Empirical Analysis of Volatility in Indian Pharma Stocks

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Abstract

Long term investors in equity markets continuously seek to invest in the undervalued stocks which have the potential of growth over the period of time. Due to the recent fall in stock prices pharma stocks have become attractive investment opportunities for investors. This study deals in identifying whether the pharma stocks have actually been better performers than the sensex stocks or whether the pharma stocks are riskier than sensex pre recession. The risk and returns were compared based on different parameters.

This study reveals that pharma stocks outperformed the sensex in terms of monthly returns while the total risk associated with pharma stocks is lesser than the sensex stocks as well. The returns from Pharmaceutical stocks are independent of market conditions while in case of sensex stocks significantly depend upon the market conditions. In case of sensex stocks, the perception of investor about expected return from stock in these sectors at the given level of risk are highly correlated, that is investors' expectation of returns from these stocks is higher for the higher level of risk. Also dependence expected return of Pharmaceutical stocks on changes in market returns is very less as compared to sensex stocks.

Key Words: Pharma Stocks, Volatility, Sensex, Defensive, Bombay Stock Exchange.

1. INTRODUCTION

Pharma is a very narrow sector and there is not much money in terms of asset under management in these funds. Hence, an upward movement in a few select stocks can turn these funds into best-performing fund during difficult market and economic times. We often hear market experts advise that investors should seek out "defensive stocks" '[1].

Defensive stocks are essentially those which are less volatile; do not get affected too much by short-term mood shifts, and thus fall less than the market in the event of a downturn Hindustan Unilever, Colgate Palmolive, Nestle India, GlaxoSmithKline Pharma and Lupin have actually managed positive returns or remained flat in 2008 and have been among the top performers in the recent fall. These stocks were underperformers in the 2007 rally. However, the theory that exposure to defensive sectors helps your portfolio has played out, with the overall performance of these sectors being better than the market. It

may be fair to add pharmaceuticals stocks to the defensive category because society will invest in medical advancement regardless of the economic environment (Hansen 2003). The stock of Sun Pharma Advanced Research, Bilcare and Biocon that rose over 50 per cent during past years lost all their gains in corrections this year. Divis Laboratories that rose over 200 per cent last year, has lost 38 per cent of the peak value so far. The stock of Cadila Healthcare, Cipla and Lupin, whose returns ranged between a negative 16 per cent to positive 2 per cent in 2007, have all seen moderate correction in prices in 2008.

Lupin Pharma, however, recorded 8 per cent increase in prices. GlaxoSmithKline Pharma was the only stock in BSE healthcare space that recorded negative return (11 per cent) in 2007 rally and reversed to post an increase of 5 per cent this year. The stocks that generated exceptional returns in 2007 and still held their ground this year were Sun Pharma, Piramal Healthcare and Glenmark Pharma. The BSE healthcare index has fallen 26 per cent since January this year.

All this suggests that investors have taken opportunities to book profits even in defensive stocks, which delivered high returns in 2007. This can be seen from the following Table-1:

Table-1: Performance of Pharma Stocks

INDICES	**Actualized return Mar-31-Jun30 2008**
BSE SENSEX	-14%
BSE MIDCAP	-16%
BSE SMALLCAP	-15%
BSE 100	-15%
S&P CNX NIFTY	-15%
CNX NIFTY JUNIOR	-22%
BSE AUTO	-21%
BSE BANKEX	-23%
BSE CAPITAL GOODS	-28%
BSE FMCG	-9%
BSE HEALTHCARE	**8%**
BSE IT	13%
BSE METAL	-6%
BSE METAL	-6%
BSE OIL & GAS	-10%
BSE POWER	-29%
BSE PSU	-24%
BSE REALTY	-40%
BSE TECH	1%

This study investigates the value creating opportunities offered by pharmaceutical stocks. In the present paper we tried to determine the performance of pharmaceutical stocks with respect sensex stocks in Indian market to determine if pharmaceutical stocks in India have been value creators for investors. This research will help the investors to choose the pharmaceutical stocks in their portfolios depending on their risk perception and required returns for that type of risk. This study will also help to determine if really investing in pharmaceutical stocks create value.

This study analyses the share price returns involved in the investment. It involves the analysis of securities from point of view of their price, returns and risks. The analysis of risk and return related to securities will help in understanding the behavior of security prices, market and decision making for investment.

The empirical study reveals that pharma stocks outperformed the sensex in terms of monthly returns while the total risk associated with pharma stocks is lesser than the sensex stocks as well. The returns from Pharmaceutical stocks are independent of market conditions while in case of sensex stocks significantly depend upon the market conditions. In case of sensex stocks, the perception of investor about expected return from stock in these sectors at the given level of risk are highly correlated, that is investors expectation of returns from these stocks is higher for the higher level of risk. Also dependence expected return of Pharmaceutical stocks on changes in market returns is very less as compared to sensex stocks.

