

***“Day of the Week Effects in NSE Stock
Returns”***

An empirical study

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EXECUTIVE SUMMARY

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 India's stock market, primarily trying to detect the DAY OF THE WEEK EFFECT in the Stocks listed on the National Stock Exchange. It covers the post-reform period. The study uses the Daily return data of the stocks listed on National Stock Exchange and Bombay Stock Exchange Index for the period from November 1994 to September 2007 for analysis. After examining the stationarity of the return series, by applying KRUSKAL WALLIS test and ONE WAY ANOVA i.e. using both Parametric and Non Parametric Tests, we specify an Augmented Dummy Regressive model to find the Day of the week effect monthly effect in stock returns in India.

*Another feature of our study was that we analysed the day of the week effect in three different phases of market ie. **CONSOLIDATION Phase, BEARISH Phase and the BULLISH Phase**. This was carried with an intention to see whether the day of the week effect was visible in these specific market phases or not. The results confirm the existence of seasonality (in the form of Day of the Week Effect) stock returns in India for 66 Stocks spanning across various sectors that we analysed... The results of the study imply that the stock market in India is inefficient, and hence, investors can time their share investments to improve returns and make abnormal profits. However the Day of the Week effect was found to be absent in the Bullish as well as the Bearish phase, which was a departure from our previous belief of the existence of this effect in all phases of the market.*

Section I

Introduction

Efficient market hypothesis

Efficient Market Hypothesis (EMH) is probably one of the most controversial theories in Finance. EMH is simply an investment theory that states that it is impossible to "beat the market" because stock market efficiency causes the prevalent share prices to always incorporate and reflect all relevant information and its effects. According to the EMH, this means that stocks always trade at their fair value on stock exchanges, and thus it is impossible for investors to either purchase undervalued stocks or sell stocks for inflated prices. Thus, the crux of the EMH is that it should be impossible to outperform the overall market through expert stock selection or market timing, and that the only way an investor can possibly obtain higher returns is by purchasing stocks which are more risky investments. Some analysts believe and argue that it is pointless to search for undervalued stocks or to try to predict trends in the market through either fundamental or technical analysis.

Meanwhile, academics point to a large body of evidence in support of EMH, an equal amount of dissension also exists. Skeptics of EMH argue that there exists a small number of investors who have outperformed the market over long periods of time, in a way which is difficult to attribute luck, including Peter Lynch, Warren Buffett, George Soros, and Bill Miller. These investors' strategies are to a large extent based on identifying markets where prices do not accurately reflect the available information, in direct contradiction to the efficient market hypothesis which explicitly implies that *no* such opportunities exist. Among the skeptics is Warren Buffett who has argued that the EMH is not correct, on one occasion wryly saying "I'd be a bum on the street with a tin cup if the markets were always efficient" and on another saying "The professors who taught Efficient Market Theory said that someone throwing darts at the stock tables could select stock portfolio having prospects just as good as one selected by the brightest, most hard-working securities analyst. Observing correctly that the market was frequently efficient, they went on to conclude incorrectly that it was always efficient." Adherents to a stronger form of

the EMH argue that the hypothesis does not preclude - indeed it predicts - the existence of unusually successful investors or funds occurring through chance.

Historical background

The efficient market hypothesis was first expressed by Louis Bachelier, a French mathematician, in his 1900 dissertation, "The Theory of Speculation". His work was largely ignored until the 1950's; however beginning in the 30's scattered, independent work corroborated his thesis. A small number of studies indicated that US stock prices and related financial series followed a random walk model. Also, work by Cowles in the 30's and 40's showed that professional investors were in general unable to out perform the market.

The efficient market hypothesis emerged as a prominent theoretic position in the mid-1960's. Paul Samuelson had begun to circulate Bachelier's work among economists. In 1964, Bachelier's dissertation along with many of the works mentioned above was published together by Paul Coonter. In 1965, Eugene Fama published his dissertation arguing for the random walk hypothesis and Samuelson published a proof for a version of the efficient market hypothesis. In 1970 Fama published a review of both the theory and the evidence for the hypothesis. The paper extended and refined the theory, included the definitions for three forms of market efficiency: weak, semi-strong and strong

There are three common forms in which the efficient market hypothesis is commonly stated — weak form efficiency, semi-strong form efficiency and strong form efficiency, each of which have different implications for how markets work.

Weak-form efficiency

- No excess returns can be earned by using investment strategies based on historical share prices or other financial data.
- Weak-form efficiency implies that Technical analysis techniques will not be able to consistently produce excess returns, though some forms of fundamental analysis may still provide excess returns.

- In a weak-form efficient market current share prices are the best, unbiased, estimate of the value of the security. Theoretical in nature, weak form efficiency advocates assert that fundamental analysis can be used to identify stocks that are undervalued and overvalued. Therefore, keen investors looking for profitable companies can earn profits by researching financial statements.

Semi-strong form efficiency

- Share prices adjust within an arbitrarily small but finite amount of time and in an unbiased fashion to publicly available new information, so that no excess returns can be earned by trading on that information.
- Semi-strong form efficiency implies that Fundamental analysis techniques will not be able to reliably produce excess returns.
- To test for semi-strong form efficiency, the adjustments to previously unknown news must be of a reasonable size and must be instantaneous. To test for this, consistent upward or downward adjustments after the initial change must be looked for. If there are any such adjustments it would suggest that investors had interpreted the information in a biased fashion and hence in an inefficient manner.

