Seasonality in National Stock Exchange Indices and Pharmaceutical Industry

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INTRODUCTION

It has been well documented in finance literature that any predictable pattern in asset returns may be exploitable. One statistically significant pattern in stock market returns stems from seasonality. As such, seasonal effects in securities markets have attracted much interest among both academics and practitioners. Numerous researchers have studied seasonal anomalies in developed financial markets. However, it seems more difficult to find empirical studies with special reference to daily seasonality in emerging stock markets.

Among the more well-known anomalies are the size effect, the January effect and the day-of-the week effect. 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 days of the week, as we would expect on the basis of the efficient market theory. For most of the western economies, (U.S.A., U.K., Canada) empirical results have shown that on Mondays, the market gave statistically significant negative returns while on Fridays, statistically significant positive returns were observed. In other markets such as Japan, Australia, Singapore, Turkey and France, the highest negative returns appear on Tuesdays.

The most satisfactory explanation that has been given for the negative returns on Mondays is that usually the most unfavorable news appears during the weekends. Unfavorable news influences the majority of the investors negatively causing them to sell on the following Monday. The most satisfactory explanation that has been given for Tuesday's negative returns are the bad news of the weekend. The empirical studies evidencing the inefficiency are broadly related to the following:

- The low P/E effect
- Low-priced stocks
- The small firm and neglected firm effects
- Market over-reaction
- The January effect
- The weekend effect
- The persistence of technical analysis.

If an anomaly exists in the market, the investors can take advantage of the same and adjust their buying and selling strategies accordingly to increase their returns with timing the market. The main objective of this research is to find out the Day of the week effect, (week end effect), financial year effect (April effect) in the NSE Indices and in selected pharmaceutical companies and to determine the day for Investment and trading strategy for the return series.

LITERATURE REVIEW

Stock market seasonality is an old issue that continues to attract the attention of finance researchers owing to its potential of producing abnormal returns during certain period of the year (Mills, 1992). Persons (1919) had acknowledged the presence of January effect, while Kelly (1930) and Fields (1931) are credited with unveiling a phenomenon known as the Monday or weekend effect. All these anomalies were based on experience in the US markets but evidence from the international perspective suggests the presence of day-of-the-week and month-of-the-year effect. Osborne (1962) and Cross (1973) discovered empirical evidence demonstrating that Monday yields were lower than Friday ones for the S&P 500 Index. Similar results are presented by French (1980), upon comparing Monday, Friday and weekly average returns for the same index. He observed that Friday returns were greater than the average, while Monday returns were lesser than the average. Gibbons and Hess (1981) also came to the conclusion that Mondays resulted in negative returns. Their study was based on a sample of 30 stocks from the Dow Jones Industrial Index. Lakonishok and Levi (1982) have offered market transaction payment

