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A study on day-of-the-week-effect of selected scrips with reference to banking sector

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Abstract:
Research Issue: *To determine whether day-of-the-week-effect still exists and to evaluate day-of-the- week-effect for banking scrips.*
Objective:
- *To study day of the week effect of the selected scrips in banking sector from 2005- 2014.*
- *To find the performance of the scrips and to find exact day to invest in the selected scrips in banking sector.*

Research Tools: *Skewness, Kurtosis, Beta, Correlation*
Findings: *This facilitates market participants to devise trading strategy which could fetch abnormal profits on the basis of past pattern. This study investigates the day of the week effect on the volatility of major stock market indexes for the period of 2005 through 2014.The highest return occurs on Monday and thus it supports day of the week effect.*
Practical Implications: *This study suggests the traders to invest in scrips on the basis of past patterns which could earn them more profits.*
Keywords: *day-of-the-week-effect, Monday effect, return, volatility*

I. Introduction

The day-of-the-week-Effect is a phenomenon that constitutes a form of anomaly of the efficient capital markets theory. According to this phenomenon, the average daily return of the market is not the same for all the days of the month, as we would expect on the basis of the efficient market theory.

The study is conducted to find the perfect scrip for the traders to invest in equity shares. And the study also examines the performance of the various scrips.

This study facilitates the investors and traders to select the best scrip to invest in shares market. It also provides the best day to invest a week which reduces the risk in investment. This also helps investors to understand the fluctuations in the market and its impact on the market.

II. Research Methodology

2.1 Research Design:

Descriptive Research, also known as statistical research, describes data and characteristics of the variables and it is also analytical study as it studies the past and present prices of the various scrips.

2.2 Data Collection Method:

The data used is Secondary data which has been sourced from the web sources like NSE. The analysis time period of the study is January (2005) to December (2014).

2.3 Tools For Analysis:

2.3.1 Standard deviation (SD):

Standard deviation measures the volatility of the returns from a scrip over a particular period. It tells you how much the scrip's return can deviate from the historical mean return of the scheme. If a scrip has a 12% average rate of return and a standard deviation of 4%, its return will range from 8-16%.

2.3.2 Treynor's Measure:

It is based on the concept of characteristics line. It is interpreted as stating the reward (return minus the risk free rate) in relation to the scrips beta risk.

The equation for the Treynor's measure for the performance of scrip s, T_P equals

$T_s = [ER_s\text{-}RF] / \beta_s$

Where

T_s = Treynor's scrip index

ER_s = Expected market return on scrip s
RF = Risk Free rate of interest
B_s = Beta coefficient of scrips

2.3.3 Sharpe Measure:

Sharpe adjusts the scrip returns for total risk σ_s which includes both systematic risk and the diversifiable risk. Generally, if the scrips or other portfolios are well diversified, the Sharpe and Treynor measures will give them the same rankings. If the measures give different rankings, the scrip ranked higher by Treynor but lower by Sharpe may not be well diversified.

$S_s = [ER_s\text{-}RF] / \sigma_s$

Where
ER_s = Expected market return on scrip s
RF = Risk Free rate of interest
σ_s = Standard deviation of scrip

2.3.4 Jensen Measure:

A risk-adjusted performance measure that represents the average return on a scrip over and above that predicted by the capital asset pricing model (CAPM), given the scrip's beta and the average market return. This is the scrip's alpha. In fact, the concept is sometimes referred to as "Jensen's alpha". Jensen's Measure is calculated as

$\alpha_s = ER_s - [RF + \beta_s (ER_m - RF)]$

Where
ER_s = Expected market return on scrip s
RF = Risk Free rate of interest
β_s = Beta coefficient of scrip s
ER_m = Expected Market return

2.3.5 Beta:

It measures a scrip's volatility compared to that of a benchmark. It tells you how much a scrip's performance would swing compared to a benchmark. A scrip with a beta of 1 means, it will move as much as the benchmark. If a scrip has a beta of 1.5, it means that for every 10% upside or downside, the scrip price would be 15% in the respective direction.

2.3.6 Average Return:

The simple mathematical average of a series of returns generated over a period of time. An average return is calculated the same way a simple average is calculated for any set of numbers; the numbers are added together into a single sum, and then the sum is divided by the count of the numbers in the set.

2.3.7 Skewness:

Skewness is a measure of the degree of asymmetry of a distribution. If the left tail (tail at small end of the distribution) is more pronounced than the right tail (tail at the large end of the distribution), the function is said to have negative skewness. If the reverse is true, it has positive skewness. If the two are equal, it has zero skewness.

Skewness is extremely important to finance and investing. Most sets of data, including stock prices and asset returns, have either positive or negative skew rather than following the balanced normal distribution (which has a skewness of zero). By knowing which way data is skewed, one can better estimate whether a given (or future) data point will be more or less than the mean.

- If Skewness is less than −1 or greater than +1, the distribution is highly skewed.
- If Skewness is between −1 and −½ or between +½ and +1, the distribution is moderately skewed.
- If Skewness is between −½ and +½, the distribution is approximately symmetric.

2.3.8 Kurtosis:

A statistical measure used to describe the distribution of observed data around the mean. Kurtosis is the degree of peakedness of a distribution. It is sometimes referred to as the "volatility of volatility."

- $Z_{g2} < -2$, the population very likely has negative excess kurtosis (kurtosis <3, platykurtic), though you don't know how much.
- If Z_{g2} is between −2 and +2, you can't reach any conclusion about the kurtosis: excess kurtosis might be positive, negative, or zero.
- If $Z_{g2} > +2$, the population very likely has positive excess kurtosis (kurtosis >3, leptokurtic), though you don't know how much.

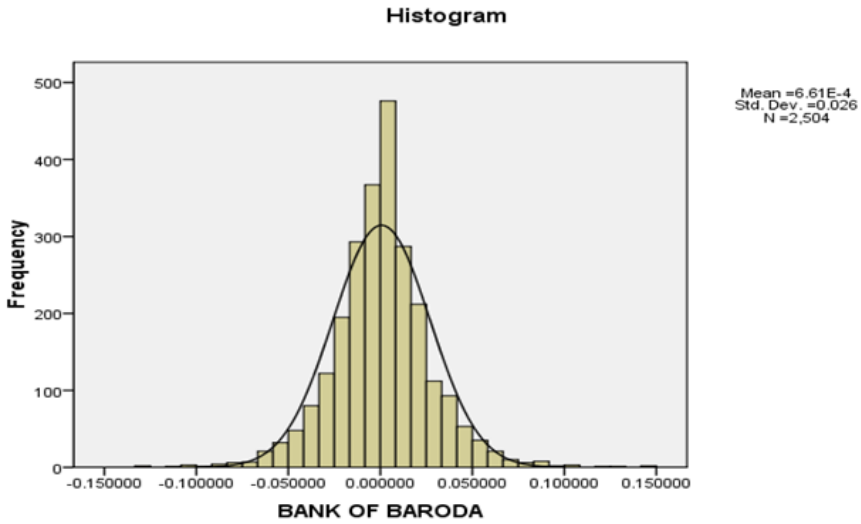
2.3.9 Correlation:

In statistics, dependence is any statistical relationship between two random variables or two sets of data. Correlation refers to any of a broad class of statistical relationship involving dependence. Correlation is computed into what is known as the correlation coefficient, which ranges between -1 and +1.

