



## An Empirical Study on Day of the Week Effect among Stocks of selected banks in India

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### ABSTRACT

Seasonal or calendar anomalies in equity markets (over specific days, weeks, months, and even years) have attracted a widespread attention and considerable interests among practitioners and academics alike. The day of the week effect refers to the existence of a pattern on the part of stock returns, whereby these returns are linked to the particular day of the week. The primary objective of the study is to investigate the existence of seasonality in stock price behavior in Indian stock market, more specifically to investigate the existence of the day of the week effect in banking sector. The rationale behind the selection of banking sector is stocks in this sector always experience high volatility in the market, linked to the movement of broad market index and banking in India is critical to economic development of the nation. Thus this sector hence needs special attention by investors. The period of the study is from 3<sup>rd</sup> November 1994 to 31<sup>st</sup> December 2013. For the purpose analysis, the study has employed daily price series that have been obtained from the official website of National Stock Exchange (NSE). The daily price series of selected nine banks were selected for this study, and used multiple regression technique to examine the significance of the regression coefficient for investigating day of week effects. It is found that all the nine selected banks evidenced day of the week effect and mostly either on Monday, Tuesday or Wednesday. Only IDBI, OBC and PNB evidenced significant Thursday effect. The existence of seasonality in stock returns violates the weak form of market efficiency because equity prices are no longer random and can be predicted based on past pattern. This facilitates market participants to devise trading strategy which could fetch abnormal profits on the basis of past pattern. These findings have important implications for the financial managers, financial analysts and investors. The understanding of seasonality would help them to develop appropriate investment strategies.

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### Introduction

Seasonality refers to regular and repetitive fluctuation in a time series which occurs periodically over a span of less than a year. Stock returns exhibits systematic patterns at certain times of the day, week or month. The existence of seasonality in stock returns however violates an important hypothesis in finance that is efficient market hypothesis. According to the Efficient Market hypothesis, past prices of shares should have no predictive power of future prices. In effect, prices should be random. However, numerous studies have been carried to prove that market inefficiencies do exist and that anomalies may be in terms of seasonal effects over the day of the week, the months of the year or over specific years. Seasonal or calendar anomalies in equity markets (over specific days, weeks, months, and even years) have attracted a widespread attention and considerable interests among practitioners and academics alike. Over the last hundred years, a vast number of the literature from both the practitioner and academic fields examined day-of-the-week effects or day seasonality on returns of various assets, such as stocks, debt securities, futures, foreign currencies and even commodities. The earliest research can be traced back to as early as the late 1920s. Calendar anomalies, relying on the assumption that a certain pattern of stock markets is formed on the basis of the past stock price, can be used to predict the future stock price. If the pattern is fixed, informed investors can utilize the pattern to earn a risk-free profit by trading the stocks. The study of

seasonality implies that investors could employ the findings on anomalies to predict the future behavior of prices (Fama, 1965).

The Indian capital market is more than a century old. Its history goes back to 1875, when 22 brokers formed the Bombay Stock Exchange (BSE). Over the period, the Indian securities market has evolved continuously to become one of the most dynamic, modern, and efficient securities markets in Asia. Today, Indian market confirms to best international practices and standards both in terms of structure and in terms of operating efficiency. Indian securities markets are mainly governed by a) The Company's Act 1956, b) the Securities Contracts (Regulation) Act 1956 (SCRA Act), and c) the Securities and Exchange Board of India (SEBI) Act, 1992. The national stock exchange, or NSE, is a recent entrant in the stock exchange scene in India. It was incorporated in November 1992, at the behest of the Government of India. The shares of about 1,589 companies trade on this exchange. Its daily average turnover for the year 2009-10 is Rs. 28,476 crores. The total market capitalization of stocks trading in NSE is Rs. 67, 45,724 crores, as on 31st March 2010. Regional exchanges also sponsor trading of some firms that are traded on national exchanges. This dual listing enables local brokerage firms to trade in shares of large firms without needing to purchase membership on the larger exchanges like BSE and NSE. Thus, for example, Infosys is listed on the Bangalore Stock Exchange apart from BSE and