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procedures as an explanation for the seasonal behaviour in the daily yields. Keim and Stambaugh (1984) tried to explain the weekend effect in the American market as being related to the measurement errors in stock prices.
These earlier studies of the day of the week effect were based on yield calculations at closing between two dates. Rogalski (1984) approached the problem by dividing yields into non-trading periods (from close to opening) and trading periods (from opening to close). He came to the conclusion that negative Monday returns were generated between the Friday closing and Monday opening, thus (*International Research Journal of Finance and Economics - Issue 2 (2006)* not taking into account the differences in average returns on specific days of the week when considering the trading period.
The presence of seasonality in the stock market implies the possibility of obtaining abnormal returns by market timing strategies, but their existence is considered an anomaly, since they depart from the Efficient Market Hypothesis. Tan and Wong (1998) and Steeley (2000) noticed that calendar effects are disappearing, but this phenomenon may only be temporary. The finding by Holden (2005) renders supports to Rosenberg's (2004) claim, since the pattern of stock returns seasonality are found to be different before, during and after the Asian financial crisis. Turn of the year, month, week and holidays are reported to have consistently generated abnormal equity returns, unrelated to the attendant risks, at the developed stock markets and are identified as calendar anomalies. Fama (1965) reported Monday's variance to be 20 percent returns greater than others daily. Later, many fascinating studies by French (1980), Gultekin and Gultekin (1983), Theobald and Price (1984), Jaffe and Westerfield (1985), Santesmases (1986), Board and Sutcliffe (1988) and Lakonishok and Smidt (1988) presented ample evidence as to the calendar anomalies using the data pertaining to the developing economies.
Taxation at the year-end, cash flows at the month-end, unfavourable news releases at the weekend, and over-reaction due to human psychology are attributed to be reason for such calendar anomalies. Studies by Obadidulla (1994) and Choudhary (1991) testing equality of monthly returns and daily returns respectively could not firmly reject the null hypothesis. Broca (1992) presented unequivocal evidence as to the day-of-the-week effect but concluded that the trading strategy based on this evidence is ineffective when compared to a naïve 'buy and hold' strategy.
The day of the week effect in Indian market was examined by many researchers Chaudhury (1991), Poshakwala (1996), Goswami and Anshuman (2000). All these studies have been based on data of mid-1980s and mid-1990s and all these studies have used conventional methods like serial autocorrelation tests and fitting an OLS. Choudhry (2000) examined seasonality of returns and volatility under a unified framework but the study has a misspecification issue with regard to conditional mean. Bhattacharya et al (2003) used GARCH framework by incorporating the lagged returns (BSE 1001) as explanatory variables in the conditional mean. They have used reporting and non-reporting weeks to study the day of the week effect. All these studies have used end of day data.
The advancement of financial modeling also raises doubt on the existence of stock market seasonality. There is documented evidence suggesting that the seasonality actually appears in the volatility of stock returns (Clare et al., 1997; Beller and Nofsinger, 1998; Franses and Paap, 2000; Poshakwale and Murinde, 2001; Arago-Manzana and Fernandez-Izquierdo, 2003). But Balaban et al. (2001) find that seasonality is exhibited in both stock returns and conditional volatility, where the nature of the day-of-the-week effect on returns and volatility differs greatly among countries. They also notice a significant positive relationship between returns and their conditional volatility. A similar finding is also reported by Mookerjee and Yu (1999). This is consistent with the Capital Assets Pricing Model (CAPM), which postulates a positive relationship between risk and return. Clare et al. (1998), Beller and Nofsinger (1998) and Lucey (2000), however, find that seasonal volatility cannot be associated with the seasonality in stock returns. As such, stock market seasonality cannot be explained from the risk-return relationship perspective.

DATA AND METHODOLOGY

his study employs the daily mean index value generated by the three major indices of NSE namely CNX Midcap, S&P CNX Nifty and S&P CNX 500 for the period from 1st January 2002 to 31st December 2007. The use of recent set of data provides fresh insights into the nature of seasonality in the region. The seasonality is tested for companies also. Pharmaceutical industry is chosen for this study. Top pharmaceutical companies are considered and twenty companies are selected based on the data availability. The selected pharmaceutical companies are namely Ajantpharma, Aurophарma, Cadila, Cipla, Dr. Reddy, Elderpharma, Glaxo, Glenmark, Indswiftlab, Ipcalab, Jbechemphar, Lupin, Natcopharma, Nicolaspir, Orchidchem, Pfizer, Ranbaxy, Shasunchem, Rcf and Sunpharma The index value and security prices are downloaded from NSE website.
The stock market returns are calculated as the natural log of daily relative mean return value used for this study.

Following is the formula:

$$R_t = I_n (Pt/Pt\text{-}1)$$

Where: *Rt* = return on day't'

It = index mean value on day *'t'*

It-1 = index mean value on day *'t*-1*'*

and *ln* = natural log.