III. Findings of the Research

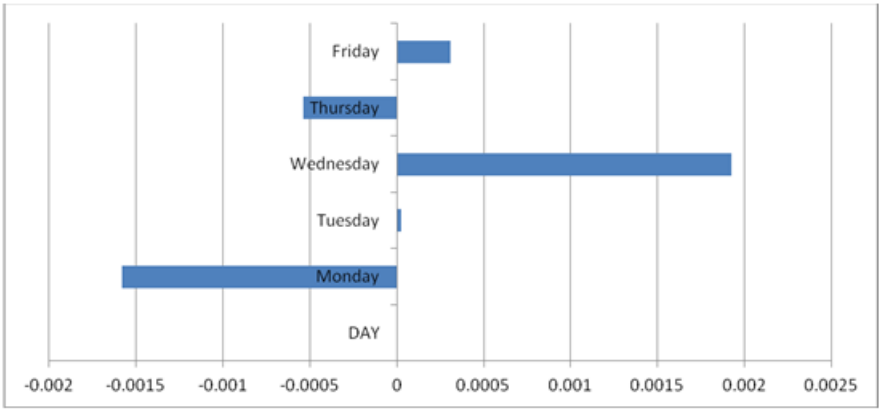
Table 1 showing Descriptive Statistics of Bank of Baroda

Std. Deviation	.02645614
Skewness	.162
Std. Error of Skewness	.049
Kurtosis	2.694
Std. Error of Kurtosis	.098
Minimum	-.12865
Maximum	.14998



The Skewness of the Bank of Baroda is -0.16 to 0.16 the distribution is approximately symmetric. The kurtosis of Bank of Baroda is 2.694, hence the kurtosis is leptokurtic.

Chart 1 showing daily returns of Bank of Baroda

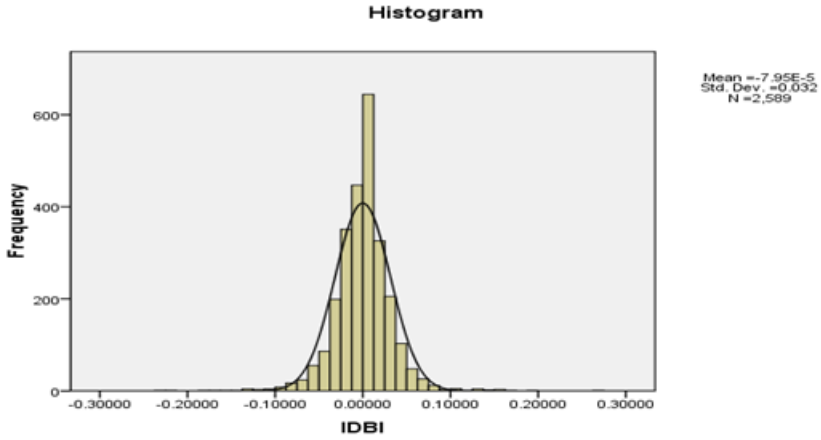


It is inferred that Wednesday and Monday are better days to invest in Bank of Baroda scrip compared to other days of the week. Monday shows high negative return and Wednesday shows a high positive rate of return.

Table 2 - showing Descriptive Statistics of Canara Bank

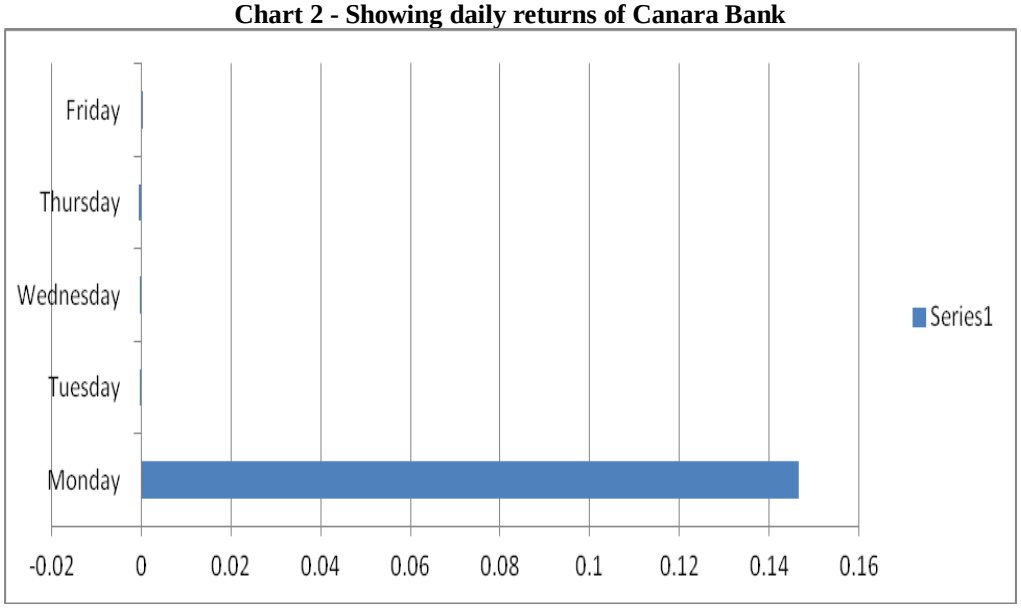
Std. Deviation	.02805262
Skewness	.083
Std. Error of Skewness	.049

Kurtosis	2.672
Std. Error of Kurtosis	.097
Minimum	-.17376
Maximum	.15226



The Skewness of Canara Bank is between -0.083 and 0.083 ,the distribution is approximately symmetric. The kurtosis of Bank of Baroda is 2.694,hence the kurtosis is leptokurtic.

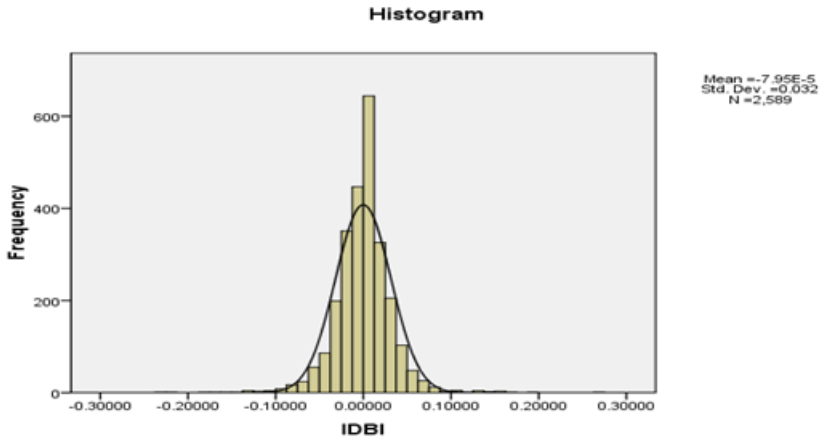
Chart 2 - Showing daily returns of Canara Bank



From the above chart , it is inferred that Canara Bank gives more returns on Monday and it's the best day to invest in Canara Bank.