Strong-form efficiency

- Share prices reflect all information and no one can earn excess returns.
- If there are legal barriers to private information becoming public, as with insider trading laws, strong-form efficiency is impossible, except in the case where the laws are universally ignored. Studies on the U.S. stock market have shown that people do trade on inside information.
- To test for strong form efficiency, a market needs to exist where investors cannot consistently earn excess returns over a long period of time. Even if some money managers are consistently observed to beat the market, no refutation even of strong-form efficiency follows: with tens of thousands of fund managers

worldwide, even a normal distribution of returns (as efficiency predicts) should be expected to produce a few dozen "star" performers.

Even though the validity of the concept is in doubt EMH remains the cornerstone and most enthralling concept of investigation for academics in Finance, ever since Fama (1965) described that the Capital Market is “A market here there are large numbers of Rational, Profit Maximizers actively competing with each other trying to predict future market values of individual securities and where important current information is almost freely available to all participants.... And on an average the competition will cause the full effects of new information on intrinsic values to be reflected instantaneously in actual prices”.

Numerous research studies have been published confirming the EMH theory. Especially, the early studies were instrumental in establishing various other concepts in the areas of Finance e.g. ; The Miller Modigliani theories of Corporate Financial Policies, The Sharpe- Lintner Capital Asset Pricing Model, and the Black Scholes Option Pricing Model. Beginning 1970 and carrying onto 1980's various anomalies began emerging in the stock markets across the globe which questioned the validation of the Efficient Market Hypothesis. There were studies that illustrated that possible trading strategies yielded abnormal rates of return using time series data and publicly available information, contradicting the EMH. The studies which validated efficiencies were broadly related to the following:

1. Low P/E effect
2. Low Priced Stocks
3. The January effect
4. The Weekend effect
5. The Holiday Effect
6. Small Firm and neglected firm effects

Various effects like Calendar effects i.e. turn of the year effect, week effect, and Holiday effect have been reported to generate very high and abnormal rate of returns in various developed stock markets. Taxation at the end of the year, news releases at the weekend and reactions of the investors to these phenomenon is the main reason behind the prevalence of this phenomenon. Various studies focusing on returns seasonality put forward four hypotheses:

1. The Tax Loss Selling Hypothesis ; which states that investors sell securities in which they are incurring losses so as to take advantage of the non payment of taxes on these losses.
2. The Window Dressing Hypothesis: here institutional investors who are primarily evaluated In the terms of Value At Risk ratios invest in risky stock in the beginning and then off set their position by selling them at the end.
3. Liquidity Hypothesis: In this anomaly investors invest money after receiving any kind of Bonuses or Monetary Incentives which improves their Liquidity Position.
4. The Time Varying Risk Premium Hypothesis which states that seasonal macro economic activities and Results have a considerable impact on stock market Returns.

LITERATURE REVIEW

Since the 1960's there have emerged numerous studies questioning the degree of market efficiency and the static assumptions behind for example EMT & CAPM. Fields like behavioral-economics and -finance have received much deserved attention for their more flexible & detailed view regarding neoclassical economic agents and markets.

1. Studies by **Bhardwaj and Brooks (1992)** for 1977-86 and **Eleswarapu and Reinganum (1993)** for 1961-90 confirmed the existence of January Effect in the US stock markets.
2. Similarly **Ariel (1987)** observed that the returns tending to be higher on the last day Of the Month.
3. **Agarwal and Tandon (1994)** found that returns were significantly negative on Mondays and Tuesdays in nine countries which they researched. They reported significantly higher returns on Fridays.
4. Study by **Brockman and Michayluk (1998)** described the existence of pre holiday effect thus validating the Liquidity Hypothesis.
5. **Ignatius (1998)**, examined the relationship of stock returns patterns on the Bombay stock Exchange with those of NYSE, found that BSE exhibited seasonality in the Returns.
6. **Reinganum (1981), Banz (1981) & Fama & French (1992, 1993)** explains that the *Size or Market equity (P*Q) effect* is the notion that small firm's on average have higher returns than large firms.
7. **Basu (1977)** observed something called the *Price-to-earnings (P/E) effect* which means that stocks with low P/E ratios have a propensity to outperform stocks with high P/E ratios with on average about seven percent per year.
8. **Guin (2005)** explain that stocks with low price to sales ratios tend to outperform the market and stocks with high price to sales ratios.

STUDIES IN THE INDIAN CONTEXT

1. The day of the week effect in Indian market was examined by many researchers (**Chaudhury (1991)**, **Poshakwala (1996)**, **Goswami and Anshuman (2000)**, **Choudhry (2000)**, **Bhattacharya, Sarkar and Mukhopadhyay (2003)**).
2. **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 weeks² to study the day of the week effect. All these studies have used end of day data.
3. **Chaudhary (1991)** tested the equality of monthly and daily returns in the Indian Stock Markets.
4. **Madhusoodanan (1998)** in his study concluded that RWH can-not be accepted for BSE sensitive index and BSE national index and observed that heteroscedasticity does not seem to be playing an important role in the Indian stock market.
5. **Mitra (2000)** developed ANN model based on past stock market prices as parameters and showed that network performs very well in forecasting developments in BSE sensitive index, thus rejecting the criteria of un-forecastability of stock prices in Bombay stock exchange.
6. **Nath & Dalvi (2004)**, examined empirically the day of the week effect anomaly in the Indian equity market for the period from 1999 to 2003 using both high frequency and end of day data for the benchmark Indian equity market index S&P CNX NIFTY. Using robust regression with biweights and dummy variables, the study finds that before introduction of rolling settlement in January 2002, Monday and Friday were significant days. Mondays were found to have higher standard deviations followed by Fridays showing the existence of market inefficiency clearly.
7. **Pant & Bishnoi(2001)**, In their paper analyzed the behavior of daily and weekly returns of five Indian stock market indices for random walk during April-1996 to June-2001. They tested the indices for normality, autocorrelation using **Q-statistic & Dickey-Fuller test** and analyzed variance ratio using **homoscedastic and heteroscedastic test estimates**. The results support that Indian stock market indices do not follow random walk.
8. **Pandey (2002)** , Using Sensex monthly returns data from 1991 to 2002, inferred that there was a tax loss selling effect in the Indian stock market returns.