To test for normality of the distributions of daily returns, the mean return data is analyzed using measures such as variance, standard deviations, kurtosis, and skewness. Then the results were validated by parametric and non-parametric tests. The daily returns were tested for normality using the *Shapiro-Wilk* test. Since the result of the normality test indicates that the distributions of the returns are non-normal, we use the non-parametric test, the *Kruskal-Wallis* to check the results for equality of mean returns. The *Kruskal-Wallis* statistic is as follows:

$$H = \left[\frac{12}{N(N+1)} x \sum_{j=1}^{5} \frac{R_j^2}{n_j} \right] - 3(N+1)$$

Where: k = number of samples;

nj = number of values in jth sample;

N = Σnj =total number of values;

Rj = sum of ranks in the sample

When N values are ranked together (the statistic is approximately Chi-square distributed degrees of freedom equal to k-1).The null hypothesis tested is that there are no differences in the mean daily returns across the weekdays. If the computed *'H'* is greater than the critical value, the null hypothesis cannot be accepted. Conversely, if the computed *'H'* value is less than the critical value, the alternate hypothesis cannot be accepted.

Pattern of Seasonality is determined by using pair-wise multiple comparison procedure, we can indirectly test which pair shows significant deviations from one another and uncover the general pattern of high-low tendencies in the data. The test procedure relies on the Kruskall-Wallis rank sum R_j. The data in the rank-day matrix prepared for 'H' test is used for this purpose. For a given overall significance level of α decide $\tau_\mu \neq \tau_v$

$$\left| R_\mu - R_v \right| \geq Z\,[\alpha / k\,(k-1)]\,[N\,(N+1)/\,12]^{1/2} \left[\frac{1}{n_\mu} + \frac{1}{n_v} \right]^{1/2}$$

where: μ = 1, 2 ....k-1

v = μ+1... k

k = 5

N = total number of daily means

n = number of daily means in the *μ*th and v*th* column

R = average rank sum of the *μ*th and ith columns

Z(α/K(K+1) = the upper percentage point of the unit normal distribution for a given value

DATA ANALYSIS

The daily mean index value based on all the four reported figures of the day opening, high, low, and closing was used for calculating the daily returns. Descriptive statistics is initially used to analyze the daily mean return for the entire index to test for normality of the data. The results are given in Table 1. The Mean has been found to be higher in CNX Midcap. The standard deviation for CNX Midcap is also found to be the largest. It can be seen that the daily mean return series is non-normal and has a negative Skewness and excess Kurtosis which means that they

have a heavier tail than the standard normal distribution. The descriptive statistics for the selected twenty pharmaceutical companies is given in Table 2.

Table 1 - Descriptive Statistics for Index

S.No	Index	Mean	Standard deviation	Skewness	Kurtosis
1	CNX Midcap	0.00161	0.01415	-1.38730	9.25175
2	S&P CNX 500	0.00136	0.01225	-1.39751	11.88180
3	S&P CNX nifty	0.00117	0.01107	-1.24394	11.20210

Table 2 - Descriptive Statistics for Selected Pharmaceutical Companies

S.No	Company	Mean	S.D	Skewness	Kurtosis
1	Ajantpharm	0.00041	0.03106	0.59269	3.44792
2	Aurophama	0.00059	0.02647	-8.88676	213.602
3	Cadila health	0.00060	0.02630	-10.6683	280.606
4	Cipla	-0.0011	0.05156	-23.7876	686.387
5	Dr. Reddy	-0.00016	0.02570	-13.4514	360.877
6	Elderpharma	0.0016	0.02634	0.69131	4.50997
7	Glaxo	0.0008	0.01638	-0.33406	4.21673
8	Glenmark	0.00076	0.05294	-18.186	472.323
9	Indswift	0.00114	0.03247	0.59358	3.70335
10	Ipcalab	0.00142	0.02977	-8.0918	185.898
11	Jbchem	-0.00026	0.04755	-26.0890	887.521
12	Lupin	0.00130	0.03195	-5.5720	170.874
13	Natcopharma	0.00182	0.03282	0.7284	4.05207
14	Nicolaspir	0.00030	0.04565	-26.598	907.438
15	Orchidchem	0.00094	0.02795	-1.9174	28.8129
16	Pfizer	0.00039	0.01847	0.14106	3.25503
17	Ranbaxy	-0.00032	0.02845	-13.645	309.190
18	Rcf	0.00204	0.03702	0.3619	6.73677
19	Shasunchem	0.00023	0.04991	-21.6529	694.187
20	Sunpharma	0.00050	0.03067	-14.1226	310.715

Among the 20 companies, 16 companies registered positive mean return for all days throughout the study period. The highest mean return is reported in Rashtriya Chemicals & Fertilizers Ltd. (Rcf), while lowest mean return is registered in Dr. Reddy's Laboratories Ltd.