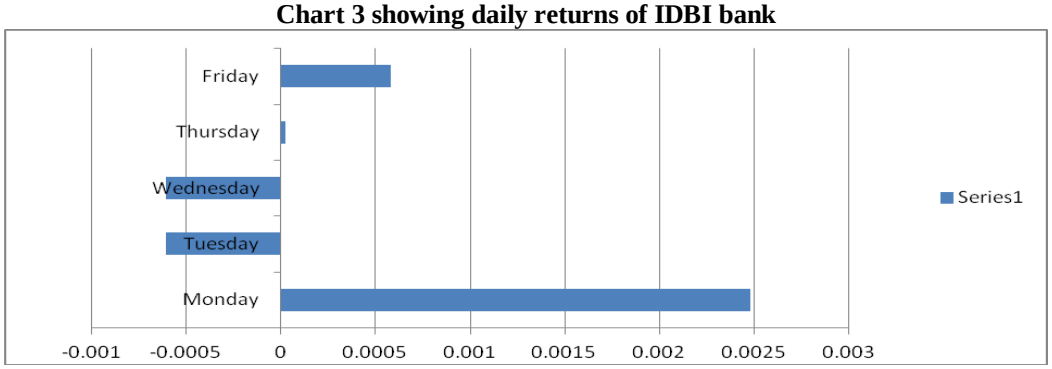
Table 3 showing Descriptive Statistics of IDBI bank

Std. Deviation	.03162724
Skewness	-.010
Std. Error of Skewness	.048
Kurtosis	7.813
Std. Error of Kurtosis	.096
Minimum	-.23437
Maximum	.26743



The Skewness of IDBI Bank is between -0.010 and 0.010,the skewness is approximately symmetric. The kurtosis of IDBI is 7.813 ,it is positive kurtosis, known as leptokurtic.

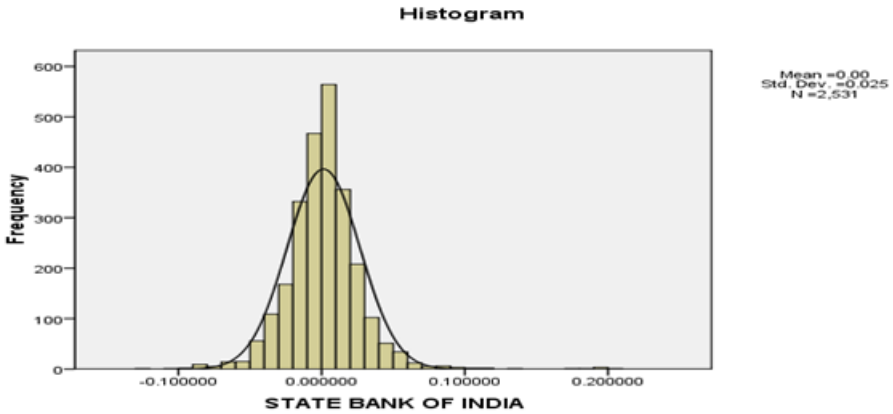
Chart 3 showing daily returns of IDBI bank



From the above chart we can understand that Monday gives more returns and Monday is a better day to invest in IDBI Bank.

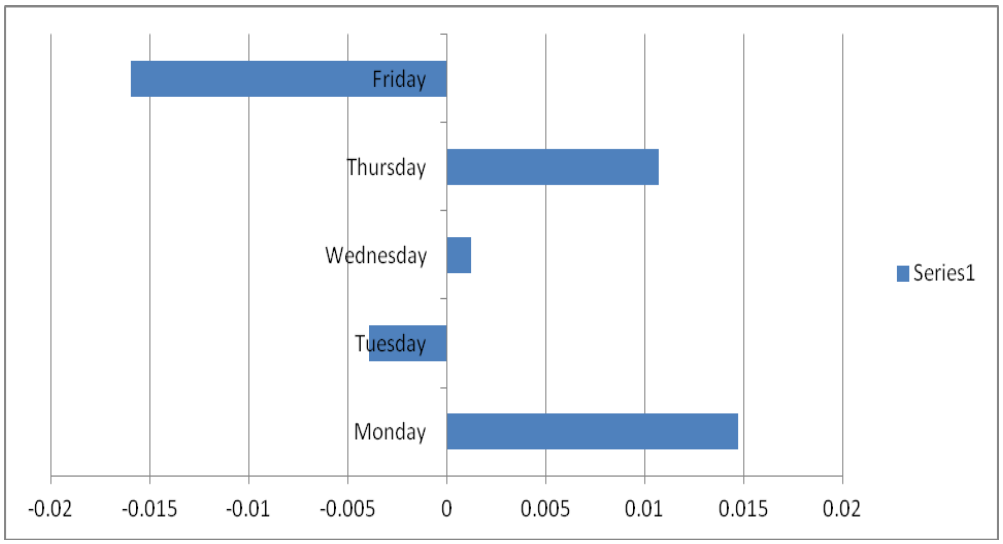
Table 4 - showing Descriptive Statistics of State Bank of India

Std. Deviation	.02545041
Skewness	-1.023
Std. Error of Skewness	.049
Kurtosis	8.840
Std. Error of Kurtosis	.097
Minimum	-.20298
Maximum	.12994



The Skewness of State Bank of India is between -1.023 and 1.023,the distribution is highly skewed. The kurtosis of SBI is 8.813 ,it is positive kurtosis, known as leptokurtic.