Financial analysts play a key role in distinguishing which news are relevant for the valuation of a particular asset, and the changes in their recommendations are signals of new information in the market. Recent finance literature highlights the role of technological change in increasing firm specific and aggregate stock price volatility (Campbell et al. 2001, Shiller 2000, Pastor and Veronesi 2006). Gonzalez and Gimeno (2008) studied the impact of buy or sell recommendations on returns and also volatility of the pharmaceutical companies listed in the New York Stock Exchange The pharma sector now commands attention as one of the key building blocks of the Indian outsourcing story. Mazzucato and Tancioni (2002) investigated more closely the relationship between stock price volatility and innovation using firm level patent citation data focus the analysis on firms in the pharmaceutical and biotechnology industries between 1974 and 1999. Results suggest that there is a positive and significant relationship between idiosyncratic risk, R&D intensity and the various patent related measures.

The whole idea of an investment is to secure your future (Grabowaki 1990). In this case, it is imperative to make a wise decision before one pump his hard earned money into any type of investment. This holds true whether his resources are limited or not. Investors are aware of the fact that the last couple of years have been lackluster in terms of the economy and investing (Jovanovic 1994). At a time like this, one needs to think, not twice, but ten times before investing. Nevertheless, a few

industries like the pharmaceutical industry, has managed to survive the economic meltdown (Knight 1921 & Manderbrot 1963)). This obviously makes them a safe option to put your money. Pharmaceuticals companies have survived the crisis predominantly because of it being a need-based industry (Berndth 2002).

Medicines are essential to the survival of every being. This need does not change, irrespective of the fact where people live. With millions of dollars spent on ongoing research and development, the pharmaceutical industry is poised to reach new heights in terms of profits, thereby making it a safe investment. Past evidence indicates that several of those who invested in the industry have now gone on to make considerable profits, with many millionaires included in the list (Clark 1973).

2.1 OBJECTIVES OF THE STUDY

1. To evaluate the defensive nature of healthcare sector vis-à-vis the industry benchmark.
2. To analysis the performance of pharmaceuticals stocks vis a vis the whole market
3. To highlight the defensive nature of healthcare stocks on basis of their alpha, beta, standard deviation.
4. To create an ideal portfolio with the feature of healthcare stocks.

2.2 Rationale of the Study

A great volatility prevailing in the capital market has led the investors especially the moderate and conservative risk averse investors to invest in stocks that are less volatile in nature and provide a steady return with a limited amount of risk involved. These kind of stocks which give a reasonable return and has less risk involved in them are called defence stocks and are considered safe for investment by the investors. It is a belief among the investors and capital market guru's that healthcare sector is safe for investment and it being a utility sector is less prone to risk and can provide a steady return (Deny 2005). Whether healthcare sector is a safer bet for the investment is a matter of consideration.

In order to understand this, there was a need to undertake an empirical study that will enable us to actually believe that investment in healthcare is safe or not and how much can it prove itself to be better than the market movement for the moderate and conservative risk investors.

3. METHODOLOGY

This is an empirical study which assesses volatility in Indian Pharma Stock market. To analyze the performance of pharmaceuticals stocks vis-a-vis the whole market, the required data for study was collected from the PROWESS software provided by Centre for Monitoring Indian Economy (CMIE) database. The stocks in BSE SENSEX and BSE Healthcare index were also taken from PROWESS (CMIE database). The data was taken on monthly basis. The study period entails data from April 2004 to December 2010. The stock prices have been taken as such that involves the period of gradual increase in the stock market, debacle of the stock market and eventually the rising back of the stock market. The overall collected data comprises BSE healthcare index (21stocks) with BSE sensex (30 stocks). The

hypothesis is tested through z-test and t-test. The popular software SPSS 13.0 was used for the whole analysis along with Microsoft excel. As per the requirements of the study, the data was also collected from the website of Mumbai Stock Exchange.

4. FORMULATION OF HYPOTHESIS

The following hypotheses have been framed to test the entire study.

(1)

H0: Healthcare stocks give good return in volatile markets.

H1: Healthcare stocks underperforms in volatile markets

(2)

H0: There is no significant difference in return from Healthcare Index and sensex.

H1: There is difference in return from Healthcare Index and sensex.

(3)

H0: There is no significance difference between the risk of Healthcare Index and sensex.

H1: There is significance difference between the risk of Healthcare and sensex**.**

The sample has been taken for a monthly data of a period April 2004 – December 2010, 79 numbers of observations. The reason for considering the monthly data is to eliminate the element of daily noise in the share prices and do a fair study of the movement the share prices. The data is secondary in nature collected from the reliable source of Bombay Stock Exchange. The data obtained is in the form of Time Series data depicting the prices of stocks and Index and various time periods.

This research study measures the difference in risk and return among Healthcare and BSE SENSEX 30 stocks over the period of April 2004 and December 2010. BSE SENSEX has been taken as a benchmark portfolio. The data is collected from the BSE website. The monthly returns for different companies (in percentage) are determined as:

$$R_i = \frac{P_1 \quad P_0}{P_0} \quad 100$$

Where: R_i is monthly return of a company,

P_1 is closing price of company for the month,

P_0 is opening price of company for the month.

