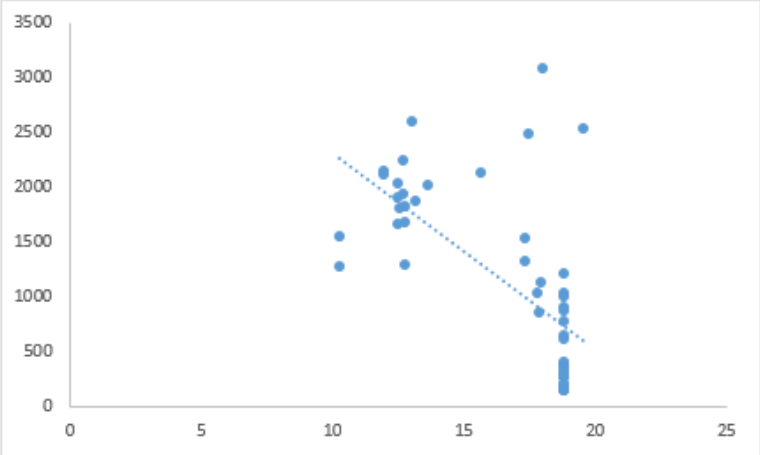
15. Vijaya Bank



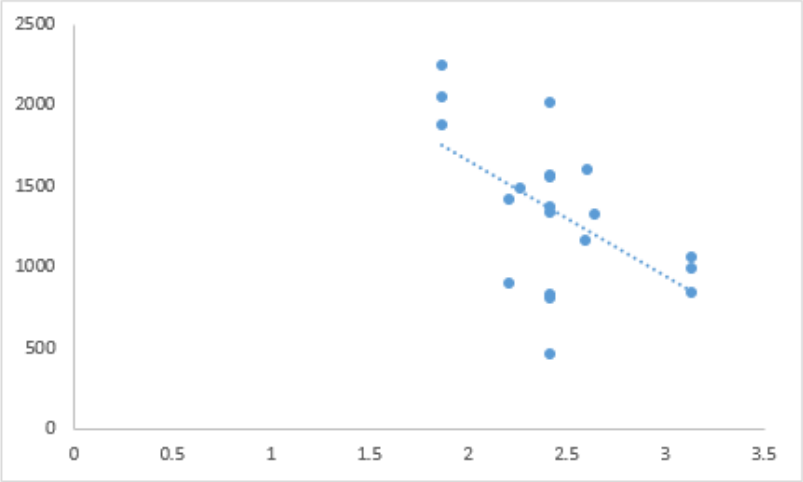
16. Rashtriya Chemicals



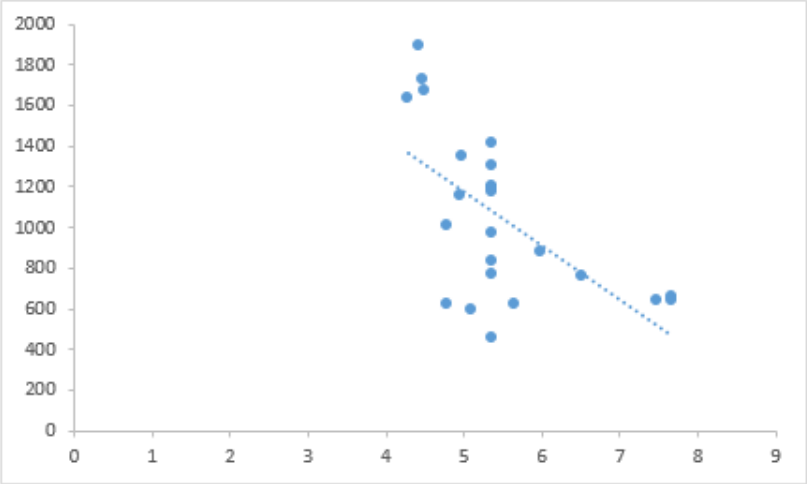
17. MTNL



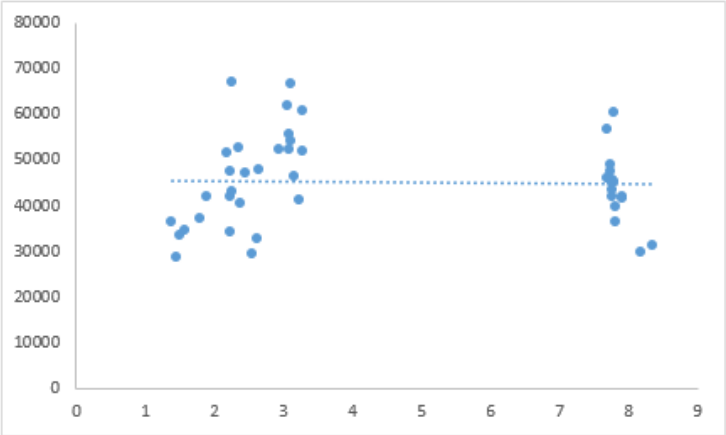
18. Indian Bank



19. Andhra Bank



20. ONGC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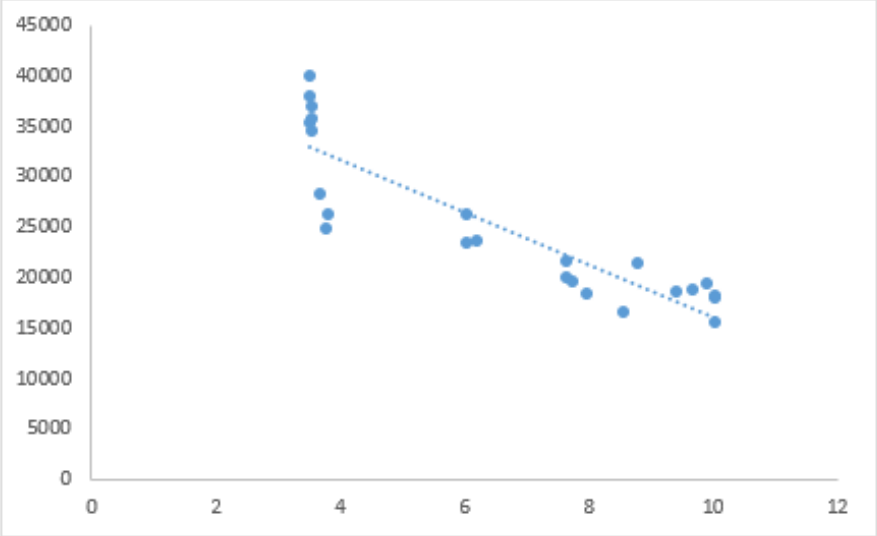
21. NTPC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