The Standard deviation for Glenmark Pharmaceuticals Ltd is found to be largest, while that for Pfizer Ltd is the lowest of all. With the exception of 6 companies, the Skewness of the daily mean return for the other 14 companies is found to be Negative. The negatively skewed implies that the return distribution of the shares traded in our market have a lower probability of earning positive return. The Kurtosis of the daily mean return for all companies is excessive, thus suggesting the presence of leptokurtosis.

The day effect for the three indices is found by classifying mean return data into day wise. All the three indices show highest and lowest average returns on Thursdays and Tuesdays respectively. There is no strong evidence for week end effect in three indices. While comparing the Monday mean return with Tuesday, Monday has higher

Table 3 - Day of week effect on Index

S.No	Index	Mon (μ_1)	Tue (μ_2)	Wed(μ_3)	Thu(μ_4)	Fri(μ_5)
1	**CNX Midcap**	0.00206	0.00017	0.00121	0.00224	0.00193
2	**S&P CNX 500**	0.00187	0.00056	0.00079	0.00193	0.00126
3	**S&P CNX nifty**	0.00135	0.00066	0.00091	0.00138	0.00132

mean return than Tuesday. This shows the presence of **Tuesday effect** for the entire index. For the selected pharmaceutical companies, 5 companies have negative mean return on Monday and positive mean return on Friday, it supports the **Monday effect**. Of 20 companies, 9 companies support the **Tuesday effect**. These companies have negative mean return on Tuesday and positive mean return on Monday. Most of the Tuesday mean return is lower than the Monday. **Thursday effect** is present in 12 companies.

Table 4(a) - Day of the week effect on selected pharmaceutical companies

S.No	Company	Mon(μ_1)	Tue(μ_2)	Wed(μ_3)	Thu(μ_4)	Fri(μ_5)
1	**Ajantpharm**	0.00416	-0.0000	-0.00380	-0.00110	0.00194
2	**Auropharma**	0.00264	-0.0001	0.00005	0.00190	0.00020
3	**Cadila health**	0.00221	0.00113	-0.00215	0.00005	0.00111
4	**Cipla**	-0.00312	-0.0008	-0.00371	0.00111	0.00069
5	**Dr. Reddy**	-0.00387	0.00005	0.00110	0.00150	0.00004
6	**Elderpharma**	0.00384	0.00067	0.00172	0.00110	0.00050
7	**Glaxo**	0.00259	-0.0002	0.00098	0.00140	-0.00089
8	**Glenmark**	0.00063	0.00219	0.00073	0.00447	0.00069
9	**Indswift**	0.00362	0.00268	-0.00335	0.00001	0.00150
10	**Ipcalab**	0.00244	0.00024	0.00012	0.00408	0.00014
11	**Jbchem**	0.00148	-0.0045	0.00151	0.00125	-0.00166
12	**Lupin**	0.00290	-0.0009	0.00084	0.00420	-0.00080
13	**Natcopharma**	0.00354	0.00469	-0.00317	0.00205	0.00150
14	**Nicolaspir**	-0.00274	0.00059	0.00138	0.00127	0.00063
15	**orchidchem**	0.00297	0.00000	-0.00055	-0.00016	0.00168
16	**Pfizer**	0.00203	-0.0011	0.00139	-0.00009	-0.00005
17	**Ranbaxy**	-0.00058	-0.0007	-0.00147	0.00057	0.00029
18	**Rcf**	0.00567	-0.0015	-0.00059	0.00261	0.00315
19	**Shasunchem**	0.00253	-0.0015	0.00026	0.00431	-0.00533
20	**Sunpharma**	-0.00044	0.00001	0.00110	0.00070	0.00070