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NSE. However, BSE and NSE are still the preferred exchanges for large traders. The 1990s will go down as the most important decade in the history of the capital market of India. The Capital Issues (Control) Act, 1947 was repealed in May 1992. The decade was characterized by a new industrial policy, emergence of SEBI as a regulator of capital market, advent of foreign institutional investors, euro-issues, free pricing, new trading practices, new stock exchanges, entry of new players such as private sector mutual funds and private sector banks, and primary market boom and bust. The 1991-92 securities scam revealed the inadequacies of and inefficiencies in the financial system. It was the scam, which prompted a reform of the equity market. The Indian stock market witnessed a sea change in terms of technology and market prices. Technology brought radical changes in the trading mechanism. The Bombay Stock Exchange (BSE) was subject to nationwide competition by two new stock exchanges – the National Stock Exchange (NSE), set up in 1994, and Over the Counter Exchange of India (OTCEI), set up in 1992. With automation and geographical spread, stock market participation increased. In 1996, the National Stock Exchange of India launched S&P CNX Nifty and CNX Junior Indices that make up 100 most liquid stocks in India. CNX Nifty is a diversified index of 50 stocks from 25 different economy sectors. The Indices are owned and managed by India Index Services and Products Ltd (IISL) that has a consulting and licensing agreement with Standard & Poor's. In 1998, the National Stock Exchange of India launched its web-site and was the first exchange in India that started trading stock on the Internet in 2000. The NSE has also proved its leadership in the Indian financial market by gaining many awards such as 'Best IT Usage Award' by Computer Society in India (in 1996 and 1997) and CHIP Web Award by CHIP magazine (1999). In 2000 the BSE used the sensitive index, i.e., Sensex to open its derivatives market, trading Sensex futures contracts. The development of Sensex options along with equity derivatives followed in 2001 and 2002, expanding the BSE's trading platform. The rationale behind the selection of banking sector is stocks in this sector always experience high volatility in the market, linked to the movement of broad market index and banking in India is critical to economic development of the nation. Thus this sector hence needs special attention by investors.

### Objectives of Study

The primary objective of the study is to investigate the existence of seasonality in stock price behavior in Indian stock market, more specifically to investigate the existence of the day of the week effect in banking sector.

The specific objectives of the study are:

- a) To analyze the basic descriptive statistics like mean, median, standard deviation, kurtosis and skewness for daily return of selected banking stocks.
- b) To examine the significance of regression coefficient for the daily effect using multivariate technique in the selected banking stocks.

### Literature Review

During the past five decades, much time and effort have been devoted in the field of finance to investigate the behaviour of certain speculative prices such as those of securities and commodity futures. Research efforts have been directed, in particular, to study price behaviour of common stocks or equity shares as they are popularly called in India with a view to understanding the underlying stochastic processes which determine the prices of these shares.

In an earlier study, Sharma and Kennedy (1977) found that the Indian markets obeyed the theory of random walk and concluded that markets were efficient. Ignatius (1998) examined seasonality in a BSE index and in the Standard and Poor's 500 stock indexes for the period 1979-1990. Pandey (2002) studied the presence of the seasonal or monthly effect in stock returns has been reported in several developed and emerging stock markets. This study investigates the existence of seasonality in the post-reform period. The study uses the monthly return data of the Bombay Stock Exchange's Sensitivity Index for the period from April 1991 to March 2002 for analysis. The results confirm the existence of seasonality in stock return in India and the January effect. Sarma (2004) examined calendar effects during the post reform era in the Indian stock market. He investigated the BSE 30, the BSE 100, and the BSE 200 stock indexes to detect the day-of-the-week effect. Utilizing Kruskal-Wallis test statistics, the study concluded that the Indian stock market exhibited some seasonality in daily returns over the period January 1, 1996 to August 10, 2002. The major findings of the study are the Monday-Tuesday, Monday-Friday, and Wednesday-Friday sets have positive deviations for all the indices, The Monday-Friday set for all the indices has the highest positive deviation thereby indicating the presence of opportunity to make consistent abnormal returns through a trading strategy of buying on Mondays and selling on Fridays. Kumari and Mahendra (2006) studied the day of the week effect and other market anomalies in the Indian Stock Market over a period from 1979 to 1998 both in The Bombay Stock Exchange and in the National Stock Exchange. They found that the Monday returns were higher compared with the other days of the week but on the other hand the returns on Tuesday were negative. In the case of monthly returns they documented that the returns in April were significantly higher and different from the rest of the months. Tripathy (2010) investigated the expiration day and week effects for nifty futures by using statistical t-test, F-test and Kruskal-Wallis test for the period from November 2007 to November 2009. The study also analyzed the day of the week effect in Bearish phase and Bullish phase to see whether the day of the week effect was visible in these specific market phases or not. The study explains that the Day of the Week effect found to be absent in the Bullish as well as the Bearish phase. The study found that the trading volume for the NIFTY future index increased as the expiration date move towards nearer. It was highest around 10-15 days prior to expiration and decreased as the expiration approached.