9. **Parameswaran (2000)** performed variance ratio tests corrected for bid-ask spread and non synchronous trading on the weekly returns derived from CRSP daily returns file for a period of 23 years. His results show that eight out of ten size sorted portfolios do not follow a random walk. He observed that non-trading is not a source of serial correlation in the large sized firms.
10. **Ramasastri (1999)** tested Indian stock markets for random walk during post liberalization period using three Dickey-Fuller hypotheses. Contrary to other studies he could not reject the null hypothesis that stock prices are random walks.

SUMMARY OF SOME PREVIOUS STUDIES

Effects	Authors	Findings
<i>Month-of-the-year effect or January effect</i>	Keim (1983), Ariel (1987) & Haugen and Jorion (1996)	Stock prices are usually higher in the first two weeks in January than in the end of December.
<i>Turn-of-the-year effect</i>	Dyl (1977) & Givoly and Ovadia (1983)	Trading volume is usually larger for example losing stocks in December.
	Guin (2005)	This has to do with tax-related issues, selling in December and buying in January.
<i>Summer effect</i>	Wachtel (1942)	He found evidence of a rising stock prices in the summer
<i>Month-of-the-quarter effect</i>	Penman (1987)	Firm's usually have higher rate of returns in the first month of the quarter.
<i>Week-of-the-month effect</i>	Linn & Lockwood (1988) and Hensel and Ziemba (1996)	Stocks usually have higher returns during the first week of the month than the last thee.
<i>Day-of-the-week effect or Weekend effect</i>	Cross (1973) and French (1980)	On average, closing price on Monday evening are lower than Fridays closing prices a
	Guin (2005)	“The weekend effect can be related to that companies and governments tend to realize bad news over the weekends”
	Foster and Wiswanathan (1990)	Trading volumes are increasing on Fridays due to information symmetry and decreasing on

		Mondays due to information asymmetry.
<i>Monday effect</i>	French (1980), Barone (1990) and Gibbons & Hess (1981)	Average returns on Mondays are lower than any other day of the week. They also found that the largest decrease in stock prices takes place during the first two days of the week.
<i>Hour-of-the-day effect or the End-of-the-day effect</i>	Guin (2005)	Trading volumes and prices tend to increase during the last 15 minutes of a day.
	Harvey and Huang (1991)	Noticed higher interest rates volatility during Thursdays and Fridays first trading hours.
<i>Holiday effect</i>	Lakonishok & Smidt (1988) and Petengill (1989)	Stock markets usually tend to have higher abnormal returns before public holidays.
<i>Political-cycle effect,</i>	Santa & Valkanov (2003)	The first and last year of a presidential administration period have higher abnormal returns than the other years.

However since then no major study had been undertaken in the Indian Context to validate the Seasonality Hypothesis or Anomaly in different phases of the market there was a gap particularly important to fill in the current context of the Extended Bull run that the Indian stock markets were experiencing.

Section II

Methodology

There were two basic tests we conducted to investigate anomalies in the Indian stock market.

Kruskal-Wallis Test

The Kruskal-Wallis one way analysis of variance by ranks is a non-parametric method for testing equality of means across groups. It is similar to a one way analysis of variance with the data replaced by their ranks. The reason why we chose this test is that it is non-parametric in nature, and thus does not compel us to assume a normal population.

For this purpose, our null hypothesis is that the mean returns across all the trading days are equal. If the Kruskal-Wallis statistic is less than the critical chi value, it implies that the null hypothesis should not be rejected, and that mean returns across the week-days are not significantly different from each other. The opposite reasoning holds when the K-W statistic is more than the critical value.

We have also presented below a few stylized facts on the stocks that we chose to investigate.