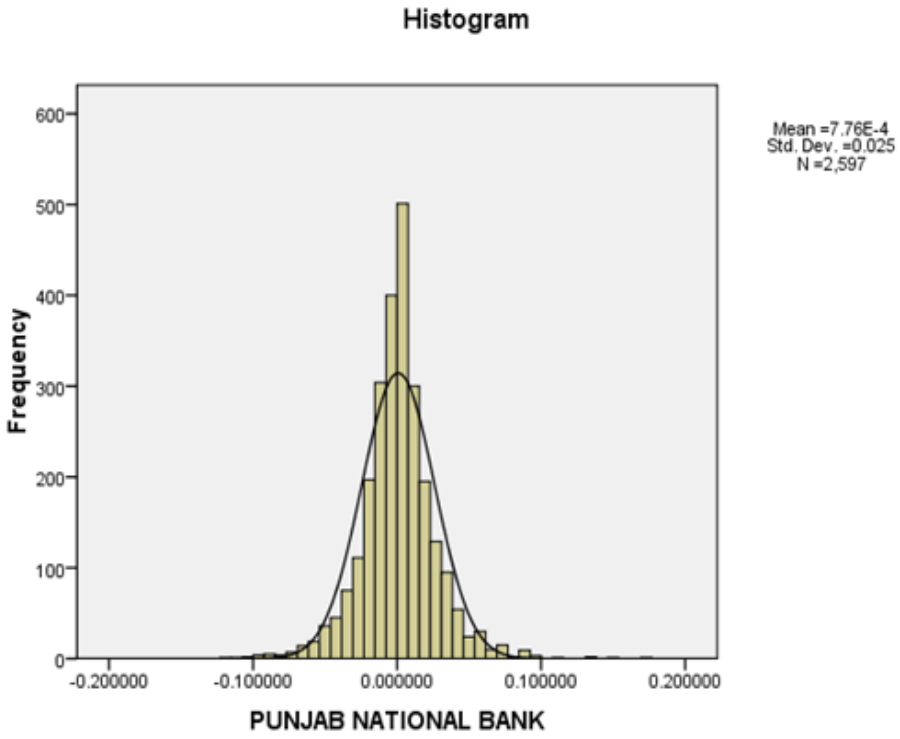
Chart 4 - showing daily returns of State Bank of India



From the above chart, Monday, it is inferred that Friday and Thursday are the best days to invest in the State Bank of India.

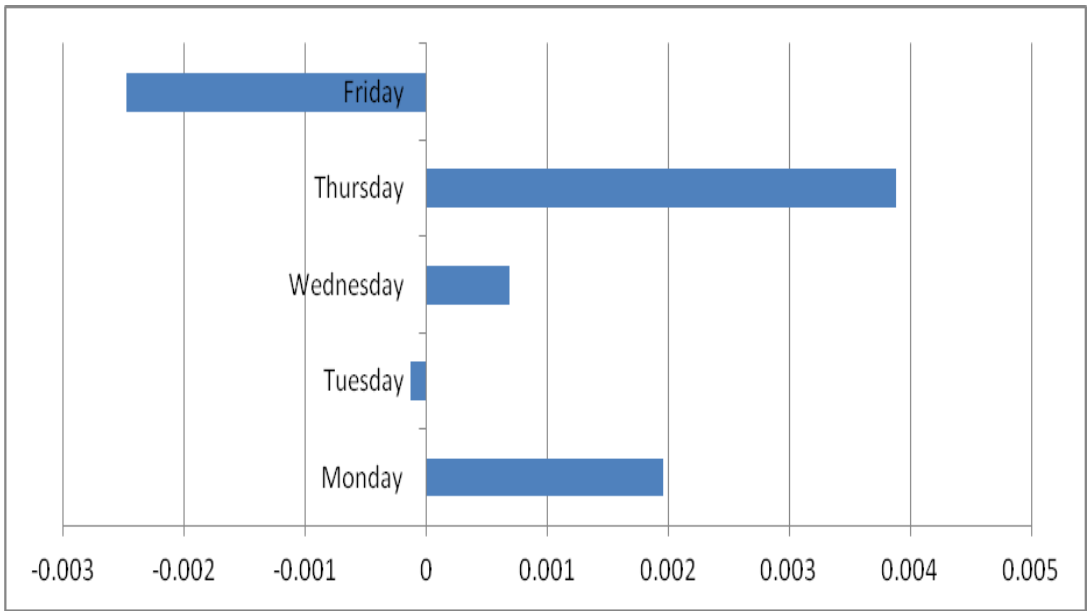
Table 5 showing Descriptive Statistics of Punjab National Bank

Std. Deviation	.02543209
Skewness	.260
Std. Error of Skewness	.048
Kurtosis	3.616
Std. Error of Kurtosis	.096
Minimum	-.12174
Maximum	.16938



The Skewness of Punjab National Bank is between -0.258 and 0.258, the skewness is approximately symmetric. The kurtosis of Punjab National Bank is 3.655,it is positive kurtosis, known as leptokurtic.

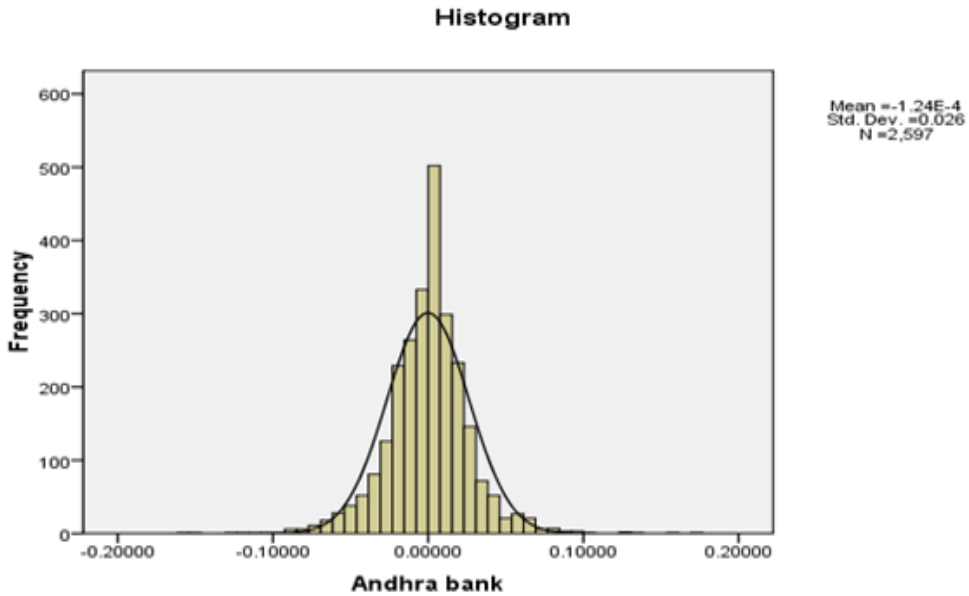
Chart 5 - showing daily returns of Punjab National Bank



From the above chart, Monday, Thursday and Friday gives more returns and are the better day to invest in the Punjab National Bank.