Table 4(b) - Day of the Week effect for Pharmaceutical companies

Monday effect	Tuesday effect	Thursday effect
Cipla	Ajantpharm	Auropharma
Dr. Reddy	Auropharma	Cadila health
Nicolaspir	Glaxo	Cipla
Ranbaxy	Jbchem	Dr. Reddy
Sunpharma	Lupin	Glaxo
	Pfizer	Glenmark
	Rcf	Indswift
	Shasunchem	Ipcalab
		Lupin
		Natcopharma
		Ranbaxy
		Shasunchem

Most of research done in developed market tests the year end effect which they call as January effect. In India, we have tax year end in March. We found Month of the year effect in April. It termed as an April Effect. Through this research, it is inferred that month of the year effect is found to be more prevalent than the day of the week effect in India. It is the tendency of mean return to rise in April relative to March. Mean Return series CNX Midcap (Table 5) supports the **April effect** in the year 2003, 2004 and 2007 which have negative mean return in March and positive mean return in April. Mean return value for April is higher than the March for all the sample years. Majority of the negative mean return was registered in the year 2004. November and December month do not have any negative mean return in the study period.

S&P CNX 500 (Table 6) and S&P CNX nifty (Table 7) supports the **April effect** in the year 2004 and 2007. In the year 2003, S&P CNX 500 show more numbers of negative mean returns but for S&P CNX nifty, it was in the year 2002. It can be inferred that the entire index had lowest mean return in the year May, 2004.

Table 5 - Financial Year effect on CNX Midcap

Month	Mean Return					
	2002	2003	2004	2005	2006	2007
Jan	0.0018	-0.0009	-0.0030	-0.0022	0.0035	0.0012
Feb	0.0042	0.0006	-0.0011	0.0020	0.0010	-0.0047
Mar	0.0027	-0.0052	-0.0006	-0.0008	0.0036	-0.0003
Apr	0.0050	0.0034	0.0034	-0.0010	0.0038	0.0039
May	-0.0017	0.0096	-0.0089	0.0029	-0.0070	0.0037
Jun	0.0027	0.0046	0.0003	0.0000	-0.0050	0.0025
Jul	-0.0056	0.0036	0.0032	0.0055	-0.0002	0.0014
Aug	0.0005	0.0066	0.0021	0.0029	0.0050	-0.0011
Sep	-0.0033	0.0018	0.0031	0.0020	0.0035	0.0065
Oct	-0.0009	0.0028	0.0000	-0.0049	0.0019	0.0041
Nov	0.0033	0.0050	0.0060	0.0055	0.0023	0.0026
Dec	0.0024	0.0089	0.0054	0.0019	0.0008	0.0080

Table 6 - Financial Year effect on S&P CNX 500

Month	Mean Return					
	2002	2003	2004	2005	2006	2007
Jan	0.0012	-0.0015	-0.0016	-0.0011	0.0027	0.0017
Feb	0.0049	0.0011	-0.0019	0.0015	0.0015	-0.0050
Mar	-0.0007	-0.0039	0.0004	-0.0013	0.0041	0.0005
Apr	-0.0005	-0.0007	0.0023	-0.0017	0.0027	0.0034
May	-0.0017	0.0068	-0.0100	0.0032	-0.0069	0.0027
Jun	0.0022	0.0051	0.0011	0.0018	-0.0014	0.0007
Jul	-0.0041	0.0022	0.0032	0.0031	0.0006	0.0017
Aug	0.0019	0.0077	0.0009	0.0021	0.0043	-0.0008
Sep	-0.0026	0.0015	0.0033	0.0033	0.0026	0.0063
Oct	-0.0004	0.0025	0.0010	-0.0051	0.0025	0.0063
Nov	0.0037	0.0031	0.0046	0.0064	0.0023	0.0003
Dec	0.0021	0.0085	0.0036	0.0023	0.0002	0.0054