Kruskal Wallis Test - Mean Rank

Stock	Total Days	Chi-Square	df	Asymp Sig	Mean	S.D	Skewness	Kurtosis	Sharpe ratio
ABB	3056	11.30	4	0.0230	0.0001	0.0364	-23.87	994.96	0.0034
ACC	3152	24.56	4	0.0000	-0.0005	0.0502	-31.79	1470.10	-0.0095
Apollo Tyres	3147	37.30	4	0.0000	-0.0050	0.0508	-26.93	1192.33	-0.0984
Arvind Mills	2993	63.00	4	0.0000	-0.0050	0.0322	0.64	3.64	-0.1553
Ashok Leyland	3144	35.08	4	0.0000	-0.0004	0.0527	-26.63	1179.48	-0.0076
Asian Paints	3071	16.30	4	0.0030	0.0002	0.0258	-10.66	268.66	0.0058
Bajaj Auto	3014	14.50	4	0.0060	0.0003	0.0228	-1.65	32.51	0.0147
Bank of Baroda	2451	17.99	4	0.0010	0.0004	0.0322	0.02	3.97	0.0113
BHEL	3074	8.06	4	0.0890	0.0007	0.0322	-3.20	67.11	0.0222
BILT	2844	22.26	4	0.0000	-0.0003	0.0329	0.22	3.32	-0.0098
BPCL	2920	13.49	4	0.0090	-0.0001	0.0317	-3.35	73.89	-0.0029
Cipla	3132	20.29	4	0.0000	-0.0005	0.0450	-20.38	630.34	-0.0107
Crompton Greaves	3015	24.16	4	0.0000	0.0000	0.0457	-12.91	441.94	0.0004
Dabur	3136	32.88	4	0.0000	-0.0005	0.0500	-29.89	1304.39	-0.0092
Dr Reddy	3020	33.22	4	0.0000	0.0001	0.0318	-6.66	147.61	0.0036
East India Hotels	3123	12.45	4	0.0140	-0.0005	0.0414	-31.28	1428.84	-0.0113
Escorts	2916	48.53	4	0.0000	-0.0002	0.0336	0.31	2.83	-0.0066
Essar Oil	2790	45.05	4	0.0000	0.0000	0.0394	1.00	8.18	0.0004
Finolex	3001	68.24	4	0.0000	-0.0001	0.0341	1.05	8.53	-0.0038
GAIL	2108	21.80	4	0.0000	0.0005	0.0281	0.12	9.55	0.0173
Glaxo	3012	24.56	4	0.0000	0.0002	0.0256	-5.86	161.30	0.0085
Godfrey Philip	2760	40.38	4	0.0000	0.0030	0.0298	0.16	0.39	0.1007
Grasim	2953	4.20	4	0.3790	0.0004	0.0259	0.07	2.95	0.0154
GSFC	2858	40.50	4	0.0000	-0.0006	0.0339	0.12	0.08	-0.0177
GUJRATGAS	3018	20.81	4	0.0000	0.0002	0.0380	0.26	1.70	0.0053
HDFC Bank	2834	18.34	4	0.0010	0.0011	0.0248	0.45	7.75	0.0437
Hero Honda	3030	5.84	4	0.2120	0.0003	0.0407	-20.65	771.29	0.0072
Hindustan Motors	2969	74.82	4	0.0010	-0.0002	0.0405	0.17	0.27	-0.0042
Hindustan Zina	2205	80.03	4	0.0000	0.0014	0.0950	0.40	2.33	0.0147
ICICI	2267	1.75	4	0.7820	0.0012	0.0312	0.06	0.23	0.0377

Kruskal Wallis Test - Mean Rank

Stock	Total Days	Chi-Square	df	Asymp Sig	Mean	S.D	Skewness	Kurtosis	Sharpe ratio
IFCI	2995	99.52	4	0.0000	-0.0001	0.0370	0.25	0.72	-0.0032
Indian Hotels	3141	17.30	4	0.0020	-0.0005	0.0463	-38.09	1874.84	-0.0104
Infosys	2267	1.75	4	0.7820	0.0004	0.0450	-12.81	316.91	0.0091
IPCL	2975	20.20	4	0.0000	0.0002	0.0302	0.04	0.13	0.0054
ITC	3155	19.64	4	0.0010	-0.0003	0.0524	0.05	2.32	-0.0059
L&T	2219	37.59	4	0.0000	0.0002	0.0269	0.04	-0.01	0.0092
M&M	2986	12.34	4	0.0150	0.0002	0.0318	0.04	0.06	0.0057
MRF	2703	14.41	4	0.0060	0.0002	0.0264	0.11	0.48	0.0070
Nicolas Piramil	2966	34.90	4	0.0000	-0.0003	0.0390	0.29	1.35	-0.0082
NIRMA	2956	23.71	4	0.0000	-0.0004	0.0272	0.13	0.92	-0.0154
ONGC	2767	52.69	4	0.0000	0.0002	0.0280	-0.01	0.35	0.0080
Orient Hotel	2703	12.24	4	0.0160	-0.0001	0.0317	-0.41	12.34	-0.0032
Punjab Trac	2987	29.59	4	0.0000	-0.0001	0.0327	-14.26	438.00	-0.0037
Reliance	3155	22.27	4	0.0000	0.0005	0.0279	-4.34	105.05	0.0176
Sail	3149	37.52	4	0.0000	0.0003	0.0380	0.65	7.43	0.0082
Satyam Comp	3108	12.98	4	0.0110	0.0006	0.0483	-12.04	355.63	0.0123
SBI	3145	11.95	4	0.0180	0.0007	0.0245	-0.06	2.41	0.0276
SCI	2688	15.28	4	0.0040	0.0004	0.0385	0.00	4.79	0.0095
Shree Cem	2781	33.70	4	0.0000	0.0011	0.0350	0.27	1.77	0.0302
Siemens	3124	19.43	4	0.0010	0.0002	0.0402	-22.67	939.62	0.0059
SRF	3066	25.65	4	0.0000	0.0000	0.0378	0.34	3.99	0.0012
Sun Pharma	3101	12.62	4	0.0130	0.0004	0.0379	-12.08	320.92	0.0114
Sundram Fastner	3014	18.34	4	0.0010	-0.0009	0.0511	-28.95	1209.17	-0.0184
Tata Chem	3143	81.01	4	0.0000	-0.0002	0.0267	-1.44	26.49	-0.0056
Tata Power	3178	52.97	4	0.0000	-0.0002	0.0478	-33.01	1556.49	-0.0047
Tata Tea	3124	27.37	4	0.0000	0.0002	0.0255	0.24	2.60	0.0074
Thermax	3025	17.22	4	0.0020	0.0003	0.0405	-18.66	720.02	0.0077
Titan	3113	26.77	4	0.0000	0.0006	0.0344	0.53	2.81	0.0167
Voltas	3143	67.93	4	0.0000	0.0000	0.0522	-26.03	1135.99	-0.0003
VSNL	2561	14.01	4	0.0070	-0.0003	0.0425	-6.87	163.44	-0.0071

Regression using dummy variable

As we have said, the K-W test only gives us an indicative answer, and not a conclusive one. We thus performed a rigorous test in the form of a dummy variable regression analysis, where each dummy variable represents a given day of the week. The model is as follows:

$$R_t = \alpha_0 + \alpha_1 \times D_{1t} + \alpha_2 \times D_{2t} + \alpha_3 \times D_{3t} + \alpha_4 \times D_{4t} + e_t$$

Where;

R_t = return on a particular stock.