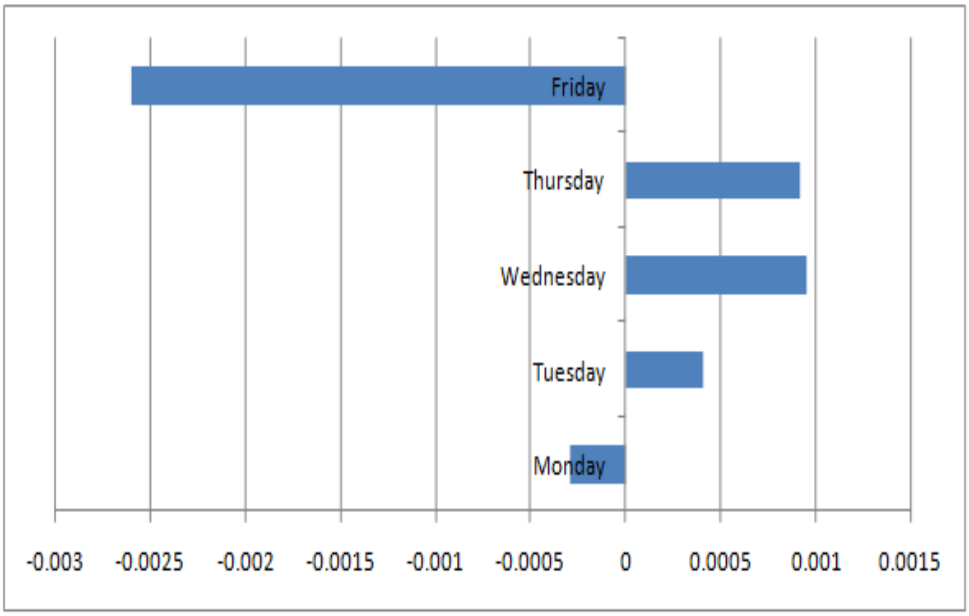
Table 6 showing Descriptive Statistics of Andhra Bank

Std. Deviation	.02644160
Skewness	.019
Std. Error of Skewness	.048
Kurtosis	3.900
Std. Error of Kurtosis	.096
Minimum	-.15555
Maximum	.17001



The Skewness of Andhra Bank is between is -0.19 to 0.19, the skewness is approximately symmetric. The kurtosis of Andhra Bank is 3.900 , it is positive kurtosis, known as leptokurtic.

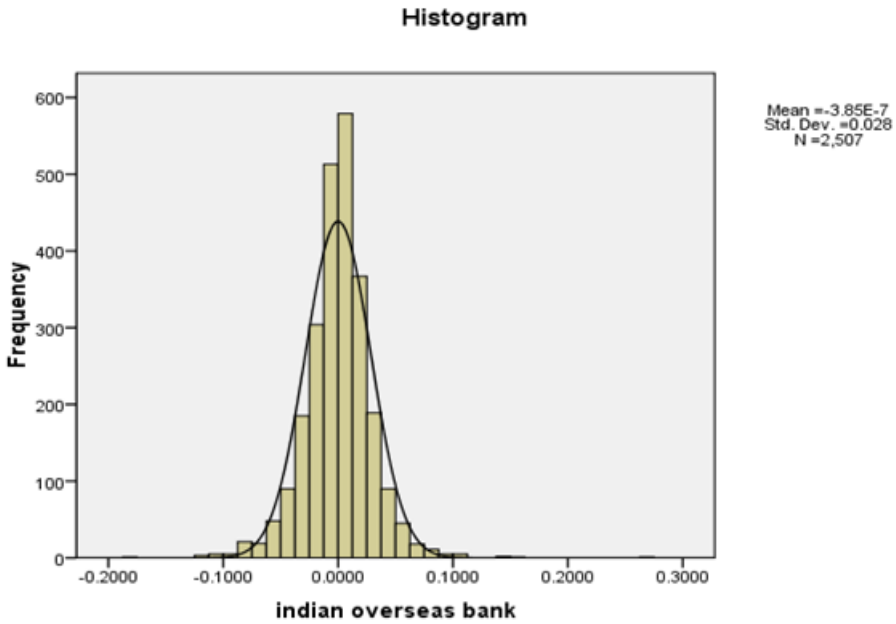
Chart 6 showing daily return of Andhra Bank



The above chart shows Wednesday and Friday gives more returns and are the best days to invest in Andhra Bank

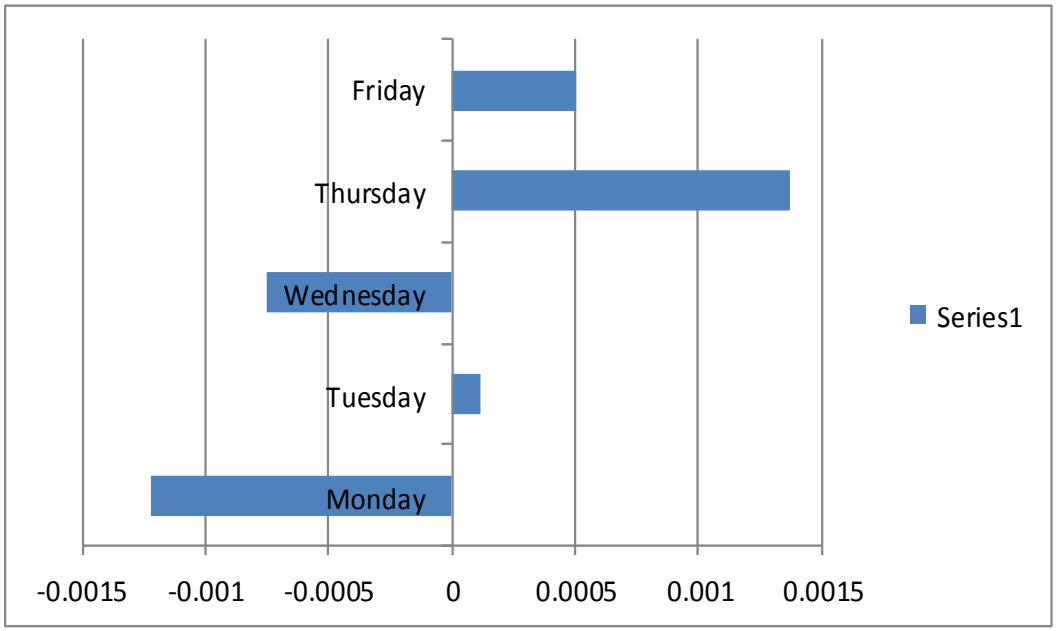
Table 7 showing Descriptive Statistics of Indian Overseas Bank

Std. Deviation	.0284909
Skewness	.231
Std. Error of Skewness	.049
Kurtosis	5.791
Std. Error of Kurtosis	.098
Minimum	-.1833
Maximum	.2688



The Skewness of Indian Overseas Bank is between -0.231 and 0.231, the skewness is approximately symmetric. The kurtosis of Indian Overseas Bank is 5.791, it is positive kurtosis, known as leptokurtic.