### Day of the Week Effect

The day of the week effect refers to the existence of a pattern on the part of stock returns, whereby these returns are linked to the particular day of the week. The last trading days of the week, particularly Friday, are characterized by the positive and substantially positive returns, while Monday, the first trading day of the week, differs from other days, even producing negative returns. The presence of such an effect would mean that equity returns are not independent of the day of the week, evidence against random walk theory.

### Indian Capital Market

On the eve of the World War I, the stock market in India consisted of the three stock exchanges at Mumbai, Calcutta and Ahmadabad. As hostilities developed, the imports into India almost stopped completely as Europe ceased to produce any manufactured articles except those required for the war. As a result, Indian manufacturers were able to penetrate the home market. It was a period of phenomenal prosperity. The stock exchanges soon became the center of attraction for all.

Table 1. Descriptive statistics of daily return for selected Banks							
Name of company	Parameter	Monday	Tuesday	Wednesday	Thursday	Friday	All Days
BOB	Mean	-0.0023	-0.00377	0.06143	0.00945	-0.0016	0.0022
	Median	0.0281	-0.0287	0.0185	0.00725	-0.0189	0.0561
	Standard deviation	0.04078	0.03422	0.03606	0.04333	0.03422	0.03341
	Kurtosis	0.34421	-1.2022	2.4792	4.68186	-0.33834	4.77215
	Skewness	1.14043	0.04518	1.4107	1.24285	0.61532	0.78537
Canara Bank	Mean	0.0045	-0.0007	0.00448	0.04736	0.05201	-0.0061
	Median	0.0186	0.0012	0.08921	0.07628	0.01852	0.0028
	Standard deviation	0.02580	0.07107	0.05484	0.03324	0.0386	0.14346
	Kurtosis	1.9717	47.811	4.02685	22.0183	4.68755	43.579
	Skewness	0.65231	-21.057	-0.35605	3.2111	2.05270	-15.444
HDFC	Mean	-0.00242	0.03882	-0.00255	0.03808	-0.00467	-0.0007
	Median	0.00926	0.01087	-0.00032	0.00586	0.00011	0.0092
	Standard deviation	0.02155	0.0286	0.03335	0.02002	0.02444	0.06635
	Kurtosis	0.72262	26.23475	5.44441	6.10494	4.35012	70.496
	Skewness	-0.56087	3.99042	-0.80393	1.97961	0.9618	-2.481
ICICI	Mean	-0.0060	-0.0076	0.03821	0.00081	-0.0223	0.00074
	Median	0.00461	0.00356	-0.00389	0.00034	-0.0056	0.00583
	Standard deviation	0.1409	0.03018	0.02550	0.02374	0.02637	0.02752
	Kurtosis	29.7867	1.45527	15.7086	1.1178	2.15707	0.65502
	Skewness	-14.7854	0.53608	2.880	0.2571	0.6171	0.19339