Tools used for analysis

Descriptive statistics

- Mean
- standard deviation

Alpha

Beta

Correlation

Regression

Paired student t test to find the difference of the return and then to test the hypothesis.

Beta ( ) is the measure of a fund's or stock's risk in relation to the market. It can be estimated by regressing the monthly security return to the return of the benchmark portfolio. It is calculated as:

$$_i \quad \frac{n \quad R \qquad R}{n \quad {}^2 \qquad {}^2}$$

To measure the statically reliability of these hypothesis t-test has been applied and the calculated value is tested for 95% level of significance. if the value of t lies in the critical

region ($-t_{0.025}$ to $+ t_{0.025}$) we reject the null hypothesis and accept that the statically significant while in other case the null hypothesis can be accepted and it can be admitted that estimates are statistically not significant.

Alpha (α) is a constant intercept indicating a minimum level of return that is expected from security, if market remains flat (neither going up nor coming down). A positive alpha is the extra return awarded to the investor for taking a risk, instead of accepting the market return. ALPHA is calculated in this way:

$$\alpha = \bar{R} - \beta \bar{\chi}$$

Where:

R is mean return of security,

$\bar{\chi}$ is mean return of benchmark portfolio.

To measure the statically reliability of these hypothesis t-test has been applied and the calculated value is tested for 95% level of significance. if the value of t lies in the critical region ($-t_{0.025}$ to $+ t_{0.025}$) we reject the null hypothesis and accept that the statically significant while in other case the null hypothesis can be accepted and it can be admitted that estimates are statistically not

$\mathbf{R^2}$ is a statistical measure that represents the percentage of a fund or security's movements that can be explained by movements in a benchmark index. It explains the risk adjusted returns of security.

2. ANALYSIS

Information on the mean monthly return and the standard deviation of return are calculated for a random sample of companies over the period of 2004 to 2010and is given in the Table-2.

5.1 Stock comparison

After the analysis of the index, the stocks are also needed to be compared with the market benchmark and on the basis of their return so that we can select the best stocks for a defence characteristic oriented portfolio.

Table.2: Return on Healthcare Stocks

Month	Return on Sensex	Return on Biocon	Return on Cadilla HC	Return on Cipla HC	Return on Divi's Lab	Return on Dr. Reddy Lab.	Return on Glaxosmithkline	Return on Glenmark	Return on IPCA Lab.
Apr-04									
May-04	-15.83	-19.13	-6.64	-14.43	-6.93	-8.42	-9.47	-5.22	-4.31
Jun-04	0.75	3.25	-9.13	-9.29	-19.42	-7.64	-1.65	-4.09	-9.00
Jul-04	7.82	7.87	10.30	17.23	-0.89	3.32	0.93	16.74	6.34
Aug-04	0.42	0.46	5.69	-4.40	5.16	-7.25	-0.79	15.32	4.89
Sep-04	7.54	0.42	8.08	24.36	16.33	4.56	13.22	74.53	1.15
Oct-04	1.59	-5.67	-4.08	-5.59	-20.18	1.99	-0.05	-5.17	12.15
Nov-04	9.91	0.23	0.04	-0.73	6.37	5.64	9.41	13.72	4.57
Dec-04	5.91	-1.39	15.03	14.34	17.27	8.99	4.41	40.67	18.77
Jan-05	-0.71	-6.33	-6.98	-9.61	-17.54	-14.92	-8.42	4.14	-11.30
Feb-05	2.41	-3.30	-7.87	-9.26	-6.32	-2.25	4.58	5.54	-7.95
Mar-05	-3.29	-11.36	-8.21	-2.08	-5.25	2.70	-2.33	6.03	-18.23
Apr-05	-5.21	-2.17	-6.24	3.49	-6.67	-13.79	-0.93	-7.42	6.63
May-05	9.11	7.61	12.01	9.76	16.84	13.77	6.46	-5.28	5.17
Jun-05	7.13	-1.30	-2.44	8.34	-4.02	3.90	5.95	8.63	6.72
Jul-05	6.14	5.56	10.39	7.24	23.01	10.93	9.94	14.79	25.16
Aug-05	2.23	5.15	-1.92	1.64	18.09	-4.27	-0.66	10.13	0.64
Sep-05	10.62	-2.84	3.18	11.19	0.65	6.59	0.89	14.66	-1.91
Oct-05	-8.60	7.01	-15.05	-5.30	-11.79	-5.31	2.24	12.44	-9.84
Nov-05	11.36	-1.08	11.80	10.49	8.62	13.18	18.20	8.51	3.70
Dec-05	6.93	1.97	-2.08	11.51	4.47	7.09	4.61	4.02	-1.51
Jan-06	5.55	-6.37	3.46	-0.47	10.20	14.42	14.35	-3.17	-17.72
Feb-06	4.54	4.67	5.58	25.06	1.79	16.37	2.62	1.97	0.00
Mar-06	8.77	-7.81	25.43	19.94	9.40	9.01	10.35	1.26	3.51
Apr-06	6.76	10.70	15.74	18.20	1.02	0.81	-2.80	3.61	-5.44
May-06	-13.65	-19.48	-25.90	-12.00	-26.20	-5.20	-19.86	-0.26	-3.74
Jun-06	2.03	-10.79	-1.88	-5.97	-6.58	-6.14	-8.24	-7.36	-18.01
Jul-06	1.27	-6.86	-1.49	9.36	17.72	9.65	-3.60	1.45	25.10
Aug-06	8.89	15.07	20.41	5.91	16.82	3.15	21.15	13.11	19.02
Sep-06	6.46	-1.30	-4.43	4.92	22.91	1.50	1.84	-9.07	-5.05
Oct-06	4.07	-2.77	6.89	-0.08	22.18	2.29	-6.80	32.53	17.74
Nov-06	5.67	1.89	-5.97	-3.13	11.56	0.37	2.14	35.53	11.46
Dec-06	0.66	0.04	8.54	-1.24	1.76	8.04	-0.81	6.32	22.83
Jan-07	2.21	8.16	-4.21	-1.95	5.84	-8.43	-0.18	2.93	6.75