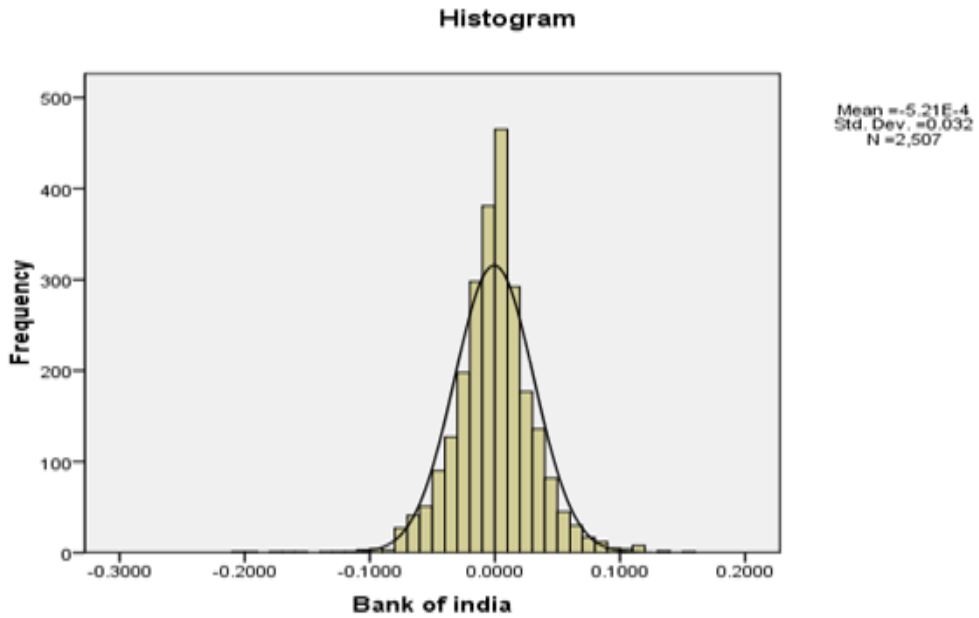
Chart 7 showing daily return of Indian Overseas Bank



From the above chart ,it is inferred that Monday and Thursday gives more returns and are the best days to invest in Indian Overseas Bank.

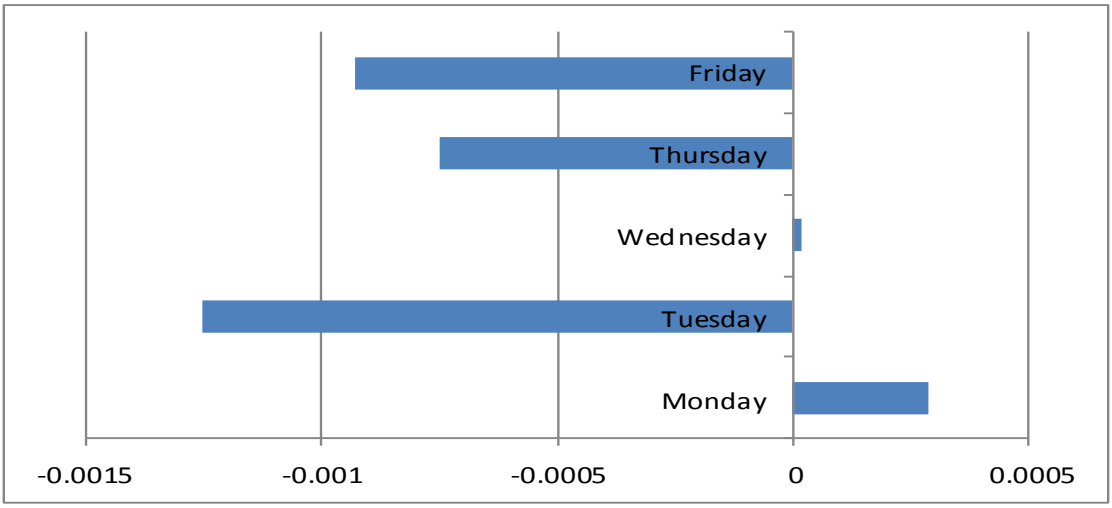
Table 8 showing Descriptive Statistics of Bank of India

Std. Deviation	.0316712
Skewness	-.137
Std. Error of Skewness	.049
Kurtosis	3.361
Std. Error of Kurtosis	.098
Minimum	-.2026
Maximum	.1524



The Skewness of Bank of India is between -0.139 and 0.139, the skewness is approximately symmetric. The kurtosis of Bank of India is 3.361, it is positive kurtosis, known as leptokurtic.

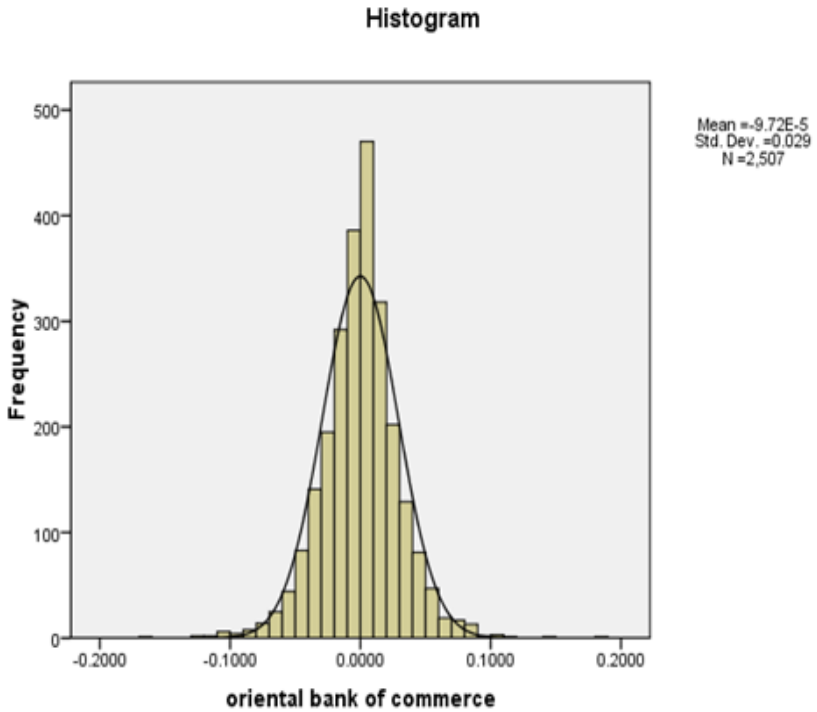
Chart 8 showing daily return of Bank of India



The above chart shows Monday and Tuesday gives maximum negative returns, therefore Monday and Tuesday are the best days to invest in Bank of India.