IDBI	Mean	-0.00109	0.04151	-0.00112	-0.0044	0.0494	-0.0005
	Median	-0.00204	0.04623	-0.00487	0.05723	0.04629	0.0063
	Standard deviation	0.03022	0.02371	0.0359	0.02528	0.02937	0.0318
	Kurtosis	1.4331	8.75494	6.1592	0.70853	3.76157	2.5792
	Skewness	0.0603	2.14267	-0.28119	0.43137	1.77583	-0.0113
OBC	Mean	-0.00037	0.0638	0.05562	0.00175	-0.00556	-0.0085
	Median	0.00482	0.00463	0.00572	0.04623	0.0461	0.0463
	Standard deviation	0.04425	0.05479	0.04371	0.03568	0.03613	0.03249
	Kurtosis	2.65605	5.00469	30.9665	3.81225	3.05451	2.47985
	Skewness	-0.26623	2.19001	4.26679	-0.45488	-0.03157	-0.0340
PNB	Mean	-0.0029	0.05166	-0.00277	0.00164	0.04559	0.00071
	Median	0.0467	0.0563	-0.0758	0.0009	0.0229	0.00482
	Standard deviation	0.02641	0.02558	0.0405	0.04062	0.02744	0.0367
	Kurtosis	2.9844	2.90416	3.27879	1.21778	1.7108	1.84151
	Skewness	0.04113	1.43823	0.7008	-0.01764	1.4038	-0.0345
SBI	Mean	0.00406	0.0503	0.03062	0.0005	0.02081	0.03985
	Median	0.00672	0.0743	0.06429	0.0056	0.00723	0.0654
	Standard deviation	0.02197	0.03555	0.07483	0.02801	0.06318	0.0404
	Kurtosis	-1.64844	20.5666	4.37235	2.15478	5.1183	4.4363
	Skewness	-0.63899	3.53697	2.05189	0.21351	2.21625	1.6937
Union Bank	Mean	0.00391	0.0005	0.00396	-0.00046	-0.0022	0.00054
	Median	0.00894	0.00512	0.00834	0.07342	0.05672	0.00561
	Standard deviation	0.03596	0.02423	0.0396	0.02583	0.03497	0.03159
	Kurtosis	2.78878	1.30463	0.79514	1.85273	0.8993	2.98952
	Skewness	-0.0377	0.52709	0.07607	0.61982	0.23854	0.0755

**Table 2. Regression results of day of week effect in Banking sector**

Company	Constant	B <sub>2</sub>	B <sub>3</sub>	B <sub>4</sub>	B <sub>5</sub>	R <sup>2</sup>	F-value
BOB	-0.0059*	0.0025	0.0075**	0.00069	-0.04598	0.73	3.26 (0.023)
Canara Bank	0.00756	-0.0075	0.0091*	-0.00057	0.00562*	0.75	4.37 (0.0012)
HDFC	0.00048**	0.0073*	-0.0067	0.00369	-0.07514	0.69	1.93 (0.082)
ICICI	-0.00045	-0.0096	-0.0037*	0.00459**	0.03578	0.77	6.94 (0.0032)
IDBI	-0.00045	0.0045**	0.0049***	-0.00045	-0.07426	0.66	2.28 (0.064)
OBC	0.00759	-0.0065	0.0043**	-0.0429**	0.03549	0.72	5.34 (0.0021)
PNB	0.00078	0.0081**	-0.0079	0.00365**	0.03465	0.65	4.54 (0.0041)
SBI	-0.0085**	-0.0067*	0.0013***	0.00208	-0.00053	0.75	1.65 (0.125)
Union Bank	0.05093*	0.0759	0.0072**	-0.00851	0.03024	0.81	4.85 (0.0017)

Note: \*, \*\* and \*\*\* denote significance at 1%, 5% and 10%, respectively; the values in parenthesis under F-value denote the p-value of the regression analysis.