Table 7 - Financial Year effect on S&P CNX nifty

Month	Mean Return					
	2002	2003	2004	2005	2006	2007
Jan	0.0011	-0.0023	-0.0011	-0.0010	0.0027	0.0016
Feb	0.0041	0.0012	-0.0013	0.0011	0.0014	-0.0040
Mar	-0.0017	-0.0035	-0.0007	-0.0014	0.0048	0.0001
Apr	-0.0020	-0.0028	0.0015	-0.0024	0.0020	0.0034
May	-0.0021	0.0035	-0.0093	0.0036	-0.0059	0.0023
Jun	0.0013	0.0057	0.0009	0.0026	-0.0006	0.0003
Jul	-0.0043	0.0021	0.0032	0.0023	0.0012	0.0019
Aug	0.0021	0.0065	0.0001	0.0012	0.0038	-0.0005
Sep	-0.0015	0.0019	0.0030	0.0043	0.0022	0.0061
Oct	-0.0012	0.0038	0.0016	-0.0052	0.0025	0.0073
Nov	0.0055	0.0023	0.0042	0.0067	0.0022	-0.0015
Dec	0.0020	0.0070	0.0026	0.0025	0.0003	0.0037

The April effect was present in eight companies for the year 2002, 2003, and 2004. It revealed some pattern in the scrip return. Aurobindo Pharma Ltd. and GlaxoSmithKline Pharmaceuticals Ltd. has reported negative return in October month for all years and all the companies had different month positive return for the entire sample period.

Table 8 - Financial year end effect for Pharmaceutical companies

Company	Financial year end effect				
Glaxo	2002	2003	2004	2005	2007
Elderpharma	2002	2003	2005	2007	
Ranbaxy	2003	2004	2006	2007	
Ipcalab	2002	2003	2004	2005	
Sunpharma	2003	2004	2005		
orchidchem	2002	2003	2004		
Auropharma	2002	2003	2004		
Cadila health	2002	2003	2004		
Pfizer	2003	2004			
Dr. Reddy	No financial year end effect				
CNX Midcap	2003	2004	2007		
S&P CNX 500	2004	2007			
S&P CNX nifty	2004	2007			

Results of H-Test

A non-parametric Kruskall-wallis test is applied in a place of a conventionally used parametric one-way analysis of variance. It is felt that the kruskall-wallis test is an appropriate one for the data typified of non-normality, heteroscedastic variance like the security return. The Index return series is tested by using "**H**" test and the result is given in Table 9.

Ho: There is no difference in the mean returns across the days of the week.

H1: There is a difference in the mean returns across the days of the week.

The computed '*H*' value is lower than this critical value for all the NSE indices and for selected Pharmaceutical companies also (Table 10). So the null hypothesis is accepted. Hence, there is no difference between the mean return across the days of the week. This provides evidence as to the presence of regularity in common stock return

Table 9 - Kruskall-Wallis test Result for Index

S.No	Index	H value	Critical value
1	CNX Midcap	10.57*	13.28
2	S&P CNX 500	10.85*	
3	S&P CNX nifty	5.6*	

*99 per cent confidence level and four degrees of freedom is 13.28.

during the study period. Having identified regularity in equity returns, a further enquiry is desirable to uncover the pattern of seasonality.

Table 10 - Kruskall-Wallis test Result for Pharmaceutical companies

S.No	Company	H-value	Critical value
1	Auropharma	4.8858	13.28
2	Cadila health	3.0589	
3	Dr. Reddy	2.3924	
4	Elderpharma	2.8151	
5	Glaxo	10.3593	
6	Ipcalab	8.152	
7	Orchidchem	4.2521	
8	Pfizer	7.5593	
9	Ranbaxy	4.8936	
10	Sunpharma	4.56	

The investment day for the index is determined by using the test procedure of the Kruskall-Wallis rank sum R_j. The data in the rank-day matrix prepared for 'H' test is used for this purpose. For a given overall significance level of α decide $\tau_\mu \neq \tau_v$

$$\left|R_\mu - R_v\right| \geq Z\left[\alpha / k(k-1)\right]\left[N(N+1)/12\right]^{1/2}\left[\frac{1}{n_\mu}+\frac{1}{n_v}\right]^{1/2}$$

Actual values are calculated by using the average rank sum of the two days in a week (Mon, Tue....) and the difference between them are found. Excepted values are calculated by using the equation above. Both the values depend on the data in the rank day matrix which was prepared for H test. Actual and Expected values are found out for index and the result is given in Table 11.