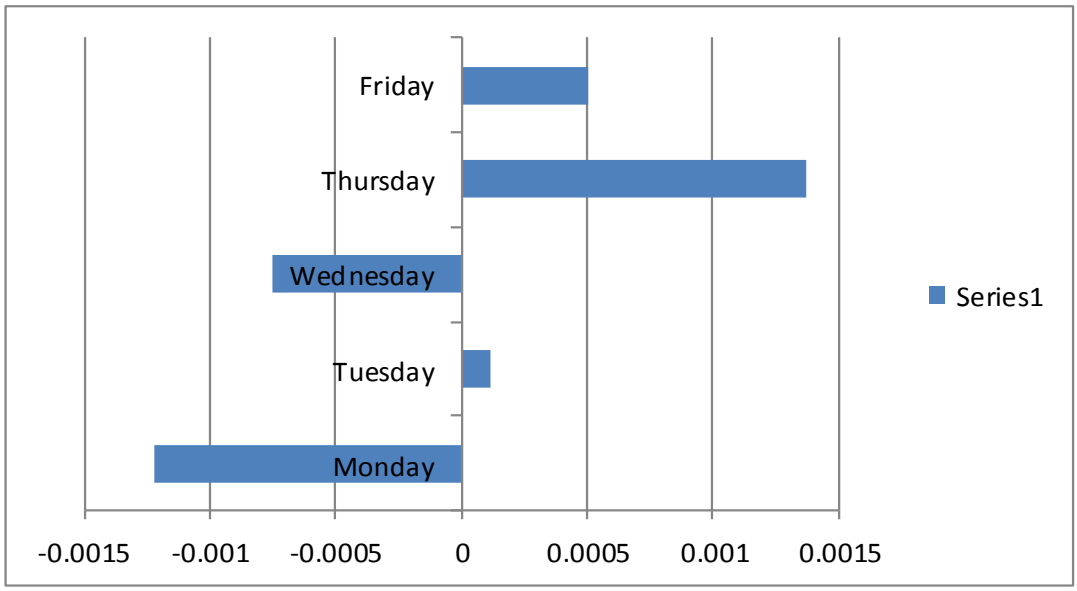
Table 9 showing Descriptive Statistics of Oriental Bank of Commerce

Std. Deviation	.0291830
Skewness	-.016
Std. Error of Skewness	.049
Kurtosis	2.424
Std. Error of Kurtosis	.098
Minimum	-.1641
Maximum	.1874



The Skewness of Oriental bank of Commerce is between -0.016 and 0.016, the skewness is approximately symmetric. The kurtosis of Oriental bank of Commerce is 2.242, it is positive kurtosis, known as leptokurtic.

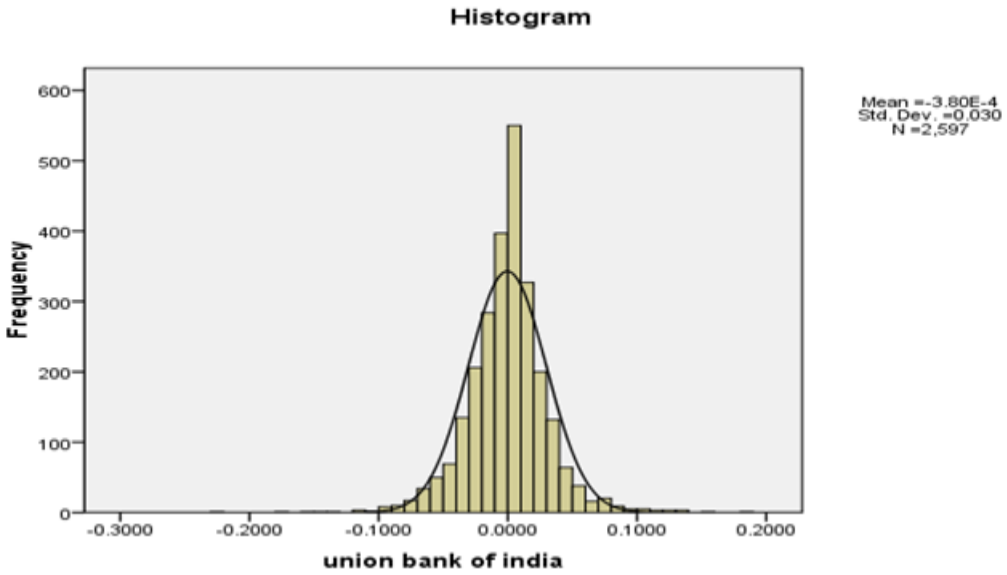
Chart 9 showing daily returns of Oriental Bank of Commerce



The above chart shows Monday and Thursday gives more returns and are the best days to invest in Oriental Bank of Commerce.

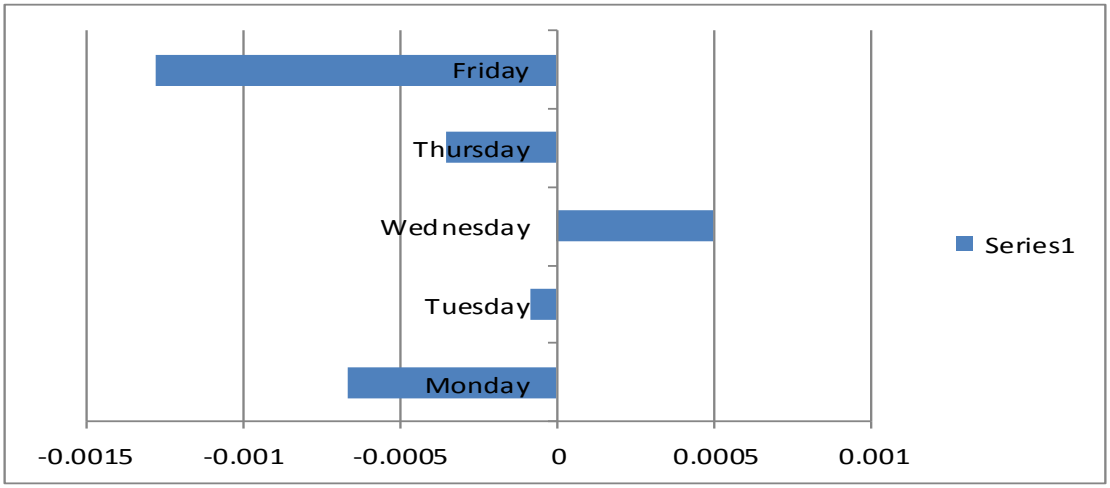
Table 10 showing Descriptive statistics of Union Bank of India

Std. Deviation	.0301899
Skewness	-.077
Std. Error of Skewness	.048
Kurtosis	4.319
Std. Error of Kurtosis	.096
Minimum	-.2246
Maximum	.1827



The Skewness of Union Bank of India is between -0.077 and 0.077, the skewness is approximately symmetric. The kurtosis of Union Bank of India is 4.319, it is positive kurtosis, known as leptokurtic.

Chart 10 showing daily returns of Union Bank of India



The above chart shows that Wednesday and Friday are the best days to invest on Union Bank of India.