D_{jt} = dummy variable for day j.

α_0 = constant, or expected return for Monday.

$\alpha_1, \alpha_2, \alpha_3, \alpha_4$ = difference between expected return for Monday and expected return for Tuesday, Wednesday, Thursday and Friday respectively.

Regression Using Dummy Variable (Period Wise Break Up of Data)

In order to add value to our term paper and to further enhance our analysis of the Market Anomalies and seasonality present in Indian Stock Markets, we Divided the Period of Analysis into three Periods as follows:

- 1. Period 1 : 1990 to 1999 : A CONSOLIDATION PHASE IN INDIAN MARKETS**
- 2. Period 2 : 2000 to 2004 : A BEARISH PHASE IN THE INDIAN STOCK MARKET HISTORY.**
- 3. Period 3 : 2004 to 2007 (MID) : A PROLONGED BULLISH PHASE**

*Breaking the entire period into three Phases helped us in Analysing whether the seasonality and the Market Anomaly in the Form of **Day of The Week Effect** occurs in these different market phases or no, And how the results for it differ from the Results when the division of data is not done.*



The above Graph depicts the three different Phases of the Indian Stock Market (ie NSE Index) which was used for our analysis.

Section III

Empirical Evidence and Results

We have applied our model for the period November 1994 to August 2007, and all interpretations have been made at a 95% significance level.

RESULTS OF THE KRUSKAL WALLIS TEST

What we came across in the course of our analysis was this.

- Out of the **66 stocks** we have analyzed,
- in only **5** of them was the **null hypothesis not rejected**.
- In other words, **57 stocks showed unequal mean returns across weekdays**.
- The very fact that **57 on 66 stocks have K-W statistics greater than the critical value gives us a basic idea of the existence of market anomalies in the Indian market**. However, one needs to discount these findings in light of the fact that the K-W test is after all a non-parametric test, and its results are not conclusive.

SIGNIFICANCE LEVEL OF THE EFFECT

Monday Tuesday Wednesday Thursday Friday

<u>7</u>	<u>11</u>	<u>39</u>	<u>4</u>	<u>9</u>
<u>59</u>	<u>55</u>	<u>27</u>	<u>62</u>	<u>57</u>
<u>66</u>	<u>66</u>	<u>66</u>	<u>66</u>	<u>66</u>
<u>10.61%</u>	<u>16.67%</u>	<u>59.09%</u>	<u>6.06%</u>	<u>13.64%</u>

The above table shows the Frequency of the day in which the Return was significantly above the mean return in the stock analysis. For eg Wednesday had the Maximum number of Significant returns for all stocks ie. Out of 66 Stocks that we analysed , 39 TIMES WEDNESDAY'S RETURN WAS Significantly higher than the mean return of other days.

Monday Effect

We did not find the Monday effect to be significant across the board. The mean return for Monday is given by the constant term. Of the 66 stocks analysed, 29 of them had negative mean returns for Monday. However, only 7 of these were significant at a 5% level. Further, only 14 stocks had their minimum mean returns on a Monday. Maybe the result would depend upon the phase in which the market is in, but over a long term, the Monday effect hardly holds.

Friday effect

As with the Monday effect, the Friday effect was not found to be a common phenomenon. For the entire period, 40 stocks had positive Friday returns. However, only 4 were significant at a 5% level. Also, only 2 stocks had maximum returns on Friday.

Other observations

We also found that most of the maximum returns occurred on a Wednesday (40 stocks), and a majority of the minimum returns occurred on a Tuesday (24 stocks).

RESULTS OF THE PERIOD WISE BREAK UP OF STOCK RETURNS

The Test we conducted using dummy variables for the three phases split by us in the stock market period from 1994 to 2007, shows some startling results.

For Period 1 ie THE CONSOLIDATION PHASE OF MARKET

- Only eighteen stocks had a significant intercept, or mean Monday returns. However, the mean returns for these stocks were negative.
- Also, there was no rigid anomaly. For instance, looking at our calculations, it is not possible to arrive at a final conclusion as to on which day returns are the minimum and negative.
- Further, 48 stocks had significant positive returns on Wednesday. And out of these 48 stocks, 47 had their maximum return on Wednesday.

For Period 2 and 3 ie BEAR AND BULL PHASES

Our analysis does not show any significant anomalies for these periods.

*Thus the Day of The Week Effect which was clearly visible for the entire range of Data , Simply Vanishes when the Market enters the **BULLISH** or a **BEARISH** phase. The mean returns for all days remains same. This is an important conclusion which implies that during these phases the markets somehow become perfectly Efficient.*

Section IV

Conclusion and Policy Implications

Even though our findings show that Monday and Friday effects are not significant, as is the case with other stock markets around the world, seasonality does exist. As we have shown, a majority of significant positive returns are on Wednesday, while significant negative returns are on Tuesday. The reasons for this cannot be answered off the cuff, but investor sentiment and psychology has a lot to do with it.

We also reached to the conclusion that the Day of The Week Effect which was clearly visible for the entire range of Data , Simply did not occur when the Market entered the prolonged **BULLISH or a BEARISH** phase. The mean returns for all days remains same. This is an important conclusion which implies that during these phases the markets somehow become perfectly Efficient. This can be attributed to the fact that all investors think the same way and are driven by the same instincts during these phases of the market and thus ruling out any chance of any investor making an abnormal return at any given day.