Feb-07	-8.18	13.82	-4.93	-5.09	-10.20	-8.83	-0.31	13.23	-2.04
Mar-07	1.04	6.03	4.83	1.03	5.98	7.43	-3.61	13.91	-2.84
Apr-07	6.12	-1.33	-3.80	-10.54	18.56	-2.46	4.45	9.01	10.17
May-07	4.84	-3.28	4.04	3.23	36.13	-8.48	9.26	5.69	-5.15
Jun-07	0.73	-4.72	12.06	-4.23	17.36	1.00	-0.52	-6.24	16.14
Jul-07	6.15	6.82	-6.62	-8.52	14.86	-3.41	-8.98	4.30	-4.04
Aug-07	-1.49	-3.53	-12.96	-12.24	-12.35	1.14	1.33	0.27	-2.26
Sep-07	12.88	4.07	1.67	8.99	3.65	1.28	-4.92	-38.87	-4.11
Oct-07	14.73	9.99	1.88	-2.00	41.58	-4.32	-2.76	16.23	-2.69
Nov-07	-2.39	9.74	-9.33	2.63	-6.12	1.80	-12.35	-6.82	-6.41
Dec-07	4.77	1.40	9.56	15.89	15.56	16.33	8.66	30.19	13.05
Jan-08	-13.00	-34.34	-21.42	-11.36	-24.38	-28.17	-20.61	-17.62	-7.02
Feb-08	-0.40	17.31	5.46	9.98	-2.08	10.31	35.67	-0.78	-0.78
Mar-08	-11.00	-3.51	-2.36	6.03	-8.31	1.42	-5.77	1.09	-2.67
Apr-08	10.50	13.85	13.35	-3.05	18.12	5.33	4.28	36.21	3.71
May-08	-5.04	-5.44	2.37	-0.47	-1.16	14.80	4.48	-1.71	-5.15
Jun-08	-17.99	-14.90	0.63	-0.45	-9.96	-6.16	-2.49	-2.79	-6.18
Jul-08	6.64	-3.48	5.08	3.60	5.65	-15.11	-0.95	1.25	-2.22
Aug-08	1.45	3.03	3.09	9.83	8.20	1.77	6.84	-2.37	5.77
Sep-08	-11.70	-9.26	-3.73	-4.85	-12.47	-12.14	0.41	-22.05	-3.62
Oct-08	-23.89	-46.01	-16.78	-22.36	-17.83	-15.86	-9.30	14.65	-31.51
Nov-08	-7.10	-5.93	-12.58	13.02	10.70	-0.02	8.97	14.83	-12.57
Dec-08	6.10	28.93	18.62	-6.81	10.33	9.72	-1.66	-8.97	9.30
Jan-09	-2.31	-12.91	-6.80	2.73	-34.04	-3.96	1.64	-53.50	-5.35
Feb-09	-5.65	0.00	2.00	-0.47	-1.77	-13.27	2.93	5.25	-4.89
Mar-09	9.19	42.36	6.96	14.99	9.89	24.88	-9.33	9.32	-0.32
Apr-09	17.46	-1.80	12.86	9.53	-10.52	11.40	7.89	13.94	22.22
May-09	28.26	27.91	8.37	-7.37	35.24	18.46	-0.91	26.31	35.98
Jun-09	-0.90	20.66	13.82	13.61	-3.27	20.62	2.66	-4.18	-4.71
Jul-09	8.12	-0.34	22.32	8.84	-3.91	5.10	14.01	14.80	17.95
Aug-09	-0.02	9.12	-1.80	-1.52	-1.57	-2.80	5.27	-13.07	12.94
Sep-09	9.32	8.69	13.99	3.04	7.38	24.34	8.62	9.37	15.22
Oct-09	-7.18	-4.71	8.99	2.86	-6.21	2.13	1.38	-5.62	13.33
Nov-09	6.48	5.45	5.77	11.26	13.96	11.92	5.86	3.21	3.88
Dec-09	3.18	6.23	8.46	4.83	11.58	1.27	-3.63	18.87	11.28
Jan-10	-6.34	-2.55	9.89	-5.45	-9.76	-1.62	-5.58	11.95	7.31
Feb-10	0.44	-2.36	6.88	-0.63	2.20	1.55	12.85	3.90	-2.66
Mar-10	6.68	8.16	8.32	6.91	8.92	11.74	3.63	5.82	23.30
Apr-10	0.18	6.12	2.64	1.62	-0.80	-1.14	7.15	1.35	-2.39
May-10	-3.50	-2.30	8.07	-6.89	10.57	11.16	10.55	0.56	4.16
Jun-10	4.46	10.38	7.84	5.89	3.67	3.50	4.03	-0.06	6.47
Jul-10	0.95	-4.93	-3.66	-3.30	-2.95	-6.86	-7.99	-0.61	-4.14
Aug-10	0.58	9.57	-4.82	-7.12	-0.89	0.73	-7.67	5.99	1.64
Sep-10	11.67	5.78	8.76	6.03	-6.74	5.71	18.72	4.48	9.23
Oct-10	-0.18	14.85	6.69	9.51	-0.12	15.11	0.65	13.84	4.62
Nov-10	-2.55	-5.16	9.74	-2.43	-10.56	7.68	-4.07	3.81	-2.91
Dec-10	5.06	7.99	1.32	7.62	4.35	-6.88	9.79	2.82	9.31