Table 11 - Actual and Expected Multiple comparison values for Index

Day	Actual			Expected values	Deviation		
	CNX Midcap	S&P CNX 500	S&P CNX Nifty		CNX Midcap	S&P CNX 500	S&P CNX Nifty
Mon-Tue	104.175	99.862	64.088	90.880	13.295	9.018	-26.792
Mon-wed	70.401	92.653	69.677	90.960	-20.559	1.693	-21.283
Mon-Thu	23.940	21.633	22.342	90.660	-66.720	-69.027	-68.318
Mon-Fri	41.010	59.480	26.331	91.040	-50.030	-31.560	-64.709
Tue-Wed	33.774	2.791	5.590	91.110	-57.336	-88.319	-85.520
Tue-thu	80.236	68.229	41.745	90.810	-10.574	-22.581	-49.065
Tue-Fri	63.166	30.383	37.756	91.190	-28.024	-60.807	-53.434
Wed-Thu	46.462	71.019	47.335	90.890	-44.428	-19.871	-43.555
Wed-Fri	29.392	33.173	43.346	91.260	-61.868	-58.087	-47.914
Thu-Fri	17.070	37.846	3.989	90.960	-73.890	-53.114	-86.971

Through pair-wise multiple comparison procedure, we can indirectly test which pair shows significant deviations from one another and uncover the general pattern of high-low tendencies in the data which shows the day for investment. Higher deviation shows suitable day for investment. Deviations are found out for the entire index and result shows that Mon-Tue has positive deviation for CNX Midcap and S&P CNX 500. S&P CNX 500 has positive deviation on Mon-wed. S&P CNX Nifty does not have any positive deviation. Among the selected pharmaceutical companies, Glaxo and Pfizer have positive deviation for Mon-Tue. Ranbaxy has positive deviation on Mon-wed. Ipcalab reports positive deviation on Tue-Thursday. Sunpharma shows positive deviation on Thu-Fri. Other 5 companies such as orchidchem, Auropharma, Cadila health, Dr.Reddy, Elderpharma do not have positive deviation of Actual from Expected Average Rank Difference.

Table 12 - Actual and Expected Multiple comparison values for Pharmaceutical companies

Day	Expected values	Actual									
		Auropharma	Cadila health	Dr. Reddy	Elder pharma	Glaxo	Ipcalab	orchidchem	Pfizer	Ranbaxy	Sunpharma
Mon-Tue	90.93	50.238	32.627	12.684	41.455	90.990	39.942	57.336	98.830	37.213	37.532
Mon-wed	91.01	60.177	44.483	52.702	34.614	65.932	32.298	56.875	36.126	92.116	30.586
Mon-Thu	90.7	14.796	56.604	46.430	15.937	42.182	50.540	18.593	68.192	37.385	21.363
Mon-Fri	91.01	58.635	45.821	17.636	54.189	103.056	2.879	36.982	63.787	35.834	38.737
Tue-Wed	91.23	9.939	11.857	40.018	6.841	24.271	7.644	0.461	52.705	40.903	6.946
Tue-thu	90.93	35.442	23.978	33.747	25.518	48.021	93.482	38.743	20.639	0.171	58.895
Tue-Fri	91.23	8.397	13.194	4.952	12.734	12.853	37.063	20.354	25.044	1.379	1.205
Wed-Thu	91.01	45.381	12.121	6.271	18.677	23.750	82.838	38.282	32.066	40.732	51.948
Wed-Fri	91.31	1.542	1.337	35.065	19.576	37.124	29.419	19.893	27.661	42.282	8.151
Thu-Fri	91.01	43.838	10.784	28.794	38.252	60.874	53.419	18.389	4.405	1.550	91.099