REFERENCES

1. Ariel, R (1987) A Monthly Effect on Stock Returns, *Journal of Financial Economics*, 18, 161-174.
2. Banz, R (1981) The Relationship Between Market Value and Return of Common Stocks, *Journal of Financial Economics*, November pp 453-460
3. Barone, E (1990) The Italian stock market: efficiency and calendar anomalies, *Journal of Banking and Finance* 14, 483-510.
4. Basu, S (1977) The Investment Performance of Common Stocks in Relation to their Price to Earnings Ratio: A Test of the EMH", *Journal of Finance*, 32, pp. 663-682.
5. Aggarwal, R. and Rivoli, P. (1989) "On the Relationship Between the United States' and Four Asian Equity Markets" *Asean Economic Bulletin*, 6, 110- 117.
6. Agrawal, Anup and Tandon, Kishore (1994) "Anomalies or Illusions?: Evidence from Stock Markets in Eighteen Countries", *Journal of International Money and Finance*, 83- 106
7. Bhattacharya, K, Sarkar, N and Mukhopadhyay (2003): Stability of the day of the week effect in return and in volatility at the Indian capital market: a GARCH approach with proper mean specification, *Applied Financial Economics*, 13, 553-
8. Bhanu Pant , Dr. T. R. Bishnoi ,(2001) Nirma Institute of Management, Ahmedabad, **Testing Random Walk Hypothesis for Indian Stock Market Indices.**
9. Chaudhury, S K (1991): Seasonality in share returns: preliminary evidence on day of the week effect, *Chartered Accountant (India)*, 40, November 107-9.
10. Fama, E (1965) The Behaviour of Stock Market Prices, *Journal of Business* Vol 38 No 1 34-105.
11. Fama, E (1965) Random Walks in Stock Market Prices, *Financial Analysts Journal*, September/October
12. Fama, E (1997) Market efficiency, long-term returns and behavioral finance, *Journal of Financial economics*, 49 283-306
13. Fama, E & French, K (1992) The Cross-Section of Expected Stock Returns, *Journal of Finance* 47, 427-465

14. Fama, E & French, K (1993) Common Risk Factors in the Returns on Stocks and Bonds, *Journal of Financial Economics* 33, 3-56.
15. Golaka C Nath & Manoj Dalvi (2004), DAY OF THE WEEK EFFECT AND MARKET EFFICIENCY – EVIDENCE FROM INDIAN EQUITY MARKET USING HIGH FREQUENCY DATA OF NATIONAL STOCK EXCHANGE.
16. Goswami, R and Anshuman, R (2000): Day of the week effect on Bombay Stock Exchange, *ICFAI Journal of Applied Finance*, 6, 31-46
17. Madhusoodanan, T. P., 1998, “Persistence in the Indian Stock Market Returns: An Application of Variance Ratio Test”, *Vikalpa*, Vo l 23, No. 4, 61-73.
18. Mitra, S. K., 2000a, “Forecasting Stock Index Using Neural Networks”, *Applied Finance*, Vol. 6, No. 2 , 16-25.
19. Mitra, S. K., 2000b, “Profitable Trading Opportunity in Indian Stock Market: An Empirical Study with BSE-Sensex”, *Applied Finance*, Vol. 6, No. 3, 36-52.
20. Parameswaran, S. K., 2000, “A Method of Moments Test of the Random Walk Model in the Presence of Bid-ask Spreads and Non-synchronous Trading”, *Applied Finance*, Vol. 6, No. 1, 1-22.
21. Ramasastrri, A. S., 1999-2000, “Market Efficiency in the Nineties: Testing through Unit Roots”, *Prajnan*, Vol. XXVIII, No. 2, 155-161.
22. Reiganum, M (1981) Misspecification of capital asset pricing: empirical anomalies based on earnings, yields and market values, *Journal of Financial Economics* 9:19–46.
23. Sharpe, W, Capaul, C & Rowley, I (1993) International Value and Growth Stock Returns, *Financial Analysts Journal*, January/February

APPENDIX

Stock	R-Sqr	Observations	Intercept	d1	d2	d3	d4
HDFC	0.04%	3160	0.0004	-0.0022	-0.0009	-0.0002	0.0003
HDFC	p-value		0.8154	0.4205	0.7355	0.9480	0.8560
PNB	0.14%	1312	0.0008	0.0005	0.0021	0.0029	0.0003
PNB	p-value		0.6655	0.8630	0.4293	0.2769	0.9060
M&M	0.25%	3141	-0.0003	-0.0007	0.0036	-0.0003	-0.0003
M&M	p-value		0.8142	0.6936	0.0456	0.8812	0.8993
ITC	0.08%	3161	-0.0023	0.0013	0.0015	0.0041	0.0033
ITC	p-value		0.2606	0.6501	0.6176	0.1606	0.2716
REL	0.38%	843	0.0007	-0.0004	-0.0005	-0.0035	0.0010
REL	p-value		0.7182	0.8929	0.8490	0.1886	0.7093
Ranbaxy	0.33%	3146	-0.0009	-0.0019	0.0035	0.0012	0.0003
Ranbaxy	p-value		0.4383	0.2661	0.0412	0.4827	0.5933
ONGC	1.72%	2961	-0.0007	-0.0028	0.0079	0.0005	-0.0010
ONGC	p-value		0.5535	0.0845	0.0000	0.7537	0.4953
IPCL	0.59%	3166	-0.0001	-0.0013	0.0048	-0.0013	-0.0003
IPCL	p-value		0.9166	0.4578	0.0044	0.4268	0.6503
ICICI	0.25%	2451	0.0008	-0.0009	0.0032	0.0005	-0.0010
ICICI	p-value		0.5561	0.6612	0.1066	0.8006	0.5773
RCOM	1.62%	269	0.0040	-0.0057	-0.0007	0.0036	-0.0023
RCOM	p-value		0.2225	0.2253	0.8829	0.4377	0.5703
Infy	0.13%	3105	0.0002	0.0013	0.0017	-0.0028	0.0010
Infy	p-value		0.9137	0.6233	0.5157	0.2747	0.6623
Godfrey Phillip	1.60%	2967	-0.0030	-0.0019	0.0082	0.0049	0.0060
Godfrey Phillip	p-value		0.0131	0.2759	0.0000	0.0046	0.0003
GSFC	0.72%	3054	0.0014	-0.0060	0.0026	-0.0011	-0.0023
GSFC	p-value		0.2998	0.0020	0.1809	0.5832	0.1333
Hind Zinc	0.42%	2213	-0.0067	0.0083	0.0190	0.0083	0.0050
Hind Zinc	p-value		0.1407	0.1942	0.0031	0.1919	0.4293