Return on Healthcare Stocks

Month	Return on Lupin Ltd.	Return on OPTO Circuits	Return on Orchid Chem. and Pharma	Return on Piramal healthcare	Return on Ranbaxy	Return on Sun Pharma
Apr-04						
May-04	-13.27	-21.08	-9.41	-13.39	-6.98	2.76
Jun-04	-9.35	32.28	-7.61	4.13	-7.98	-5.09
Jul-04	-2.27	18.09	-1.57	2.15	3.49	-3.21
Aug-04	8.33	-0.49	24.30	-0.94	1.79	9.01
Sep-04	8.69	65.15	4.03	18.95	13.84	10.51
Oct-04	-14.99	68.65	-10.19	8.48	0.72	3.40
Nov-04	2.05	12.43	18.39	16.28	2.34	12.23
Dec-04	8.17	-0.85	18.39	35.63	11.30	11.90
Jan-05	-12.39	1.88	14.61	-17.03	-13.30	-10.56
Feb-05	-7.34	14.19	-3.97	-3.73	-6.00	-3.56
Mar-05	-0.61	-12.87	-6.19	-12.97	-1.56	-1.43
Apr-05	1.74	-1.24	-6.47	-2.25	-9.07	6.14
May-05	10.28	14.95	12.41	14.09	20.61	5.01
Jun-05	12.01	6.13	0.95	3.03	-3.94	9.83
Jul-05	-0.56	40.62	7.79	-1.27	-11.01	6.53
Aug-05	11.00	20.76	5.52	4.82	11.62	1.85
Sep-05	-1.54	7.67	5.36	7.08	-6.48	6.24
Oct-05	-8.19	-10.03	-24.89	-15.43	-28.58	-9.61
Nov-05	9.21	13.49	12.39	17.92	9.78	10.17
Dec-05	1.24	15.61	10.34	-2.84	-5.92	2.97