However, the boom also led to the formation of many rival stock exchanges. Followed by the Second World War also resulted in a sharp boom and mushroom growth in the number of stock exchanges. Subsequently to cater to the needs and regulate the stock exchanges the government came out with a comprehensive legislation called the 'Securities Contract (Regulation) Act'. This legislation made it mandatory on the part of the stock exchanges to secure recognition from the Central Government. Only the established stock exchanges in Bombay, Ahmadabad, Calcutta, Madras, Delhi, Hyderabad and Indore were recognized under the Act. More stock exchanges were recognized subsequently. At present, there are twenty-three recognized stock exchanges in India, including the Over The Counter Exchange of India (OTCEI) and National Stock Exchange (NSE).

The reform process in India began in early 1990s with stock exchanges and then spread to banks, mutual funds, NBFCs and of late, to insurance companies. However, reforms in equity market in particular commenced in mid-1980s. Mumbai (formerly known as Bombay) Stock Exchange (BSE) has always played the dominant role in the equity market in India. Traditionally, stock exchanges were governed by brokers leading to conflict of interest situation between the interest of common investors and those of brokers/owners of stock exchanges. With the establishment of National Stock Exchange (NSE), a new institutional structure was introduced in India that could ensure smooth functioning of market through a combination of new technology and efficient market design. The Securities Exchange Board of India (SEBI) was set up as a market regulator with statutory powers to control and supervise operations of all participants in the capital market viz. stock exchanges, stock brokers, mutual funds and rating agencies. The development of debt market is another significant development, which has been facilitated by deregulation of administered interest rates. Opening of stock exchange trading to Foreign Institutional Investors (FIIs) and permission of raising funds from international market through equity linked instruments have introduced a degree of competition to domestic exchanges and other market participants. Operations of FIIs have facilitated introduction of best practices and research inputs in trading and risk management systems.

The stock market development is often usefully measured in terms of three ratios, viz, the market capitalization ratio, the total value traded ratio, and the turnover ratio. The market capitalization ratio, which is measured as market capitalization divided by GDP, indicates the size of the market. Liquidity is measured by two ratios, viz., total value traded ratio and turnover ratio. The total value traded ratio is measured as total value traded divided GDP. The total value traded ratio is measured as total value traded divided by GDP. The total value traded ratio complements the market capitalization ratio in that the market capitalization may be high without there being much trading. The turnover ratio is measured by the value ratio captures trading in relation to the size of the stock market.

#### Sample, Source and Period of the Study

For the micro level study the researcher used a three stage approach of sample selection. In the first stage leading sector that contribution significance to the economy( in terms of GDP) were selected and it was purposed to use the leading companies under these sectors depending on availability of stock data and other criteria. In the second stage attempt was made to select nine banks based on the three criteria namely profit position, turn over and market capitalization. At the end of the second stage the total nine banks could be selected. In the third stage the researcher tried to obtained continuous data for the selected banks. In this study we have taken nine from Banking sector (Bank of Baroda, Canara Bank, HDFC, ICICI, IDBI, OBC, PNB, SBI and Union Bank), The period of the study is from 3<sup>rd</sup> November 1994 to 31<sup>st</sup> December 2013. For the purpose analysis, the study has employed daily price series that have been obtained from the official website of National Stock Exchange (NSE).

#### Tools of Analysis

It is found from the extensive review of prior studies that most of the earlier works on stock price behavior have used closing price for return generating procedure with an implied assumption of trading done at the closing price. The continuous compounded annual return is well accepted approach to measuring the daily returns. The natural log of daily relative mean index value is, thus the measure of daily used for this study. The log return is calculated based on the closing price and is presented in equation 1.

$$R_t = \ln\left[\frac{C_t}{C_{t-1}}\right] \dots\dots\dots (1)$$

Where:

- R<sub>t</sub> = return on day ‘t’
- C<sub>t</sub> = Closing Price on day ‘t’
- C<sub>t-1</sub> = Closing on day ‘t-1’
- and ln = natural log.

The study has analyzed the returns on daily basis. In the first phase, we employ basic descriptive statistics like mean, median, standard deviation, Kurtosis and skewness. In the last phase, the study used multiple regression technique to examine the significance of the regression coefficient for investigating day of week effects.