Table 13 - Deviation of Actual from Expected Average Rank Differences for Pharmaceutical companies

	Auropharma	Cadila health	Dr. Reddy	Elderpharma	Glaxo	Ipcalab	orchidchem	Pfizer	Ranbaxy	Sunpharma
Mon-Tue	-40.692	-58.303	-78.246	-49.475	**0.060**	-50.988	-33.594	**7.900**	-53.717	-53.398
Mon-wed	-30.833	-46.527	-38.308	-56.396	-25.078	-58.712	-34.135	-54.884	**1.106**	-60.424
Mon-Thu	-75.904	-34.096	-44.270	-74.763	-48.518	-40.160	-72.107	-22.508	-53.315	-69.337
Mon-Fri	-32.375	-45.189	-73.374	-36.821	12.046	-88.131	-54.028	-27.223	-55.176	-52.273
Tue-Wed	-81.291	-79.373	-51.212	-84.389	-66.959	-83.586	-90.769	-38.525	-50.327	-84.284
Tue-thu	-55.488	-66.952	-57.183	-65.412	-42.909	**2.552**	-52.187	-70.291	-90.759	-32.035
Tue-Fri	-82.833	-78.036	-86.278	-78.496	-78.377	-54.167	-70.876	-66.186	-89.851	-90.025
Wed-Thu	-45.629	-78.889	-84.739	-72.333	-67.260	-8.172	-52.728	-58.944	-50.278	-39.062
Wed-Fri	-89.768	-89.973	-56.245	-71.734	-54.186	-61.891	-71.417	-63.649	-49.028	-83.159
Thu-Fri	-47.172	-80.226	-62.216	-52.758	-30.136	-37.591	-72.621	-86.605	-89.460	**0.089**

TRADING STRATEGY FOR RETURN SERIES

Day for investment shows the day in which the investment can be made, but the trading strategy shows which day gives abnormal return for the investors and helps to exploit the possibility of making abnormal returns. Entire Monday and Tuesday mean returns are taken and the average of two days is found out and the difference between them is calculated. A comparison of annual rates of mean return generated by a Passive strategy of **Buy-hold** and various alternative active strategy of **Buy-sell** like buying Monday and selling Tuesday…etc. For CNX Midcap, (Table 14) mean return of active strategy turned out to be ridiculously lower than the buy and hold strategy for the period. For S&P CNX 500, both buy and sell and buy and hold will be significant.

Table 14 - Trading Strategy for indices

	CNX Midcap (Mean return)	S&P CNX 500(Mean return)
Mon-Tue	0.18%	**0.13%**
Mon-wed	-0.20%	-0.13%
Buy-hold	**0.96%**	**0.13%**

For Pharmaceutical companies, Glaxo, Ipcalab and Sunpharma, Buy and Hold (passive strategy) is most effective one. Buying Monday and Selling (Table 15) Tuesday is an appropriate one for Pfizer, likewise buying Monday and selling Wednesday is suitable for Ranbaxy.

Table 15 - Trading Strategy for Pharmaceutical companies

	Glaxo (Mean return)	Ipcalab (Mean return)	Pfizer (Mean return)	Ranbaxy (Mean return)	Sunpharma (Mean return)
Mon-Tue	0.28%	0.21%	**0.30%**	0.02%	-0.04%
Mon-Wed	0.16%	0.23%	0.06%	**0.09%**	-0.15%
Tue-Thu	-0.16%	-0.38%	-0.10%	-0.13%	-0.06%
Thu-Fri	0.22%	0.39%	0%	0.02%	0%
Buy-hold	**0.50%**	**0.80%**	0.23%	-0.32%	**0.30%**

CONCLUSION

It is concluded that there is a presence of seasonality across the month of the year from 2002 to 2007 in the selected Indices as well as on pharmaceutical Industry. It confirms the leptokurtic distribution of equity returns; presence of highest variance on Mondays; Month end effect, and regularity of returns across the indices. It also confirms the conclusion as to the futility of trading strategy based on the observed regularity of returns.

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