Jan-06	10.11	13.78	9.43	-12.52	10.14	1.99
Feb-06	10.84	-7.15	21.88	-0.96	7.59	11.60
Mar-06	8.84	3.51	15.65	9.44	0.51	11.59
Apr-06	15.53	88.86	-7.58	-8.24	9.49	-0.31
May-06	-12.39	-5.92	-34.23	-19.78	-12.93	-6.75
Jun-06	-13.18	-28.37	-18.06	-0.16	-13.38	-1.82
Jul-06	0.34	8.25	-3.89	5.11	4.90	3.38
Aug-06	11.83	4.73	13.73	12.71	8.81	10.80
Sep-06	-8.14	10.34	2.94	4.69	8.12	2.68
Oct-06	11.12	26.04	-0.31	-4.86	-9.13	-2.66
Nov-06	3.19	16.25	0.14	4.28	-6.86	12.09
Dec-06	15.72	-13.05	-5.86	12.75	5.25	-3.54
Jan-07	-1.87	7.16	28.94	-3.45	4.27	4.98
Feb-07	0.48	-5.19	-10.01	-11.67	-17.38	-9.75
Mar-07	0.36	2.46	15.17	8.74	4.44	13.63
Apr-07	16.38	12.62	-1.34	4.86	5.32	-2.57
May-07	0.89	1.43	0.74	-2.17	4.40	7.92
Jun-07	3.01	13.08	-3.82	18.95	-8.45	-7.78
Jul-07	-12.12	24.07	-10.15	-10.11	9.85	-8.96
Aug-07	-8.87	-4.74	-9.65	0.20	0.36	0.06
Sep-07	-0.09	24.01	11.07	4.15	11.01	3.70
Oct-07	0.09	14.66	1.04	6.67	-1.69	9.19
Nov-07	-10.42	4.12	12.87	1.70	-9.34	4.58
Dec-07	20.58	13.46	10.92	17.11	10.02	10.84
Jan-08	-9.96	-11.23	-15.97	-15.05	-17.55	-6.84
Feb-08	-2.63	-8.37	4.98	-9.67	26.92	7.68
Mar-08	-11.11	-19.89	-35.93	10.60	-1.57	0.45
Apr-08	14.66	8.45	48.47	14.45	9.41	17.69
May-08	25.54	-6.40	0.46	3.86	10.12	-3.19
Jun-08	-6.20	-13.11	-6.48	-16.54	-1.06	-0.74
Jul-08	10.58	2.94	11.64	6.45	-4.58	1.26
Aug-08	-1.02	5.88	-2.01	5.73	3.89	4.66
Sep-08	-1.37	-24.23	-13.63	-2.30	-52.22	-0.53
Oct-08	-8.06	-37.46	-51.99	-31.99	-31.60	-23.50
Nov-08	-11.57	-15.00	-17.92	-6.42	23.22	-3.80
Dec-08	5.55	18.01	9.79	13.33	20.88	-1.41
Jan-09	-7.76	-1.68	-21.47	-10.69	-14.54	0.80
Feb-09	14.10	-4.91	-9.62	-2.35	-24.99	-5.50
Mar-09	5.99	20.95	18.15	-6.63	2.35	9.65
Apr-09	4.04	9.28	24.37	19.67	0.21	14.64
May-09	16.29	52.50	32.93	11.44	68.00	-5.14
Jun-09	-2.01	-3.22	-24.58	20.34	-12.11	-9.82
Jul-09	15.76	6.98	0.73	0.37	14.30	7.42
Aug-09	7.32	8.94	23.68	5.59	16.96	1.54
Sep-09	11.99	6.26	51.40	15.81	23.03	17.59
Oct-09	7.86	-0.97	-15.40	0.04	-3.11	-1.26
Nov-09	12.09	3.06	25.54	3.44	16.63	5.45
Dec-09	8.43	10.47	-4.49	-5.95	13.61	3.44
Jan-10	-4.69	-5.62	-13.66	-1.97	-12.43	-2.50
Feb-10	5.43	-1.14	0.79	8.88	3.07	4.86
Mar-10	8.47	2.46	-3.68	6.64	1.68	16.14
Apr-10	5.12	3.48	2.33	26.05	-6.70	-12.45
May-10	8.97	-2.03	-11.40	-3.67	-2.99	6.01
Jun-10	5.65	9.07	18.63	-6.83	7.15	7.42
Jul-10	-4.45	14.24	12.36	0.76	-2.45	-0.75
Aug-10	-5.24	2.17	0.43	3.01	9.11	-0.60
Sep-10	9.13	6.13	25.08	0.37	13.65	14.71
Oct-10	12.78	-3.84	22.36	-4.46	4.06	4.38
Nov-10	16.35	-1.33	3.18	-7.65	-1.43	6.48
Dec-10	-5.77	-4.66	2.81	6.35	4.76	8.00

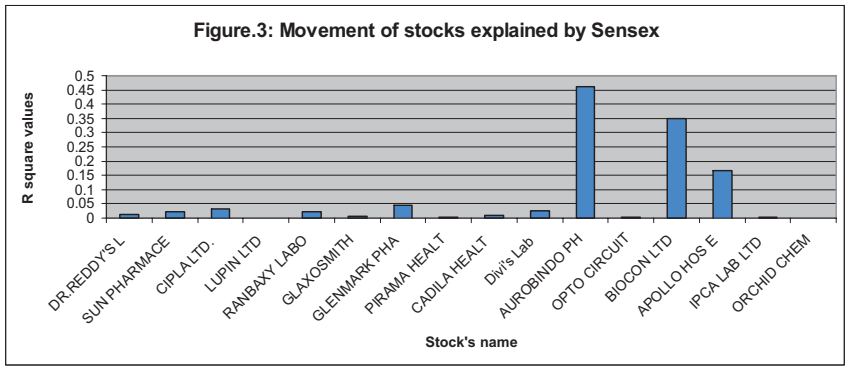
Explanation

The Table.2 shows the monthly returns of the 16 selected companies in the healthcare sector and the benchmark index Sensex. The reason for computing the return was to bring out the absolute values to bring a level platform to enable the comparison with the benchmark index. This analysis will depict how differently the healthcare stocks behave from the market movement. A further study will help to identify the stocks that can prove to be safer for investment even while the movement of the market is volatile. Since, the healthcare sector and its stocks form the part of the entire capital market. The movement of the market should also signify the same extent of movement for the stocks. But, a lesser volatility will bring out the indifferent nature of the healthcare stocks.