**Regression Analysis**

Regression analysis is employed to further examine the day of week effect for the selected Banks. A regression analysis is a statistical method used to estimate the strength of a relationship between one or more dependent variable and one or more independent variables. It assumes that the relationship between the dependent and independent variables is linear; that these variables have equal variance (homoscedasticity); that there is no correlation between two or more of the independent variable (multicollinearity);and the data is normally distributed. Regression analysis can be simple involving one dependent variable and one independent variable, or multiple involving one dependent variable and two or more independent variable. Regression analysis was used by the researcher to gain a deeper understanding of the relationship between the log return of the closing price of one day with other day of the week.

The regression analysis was to examine the significance of the seasonality of return for the stocks. We have used F-test, t-test, adjusted R<sup>2</sup> and P test for hypothesis testing and significance test. Linear regression:

In linear regression, the model specification is that the dependent variable, y<sub>i</sub> is a linear combination of the parameters (but need not be linear in the independent variables). For example, in simple linear regression for modeling n data points there is one independent variable: x<sub>i</sub>, and other days parameters, β<sub>0</sub>, β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub>, β<sub>4</sub>.....n.(n for day, 5).In order to test the day of the week effect, on the stock return in the Indian selected Banks, The regression equation for day of the week is presented below in equation 2,

$$R_t = \alpha + \beta_1 D_{2t} + \beta_2 D_{3t} + \beta_3 D_{4t} + \beta_4 D_{5t} + e_t \dots\dots\dots (2)$$

where R<sub>t</sub> is daily returns, calculated using in above both equation D<sub>2t</sub> , D<sub>3t</sub> ..... D<sub>5t</sub> are dummy variables from Tuesday to Friday.

**Descriptive Statistical Analysis**

This section presents and analyses the various descriptive statistics of the daily return for each of the selected Banks under study.

Table 1 depicts the values of descriptive statistics for each of the week days for the selected nine banks. The study finds relatively higher values of mean return (in consistent manner) on the weekdays for OBC in the range of 0.0055 to 0.063, with the exception of Monday mean return with -0.00037. Only SBI evidenced consistently positive mean return for each for the five week days with all day mean return 0.03985. Lower levels of mean return are observed for ICICI in the range of -0.023 to 0.38 with all days mean of 0.00074. Further, it is found that very high level of mean return for some weekdays and lower levels for other week days is observed for PNB in the range of 0.051 to -0.0027. For BOB, negative mean return is found for Monday,

Tuesday and Friday with positive values for remaining weekdays and all day average of 0.0022. In case of Canara, HDFC and IDBI there is evidence of inconsistently higher and lower values of mean return for weekdays with all day’s average being negative at -0.0061, -0.0007 and -0.0005 respectively. Both ICICI and Union Bank have lower levels of weekday returns with all day mean of 0.00074 and 0.00054, respectively. ICICI is found to have the minimum weekday mean return for Tuesday (-0.0076).

With regard to median, it is observed that relatively higher values of median return (in consistent manner) for the weekdays is for PNB in the range of -0.075 to 0.056, with the exception of Thursday median return of 0.0009. Only three companies namely, OBC, SBI and Union Bank evidenced consistently positive median return for each for the five week days. Lower levels of median return for the week days are observed for BOB in the range of -0.028 to 0.028 with all day average median of 0.0561. OBC is observed to have consistently positive median return for each of the five weekdays with all day’s average of 0.0463. For BOB, negative median return is found for Tuesday and Friday with positive values for remaining weekdays and all day median of 0.0561. In case of ICICI and IDBI, there is evidence of inconsistently higher and lower values of median return for weekdays with all day average being positive at 0.0058 and 0.0063, respectively. Both Canara and PNB have lower levels of weekday returns with all day average median of 0.0028 and 0.00482, respectively. PNB is found to have the minimum weekday median return for Wednesday (-0.0758).