Table 11 showing correlation between various scrips

	State bank of india	Bank of baroda	Canara bank	Punjab national bank	IDBI	Andhra bank	Indian overseas bank	Bank of india	Oriental bank of commerce	Union bank of India
State bank of india	1	0.920	0.691	0.950	0.248	0.479	-0.015	0.579	0.586	0.605
Bank of baroda	0.920	1	0.876	0.876	0.958	0.716	0.190	0.728	0.754	0.605
Canara bank	0.691	0.876	1	0.799	0.7141	0.9133	0.462	0.809	0.860	0.913
Punjab national bank	0.950	0.958	0.798	1	0.367	0.623	0.086	0.635	0.695	0.714
IDBI	0.248	0.443	0.714	0.367	1	0.817	0.696	0.664	0.700	0.7746
Andhra bank	0.479	0.716	0.9133	0.623	0.817	1	0.541	0.730	0.869	0.833
Indian overseas bank	0.015	0.190	0.462	0.086	0.696	0.541	1	0.602	0.498	0.489
Bank of India	0.579	0.728	0.809	0.635	0.664	0.730	0.602	1	0.632	0.889
Oriental bank of commerce	0.586	0.754	0.860	0.695	0.700	0.869	0.498	0.632	1	0.779
Union bank of india	0.605	0.781	0.913	0.714	0.746	0.833	0.489	0.889	0.779	1

From the above table, Correlation shows the relationship between two sets of data. Its inferred that correlation between State bank of India and Punjab National bank have positive correlation of 0.95,which shows that State bank of India and Punjab National Bank which moves with a same trend whereas State bank of India and Bank of Baroda have 0.92 which also have positive correlation. From this, any change in prices which occur in State Bank of India which also occur in Punjab National Bank and Bank of Baroda. When considering IDBI which has a correlateion of about 0.248, which shows changes in State Bank of India will not reflect much in IDBI bank.

Indian Overseas Bank and State Bank of India have negative correlation of -0.015, which shows there is no relation between these two banks. Punjab National Bank and Indian Overseas Bank have have correlation of 0.086. Union Bank of India and Canara Bank have positive correlation of 0.91. This correlation helps to in diversified securities where banks have positive correlation.

Table 12 showing risk analysis of scrips using various tools

Table 13 showing risk and return analysis

Scrips	No. of Observations	Mean	Min	Max	Std.dev.	Beta	Skewness	Kurtosis
Bank of Baroda	2500	0.0066	-.128	.14998	.0264	1.54	.162	2.694
Canara Bank	2500	0.0375	-.173	.15226	.0280	1.93	.083	2.672
IDBI	2500	0.0079	-.234	.26743	.0316	1.69	-.010	7.813
State Bank of India	2500	0.0095	-.2029	.12994	.0254	1.50	-1.023	8.840
Punjab National Bank	2500	0.0077	-.1217	.16938	.0254	1.56	.260	3.616
Andhra Bank	2500	-0.0012	-.1555	.17001	.0264	1.52	.019	3.900
Indian Overseas Bank	2500	-0.0003	-.1833	.2688	.0284	1.91	.231	5.791
Bank of India	2500	-0.0005	-.2026	.1524	.0316	1.77	-.137	3.361
Oriental Bank of Commerce	2500	0.00097	-.1641	.1874	.0291	2.38	-.016	2.424
Union Bank of India	2500	-0.0038	-.2246	.1827	.0301	2.56	-.077	4.319

Scrips	Sharpe's Measure	Treynors Measure	Jensen's alpha	Expected Return	Ranking Based on Jensen's Alpha	Ranking Based on Sharpe's Measure	Ranking Based on Treynors Measure
Bank of Baroda	0.3089	3.123	-7.434	13.2	2	3	2
Canara Bank	0.0199	0.1606	-14.377	8.7	8	9	9
IDBI	-0.0399	-0.2899	-13.350	7.9	6	10	10
Punjab National Bank	0.0489	0.4066	-10.805	9.0	5	6	6
State Bank of India	0.0803	1.16	-9.4767	10.1	3	4	4
Andhra Bank	0.9510	4.34	-4.9572	15	1	1	1
Indian Overseas Bank	0.0759	0.5287	-13.52	9.4	7	5	5
Bank of India	0.3255	2.0395	-9.859	12	4	2	3
Oriental Bank of Commerce	0.0386	0.2563	-17.50	9	9	7	7
Union Bank of India	0.0304	0.1992	-18.97	8.9	10	8	8

The above table shows the list of bank rated bases on Sharpe, Treynor, alpha(Jensons alpha) value and ranked all the banks based on the measures taken for the research. The ranking shows Andhra bank has more impressive value, expected return. The Sharpe measure for Andhra bank is 0.9510, higher the Sharpe better the risk adjusted return. So it is better to add Andhra bank in your portfolio. The Treynor Measure for Andhra bank is 4.34, it depends on the beta value, higher the beta value gives more relationship between the index value and scrip value. All scripts are having negative value for Jensons alpha which implies the returns are better than the risk free return.

The Sharpe measure for Bank of Baroda is 0.3089, higher the Sharpe better the risk adjusted return. So it is better to add Andhra bank in your portfolio. The Treynor Measure for Andhra bank is 3.123, it depends on the beta value, higher the beta value gives more relationship between the index value and scrip value. All scripts are having negative value for Jensons alpha which implies the returns are better than the risk free return.

The Sharpe measure for State Bank of India is 0.0803, higher the Sharpe better the risk adjusted return. So it is better to add State Bank of India in your portfolio. The Treynor Measure for State Bank of India is 1.16 , it depends on the beta value, higher the beta value gives more relationship between the index value and scrip value. All scripts are having negative value for Jensons alpha which implies the returns are better than the risk free return.

The Sharpe measure for Bank of India is 0.3255, higher the Sharpe better the risk adjusted return. So it is better to add Andhra bank in your portfolio. The Treynor Measure for Andhra bank is 2.0395, it depends on the beta value, higher the beta value gives more relationship between the index value and scrip value. All scripts are having negative value for Jensons alpha which implies the returns are better than the risk free return.

IV. Suggestion

This research shows performance of banks in various day of the week. This project shows that day of the week effect and most of the banks gives more returns on Monday and Friday. These suggests that Monday and Friday are the best days to invest in the scrips. The performance analysis using Sharpe, Treynor and Jenson alpha shows that Andhra Bank and State Bank of India performance is higher when comparing with risk free rate.

Suggestion to Best Day to Invest in Banking Scrips

Banking Scrip	Best day to Invest
Bank of Baroda	Wednesday, Monday
Canara Bank	Monday
IDBI Bank	Monday, Tuesday
State Bank of India	Monday, Friday
Punjab National Bank	Thursday, Friday
Andhra Bank	Wednesday, Friday
Indian Overseas Bank	Monday , Thursday
Bank of India	Monday, Tuesday
Oriental Bank of Commerce	Monday,Thursday
Union Bank of India	Wednesday, Friday

V. Conclusion

In this research we have studied the stability of the day of the week effect in mean and in conditional variance of returns of the banking scrips. It is evident that the day of the week effect is present in the banking scrips. Our findings show that Monday and Friday effects are significant, seasonality does exist. As we have shown, a majority of significant positive returns are on Monday, while significant negative returns are on Friday. From the performance analysis, it shows Andhra Bank and State Bank of India performance is good and can be included in the portfolio.

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