Extract from the above return on the stocks

Table.3: Statistical Results of Scrips with comparison with Sensex

Company	R2	alpha	Beta	F values
DR.REDDY'S L	0.012	2.318	-0.132	0.9
SUN PHARMACE	0.022	2.817	-0.144	1.67
CIPLA LTD.	0.033	2.51	-0.208	2.521
LUPIN LTD	0	2.436	0.023	0.029
RANBAXY LABO	0.023	1.868	-0.29	1.791
GLAXOSMITH	0.005	2.092	-0.074	0.348
GLENMARK PHA	0.044	5.047	-0.439	3.477
PIRAMA HEALT	0.004	2.239	-0.094	0.331
CADILA HEALT	0.01	2.528	-0.12	0.733
Divi's Lab	0.026	3.579	-0.284	2.023
AUROBINDO PH	0.461	0.172	1.424	66.779
OPTO CIRCUIT	0.004	6.745	0.161	0.319
BIOCON LTD	0.348	0.512	0.872	41.7
APOLLO HOSE	0.166	1.343	0.436	15.484
IPCA LAB LTD	0.002	2.817	-0.069	0.176
ORCHID CHEM	0	2.244	-0.033	0.018



5.2 Interpretation

R square is the value or the degree of movement in stocks explained by the movement in Sensex. The R square value of these healthcare stocks ranges 0 to 0.166 barring Aurobindo Pharma and Biocon Ltd. which is very high compared to the other healthcare stocks. It shows that the movement of healthcare stocks is explained by market benchmark Sensex to a very minute extent. The graphical representation of the R square values in the Figure.3 depicts the true picture of the co-relation of the Healthcare Stocks with the Sensex.

Looking at the beta values of the stocks in the table 3 it can be seen that all the stocks have either a negative Beta of it in positive it is almost close to 0 and the maximum being .436 for Apollo Hospitals. And, for Aurobindo and Biocon the degree of beta is very high. For Biocon Ltd. it is .872 while for the Aurobindo Pharma it is more than 1 being 1.424. Beta values show the slope of movement in the stock prices for the stock in relation to the movement in the market benchmark.

The lower alpha reflects that in case the market remains flat the healthcare stocks will provide a minimal return. While, looking at the alpha value of Biocon it can be interpreted that it may even deteriorate your wealth if the investment is made in this scrip when the market is flat.

The F-value which is around 1 shows that there is more inclination to accept that the samples do not differ significantly from each other in terms of their variances. So, a value near 1 means that the variance among them largely doesn't differ. And, in terms of risk they are similar in nature. We can see that the F-ratio of Aurobindo and Biocon is very high.

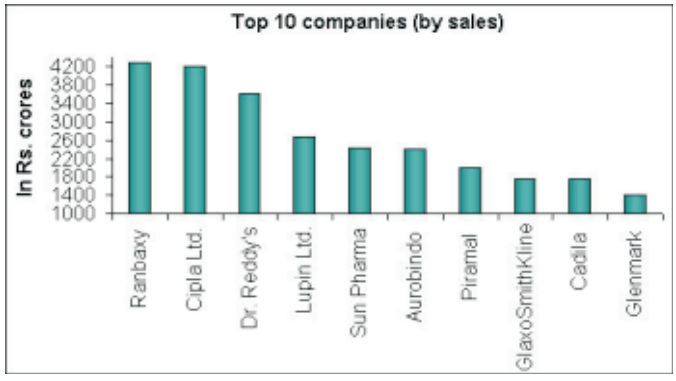


Figure.4: Top 10 companies in Sales

Even looking at the Figure.4 we can apprehend that the sales by these companies have been very high in terms. The figures are just representative of the pharmaceutical sales of these companies for the period 2009-10 and reflect the fundamental robustness of these companies stating that they can best represent the stock prices, as price reflects it all for the Company and its behaviour and status.

5.3 Effect in 2008

The year 2008 had been a shackling year for all the stocks in the market because of the sub-prime crisis hampering the growth of the world economy. In order to evaluate the performance of all the healthcare stocks we study their performance in the year 2008.

Table.4: Effect in 2008

Scrip	Average Monthly Return in 2008	Change Dec. 2007 to Dec. 2008
Sensex	-7.03	-110.29
Apollo	-1.52	-16.30
Aurobindo Pharma	-16.27	-223.48
Biocon	-11.02	-148.56
Cadilla HC	-2.06	-17.60
Cipla	1.61	-13.75
Divi's Lab	-3.69	-39.56
Dr. Reddy Lab.	-4.75	-56.54
Glaxo smithkline	0.18	10.20
Glenmark Pharma	-1.06	-0.66
IPCA lab	-6.00	-84.94
Lupin Ltd.	-0.76	-2.57
OPTO circuits	-12.22	-235.81
Orchid Chem. And Pharma	-14.40	-210.33
Piramal healthcare	-4.61	-49.76
Ranbaxy	-8.78	-68.76
Sun Pharma	-1.64	-14.75

INTREPRATATION

The year 2008 was the most traumatizing for the capital market as due to the recession in the world's giant economy The United States collapsed because of a huge recession and the entire world's economy was impacted. The Indian economy was also the one impacted. But, the extent of impact was not on a large scale as impacted in other countries. Our Indian economy was robust enough to handle the situation. There was nothing more than a slowdown. The economies around the world being co-related do effect the other economies. But, Indian economy was still growing but at a slower rate.