With regard to standard deviation, relatively higher values for the weekdays are observed for SBI in the range of 0.021 to 0.074, with the exception of Thursday standard deviation with value of 0.02801. Further, it is found that very high standard deviation for some weekdays and lower levels for other week days is observed for Canara in the range of 0.025 to 0.071 for Monday to Tuesday. For BOB, HDFC, OBC,PNB and Union Bank standard deviation is found consistent over the weekdays. Canara Bank evidenced inconsistently higher and lower values of standard deviation with all day average being positive at 0.14346. Both ICICI and Union Bank have lower levels of weekday returns with all day average standard deviation of 0.02752 and 0.03159, respectively. ICICI is found to have the minimum weekday standard deviation return for Monday (0.01409). Relatively higher values of Kurtosis (in consistent manner) for the weekdays are observed for Canara in the range of 1.97 to 47.81, with the all day Kurtosis of 43.579. The daily return on Tuesday is more peaked with value of 47.811. Lower range of kurtosis for the week days are observed for Union Bank in the range of 0.79 to 2.78 with all day kurtosis of 2.98952. Further, it is found that very high range of kurtosis for some weekdays and lower levels for other week days is observed for ICICI in the range of 29.78 to1.11 for Monday to Thursday. PNB is observed to have consistently positive kurtosis value for each of the five weekdays with all days average of 1.84151(platykurtic) . For BOB, Canara, HDFC,ICICI, OBC and SBI kurtosis is found highly peaked for four days, three days for IDBI and SBI, two weekdays for ICICI and one each for BOB and PNB.

With regard to skewness, higher values of for the weekdays are observed for Canara in the range of -21.05 to 3.21, with the all day skewness of -15.444, Tuesday returns being highly inconsistent with Kurtosis value of -21.057. Lower range of skewness for the week days are observed for BOB in the range of 0.045 to 1.41 with all day average skewness of 0.78537. Very high range of skewness for some weekdays and positive skewed

returns is observed for ICICI in the range of -14.78 to 2.88 for Wednesday and Monday, with all day positive skewness of 0.19339. On all day basis skewness, SBI is more skewed with value of 1.6937 while Canara, HDFC, IDBI and PNB have negative skewness along with BOB, ICICI, SBI and Union Bank evidencing very less positive skewness.

**Analysis of Regression Results for Day of the week effect**  
In this section, we have used regression technique to analyze the findings of the day of the week effect. We have used four weekday dummies namely Tuesday dummy, Wednesday dummy, Thursday dummy and Friday dummy with the constant signifying the Monday effect. A significant value of a weekday dummy indicates presence of the day of the week effect for that weekday.

Table 2 shows the results of regression analysis regarding day of week effect for the nine selected banks. It is observed that for Bank of Baroda, there is negative Monday effect (with  $B_1$  co-efficient of -0.0059) found significant at 1%, while there is a significant (at 5 % level) positive effect on Wednesday with the co-efficient ( $B_3$ ) value of 0.0075. Further, the regression analysis failed to observe any significance for Tuesday, Thursday and Friday coefficients with regard to Bank of Baroda.

Canara Bank evidenced both positive Wednesday effect ( $B_3$  coefficient value 0.0091) and Friday effect ( $B_5$  coefficient value 0.07562) found significant at 1%. HDFC had Monday effect ( $B_1$  coefficient value 0.00048) found significant at 5% and Tuesday effect ( $B_2$  coefficient value 0.0073) found significant at 1%, without significance for Wednesday, Thursday and Friday coefficient.