Stock	R-Sqr	Observations	Intercept	d1	d2	d3	d4
MRF	0.48%	2877	0.0015	-0.0034	0.0016	-0.0023	-0.0026
MRF	p-value		0.1621	0.0279	0.3191	0.1417	0.0974
Nirma	0.35%	3096	-0.0007	-0.0023	0.0026	-0.0001	0.0012
Nirma	p-value		0.5190	0.1413	0.0931	0.9574	0.4255
Nicolas Piramal	0.61%	3016	-0.0040	0.0019	0.0091	0.0037	0.0036
Nicolas Piramal	p-value		0.0119	0.3923	0.0000	0.0946	0.1119
Ind Hotels	0.23%	3134	-0.0013	0.0014	0.0045	0.0005	-0.0024
Ind Hotels	p-value		0.4745	0.6033	0.0845	0.8512	0.3533
IFCI	1.36%	3166	-0.0021	-0.0022	0.0104	0.0022	-0.0003
IFCI	p-value		0.1502	0.3052	0.0000	0.3020	0.8818
Hind Motors	2.06%	3125	-0.0033	-0.0037	0.0134	0.0011	0.0049
Hind Motors	p-value		0.0398	0.1060	0.0000	0.6314	0.0319
Gujarat Gas	0.54%	3084	0.0009	-0.0051	0.0036	-0.0012	-0.0007
Gujarat Gas	p-value		0.5524	0.0173	0.0979	0.5837	0.7338
Finolex	2.33%	3001	-0.0048	-0.0011	0.0095	0.0019	0.0037
Finolex	p-value		0.0000	0.4463	0.0000	0.1696	0.0089
Essar Oil	1.70%	2790	-0.0044	-0.0018	0.0083	0.0003	0.0047
Essar Oil	p-value		0.0002	0.2805	0.0000	0.8357	0.0051
Escorts	1.57%	2916	-0.0014	-0.0023	0.0056	-0.0003	-0.0034
Escorts	p-value		0.1627	0.1111	0.0001	0.8109	0.0205
EIHotels	0.55%	3123	-0.0002	-0.0018	0.0031	0.0013	0.0003
EIHotels	p-value		0.8305	0.1396	0.0124	0.2750	0.7867
Crompton Greaves	0.76%	3015	0.0001	-0.0022	0.0053	-0.0025	-0.0009
Crompton Greaves	p-value		0.9246	0.2423	0.0045	0.1807	0.6158
BILT	0.68%	2844	-0.0010	-0.0031	0.0030	-0.0013	-0.0005
BILT	p-value		0.3114	0.0285	0.0362	0.3637	0.7258
Bank Of Baroda	0.63%	2451	-0.0011	-0.0013	0.0042	0.0005	-0.0008
Bank Of Baroda	p-value		0.3200	0.3878	0.0075	0.7378	0.5853

Stock	R-Sqr	Observations	Intercept	d1	d2	d3	d4
Asian Paints	0.49%	3071	-0.0018	0.0023	0.0033	0.0018	0.0013
Asian Paints	p-value		0.0034	0.0097	0.0002	0.0387	0.1303
Ashok Leyland	0.89%	3124	-0.0015	-0.0020	0.0065	0.0019	0.0001
Ashok Leyland	p-value		0.2174	0.2526	0.0001	0.2660	0.9477
Arvind Mills	1.92%	2993	0.0012	-0.0061	0.0016	-0.0063	-0.0055
Arvind Mills	p-value		0.2069	0.0000	0.2519	0.0000	0.0001
Apollo Tyres	1.39%	3147	0.0000	-0.0036	0.0062	-0.0010	-0.0027
Apollo Tyres	p-value		0.9800	0.0270	0.0002	0.5254	0.1012
Hero Honda	0.14%	3030	0.0003	-0.0007	0.0017	0.0004	0.0016
Hero Honda	p-value		0.7242	0.6086	0.2296	0.7830	0.2551
HDFC	0.63%	2834	-0.0012	0.0007	0.0038	0.0002	0.0007
HDFC	p-value		0.1110	0.5211	0.0003	0.8739	0.4840
HCL	0.12%	1820	-0.0007	0.0015	0.0008	0.0028	0.0026
HCL	p-value		0.6509	0.5027	0.7307	0.2207	0.2571
Grasim	0.14%	2953	-0.0005	0.0005	0.0019	0.0001	-0.0001
Grasim	p-value		0.5373	0.6810	0.0970	0.9283	0.9265
Glaxo	0.67%	3012	0.0006	-0.0023	0.0019	-0.0007	-0.0016
Glaxo	p-value		0.3828	0.0233	0.0662	0.4878	0.1061
GAIL	1.03%	2108	-0.0020	0.0003	0.0056	0.0018	0.0010
GAIL	p-value		0.0424	0.8545	0.0000	0.1751	0.4721
Dr. Reddy	1.13%	3020	-0.0016	-0.0004	0.0058	0.0018	0.0016
Dr. Reddy	p-value		0.0508	0.7588	0.0000	0.1231	0.1862
Dabur	1.04%	3136	0.0007	-0.0035	0.0043	0.0005	-0.0009
Dabur	p-value		0.4810	0.0118	0.0019	0.7371	0.5145
Cipla	0.52%	3132	-0.0004	-0.0006	0.0042	0.0003	0.0016
Cipla	p-value		0.6476	0.6481	0.0017	0.8333	0.2221
BPCL	0.42%	2920	-0.0014	-0.0003	0.0038	0.0017	0.0007
BPCL	p-value		0.1313	0.8092	0.0044	0.1913	0.6104