Again it is observed that for ICICI that there is negative Wednesday effect ( $B_3$  coefficient value -0.0037) found significant at 1%, and positive Thursday effect (with  $B_4$  co-efficient value of 0.00459) significant at 5 % level. The regression results fail to observe any significance for Monday, Tuesday and Friday coefficient for ICICI. It is found for IDBI that there is positive Tuesday effect (with  $B_2$  co-efficient of 0.0045) found significant at 5% while there is a significant (at 10 % level) positive effect on Wednesday with the co-efficient ( $B_3$ ) value of 0.0049. For OBC, there is positive Tuesday effect (with  $B_2$  co-efficient of 0.0081) and Thursday effect (with  $B_4$  co-efficient value of 0.00365) both found significant at 5%, without any significance for Monday, Tuesday and Friday coefficients. PNB showed positive Wednesday effect ( $B_3$  coefficient value -0.0037) found significant at 1%, and positive Thursday effect (with  $B_4$  co-efficient value of 0.00459) while there is a significant at 5 % level. For SBI there is negative Monday effect (with  $B_1$  co-efficient of -0.00085) found significant at 5% and Tuesday effect (with  $B_2$  coefficient of -0.0067) found significant at 1%, while there is a significant (at 10 % level) positive effect on Wednesday with the co-efficient ( $B_3$ ) value of 0.0013. It is observed that for Union Bank, there is positive Monday effect (with  $B_1$  co-efficient of 0.05093) found at 1% significant and Wednesday effect (with  $B_3$  co-efficient value of 0.0072) found significant at 5%. Further, the regression analysis failed to observe any significance for Tuesday, Thursday and Friday coefficients with regard to Union Bank. The highest value of  $R^2$  (0.81) (coefficient of determination) is observed for Union Bank and lowest value of 0.65 for PNB. The  $R^2$  values of the other banks are in the range of 0.65 to 0.81 which implies that the regression model is an appropriate one and provides good results regarding the significance of the coefficients.

Analysis of the last column of Table 2 shows that the F-value is relatively higher in the range of 1.65 to 6.94 with respect, the selected banks. Further, it is observed that ICICI has

highest F-value of 6.94 with P-value of 0.0032, followed by OBC with F-value 5.34 and the corresponding P-value of 0.0021.

#### **Major findings on Descriptive statistics of selected Banks**

The descriptive statistics techniques used for analysis of return for selected banks are mean, median, standard deviation, kurtosis and skewness. These statistics are calculated for each of the five trading days, over the study period covered from 3<sup>rd</sup> November 1994 to 31<sup>st</sup> December 2013. With regard to average all day return, highest and lowest value is found for SBI and OBC, respectively. Similarly with regard to standard deviation for all day return, highest and lowest value is found for Canara bank and ICICI, respectively. With respect to kurtosis for all day return, highest and lowest value is found for HDFC and PNB respectively. Similarly with regard to skewness for all day return, highest and lowest value is found for SBI and Canara Bank, respectively.

#### **Major findings of Regression analysis**

In the study has used multiple regressions to find the effect of day of the week on the stock returns for the selected Banks. For the analysis the daily return is taken as dependent variable and the five week days dummies are the independent variable. The week day on which the regression coefficient is found to be significant is observed and the day of the week seasonality is indicated. In the banking sector, all the nine selected banks also evidenced day of the week effect and mostly either on Monday, Tuesday or Wednesday. Only IDBI, OBC and PNB evidenced significant Thursday effect. Further, the value of  $R^2$  for the derived regression models for each of the selected Banks is relatively higher which indicates that the deviation in the dependent variable is well explained by the independent variables (trading day dummies).

#### **Conclusion**

The study presented a comprehensive analysis of the stock price behavior, more specifically on the seasonality effect, in the Indian stock market. The seasonality effect is examined by a detailed analysis of day of the week effect and the period of study spans over nineteen years i.e. from 1994 to 2013. The study found significant day of week effect for specific trading days. The multiple regression analysis also found evidence of day of week for the price series with regard to the selected banks. Further, the value of  $R^2$  for the derived regression models for each of the selected banks is relatively higher which indicates that the deviation in the dependent variable is well explained by the independent variables (day dummies). On the whole, the price series in the Indian stock market showed signs of return seasonality with respect to day of week. The existence of seasonality in stock returns violates the weak form of market efficiency because equity prices are no longer random and can be predicted based on past pattern. This facilitates market participants to devise trading strategy which could fetch abnormal profits on the basis of past pattern. These findings have important implications for the financial managers, financial analysts and investors. The understanding of seasonality would help them to develop appropriate investment strategies.

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