Stock	R-Sqr	Observations	Intercept	d1	d2	d3	d4
BHEL	0.18%	2919	0.0010	-0.0004	0.0020	-0.0008	-0.0005
BHEL	p-value		0.2905	0.7481	0.1458	0.5766	0.7299
Bajaj	0.35%	3014	-0.0001	-0.0009	0.0022	0.0000	0.0000
Bajaj	p-value		0.9050	0.3572	0.0300	0.9802	0.9782
ACC	0.80%	3152	-0.0008	-0.0008	0.0058	0.0000	0.0022
ACC	p-value		0.4345	0.6112	0.0001	0.9856	0.1432
ABB	0.30%	3056	0.0002	-0.0006	0.0027	0.0009	0.0005
ABB	p-value		0.8305	0.6354	0.0196	0.4603	0.6824
Orient Hotels	0.003145746	2730	-0.0012	-0.0014	0.0039	0.0020	0.0009
Orient Hotels	p-value		0.3970	0.4683	0.0466	0.2919	0.6560
Punjab Tractors	0.001630871	2995	-0.0006	-0.0016	0.0025	0.0009	0.0002
Punjab Tractors	p-value		0.6557	0.4101	0.1822	0.6461	0.9009
Reliance	0.005073858	3165	-0.0019	0.0002	0.0051	0.0037	0.0028
Reliance	p-value		0.0919	0.9167	0.0012	0.0177	0.0733
SAIL	0.007685342	3164	-0.0019	-0.0018	0.0081	0.0025	0.0025
SAIL	p-value		0.1975	0.3980	0.0002	0.2420	0.2399
Satyam	0.000799635	3099	-0.0015	0.0012	0.0035	0.0035	0.0020
Satyam	p-value		0.4502	0.6699	0.2017	0.1966	0.4626
SBI	0.00589368	3165	-0.0018	0.0016	0.0057	0.0023	0.0028
SBI	p-value		0.0613	0.2474	0.0000	0.0949	0.0407
SCI	0.003366671	2717	0.0005	-0.0030	0.0032	-0.0024	0.0005
SCI	p-value		0.7592	0.1993	0.1720	0.2923	0.8248
Shree Cem	0.013543466	2801	-0.0024	-0.0004	0.0110	0.0032	0.0033
Shree Cem	p-value		0.1091	0.8334	0.0000	0.1255	0.1177
Siemens	0.004836757	3110	-0.0008	-0.0029	0.0054	0.0024	0.0000
Siemens	p-value		0.6091	0.1981	0.0172	0.2833	0.9834
SRF	0.006027896	3095	-0.0015	-0.0029	0.0058	0.0017	0.0028
SRF	p-value		0.3104	0.1663	0.0063	0.4182	0.1925

Stock	R-Sqr	Observations	Intercept	d1	d2	d3	d4
Sundaram Fastener	0.003292396	3017	-0.0006	-0.0010	0.0049	-0.0015	-0.0042
Sundaram Fastener	p-value		0.7590	0.7359	0.0989	0.6135	0.1574
Sun Pharma	0.001589786	3094	-0.0016	0.0018	0.0039	0.0009	0.0036
Sun Pharma	p-value		0.2837	0.4002	0.0729	0.6879	0.0939
Tata Chem	0.017104171	3179	0.0009	-0.0049	0.0051	-0.0022	-0.0036
Tata Chem	p-value		0.3755	0.0010	0.0006	0.1436	0.0160
Tata Power	0.001787013	3163	-0.0001	-0.0035	0.0029	-0.0002	0.0000
Tata Power	p-value		0.9763	0.1900	0.2894	0.9389	0.9930
Tata Tea	0.008040073	3164	-0.0006	-0.0017	0.0050	-0.0003	0.0009
Tata Tea	p-value		0.5256	0.2257	0.0004	0.8524	0.5472
Thermax	0.003406953	3031	0.0017	-0.0033	0.0022	-0.0015	-0.0045
Thermax	p-value		0.3055	0.1553	0.3463	0.5237	0.0534
Titan	0.006936801	3031	-0.0001	-0.0011	0.0059	-0.0019	-0.0009
Titan	p-value		0.9548	0.5703	0.0023	0.3175	0.6676
Voltas	0.019665777	3031	0.0001	-0.0038	0.0087	-0.0002	-0.0041
Voltas	p-value		0.9444	0.0375	0.0000	0.9069	0.0356
VSNL	0.00160382	2563	0.0010	-0.0043	0.0006	-0.0017	-0.0013
VSNL	p-value		0.5888	0.1059	0.8147	0.5246	0.6329
Wipro	0.00155914	2563	-0.0014	0.0034	0.0024	0.0036	-0.0038
Wipro	p-value		0.5662	0.3231	0.4807	0.3001	0.3809