The slowdown effect must have affected the stock prices too considering our assumption of semi-strong EMH. The evaluation of healthcare stocks in this period can really help in choosing the best stocks that can even survive the traumatizing debacle in the capital market (Pastor 2004, 2005).

The reason for considering the year 2008 for examination is to ascertain the market movement and the impact in the stock market influenced by the global downturn.

The average return in the year 2008 for sensex was a negative 7.03% and stocks like OPTO Circuits, Orchid Chemicals and Pharma, Aurobindo Pharma, Ranbaxy and Biocon are negative too impacted by the economic downturn and the extent of negative return is even higher than the market benchmark.

However, there are certain healthcare stocks that have played true to the nature of defense stocks as their classification. Apollo Hospitals gave a negative return of 1.52%, Glenmark Pharma gave a negative return of 1.06% and Lupin Ltd. gave a negative return of just 0.76 %. While looking at other stocks like Cipla Ltd. and Glaxo-smithkline have been on a positive note. Though the return is not very significantly high these stocks have been able to enable themselves on the positive side despite the world economy facing a debacle in the same year.

5.4 Present Situation

Before considering the right stocks to invest, it will be wise to consider the present performance of different sectors to identify whether the healthcare sector is worth investing at the present scenario. Therefore, we analyse their performace in the present situation.

Table.5: Present Scenario

Sector	Return in 2010	Return in 2011 as on January 14,2011
BSE SENSEX	14.84	-8.74
BSE MIDCAP	13.90	-8.01
BSE SMALLCAP	13.57	-7.52
BSE 100	13.54	-8.38
BSE 200	13.96	-8.32
BSE 500	14.05	-8.17
BSE AUTO	27.35	-10.55
BSE BANKEX	25.03	-12.90
BSE CAPITAL GOODS	8.42	-11.56
BSE FMCG	24.23	-2.74
BSE HEALTH CARE	25.48	3.87
BSE IT	24.01	-5.99
BSE METAL	1.12	-7.48
BSE OIL & GAS	1.23	-6.25
BSE POWER	-6.69	-6.31
BSE PSU	-0.75	-8.30
BSE REALTY	-35.00	-13.15

Interpretation

Looking at the present condition of healthcare sector, the Healthcare sector looks very booming but considering our focus as the defence stock, it doesn't live up to the definition. The definition of the defence stocks asserts that the stocks should limit themselves in both the direction i.e. even the return on the stocks cannot be very high nor there can be a drastic downfall in the stocks.

Looking at the table no.5 and bar Figure no.5 on the next page, it can be seen that in the current fiscal the return in the healthcare sector has been 25.48% which is way higher than the market benchmark index i.e. Sensex which could gain as much as 14.84% for the fiscal ending 31Dec, 2010. The only sector to surpass the return on healthcare sector is the Auto Sector which gave a return of 27.35%. While other market sectoral indices baring FMCG and IT, have just been able to fetch a return of around 14% to 15% which is much below the return of these booming sector.

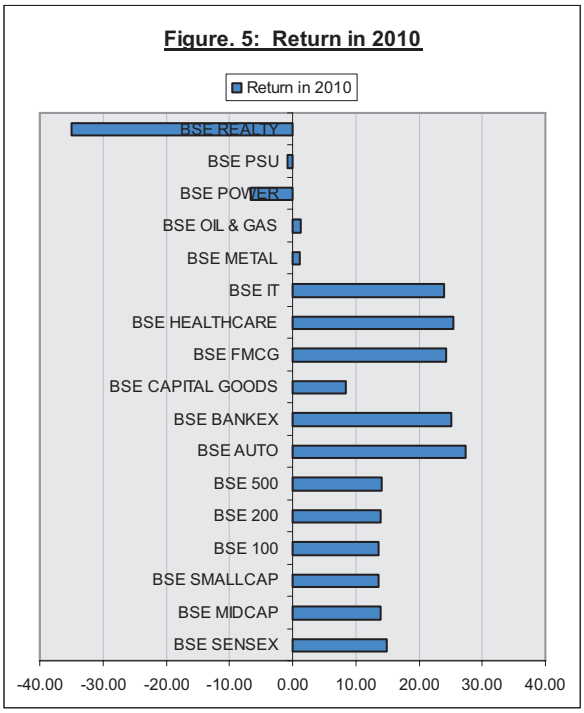


Figure. 5: Return in 2010

5.5 Test of Data (w.r.t. objectives) (Test 1)

H0: Healthcare Index gives good return in volatile markets

H1: Healthcare Index underperforms in volatile markets

In volatile markets the stock market gives either very high return in terms of positive risk prevailing and negative return in terms of negative risk. So it is expected that in order to prove the hypothesis the healthcare index needs to be in significant match with the market benchmark sensex.

To test this the period is considered from January 2008 onwards. Since January 20008, the market has been highly volatile. To test the hypothesis the paired t-test is conducted for the period. It is believed that HC is not as volatile as the market benchmark. The test is done at the 5% significance level (95% confidence level).

$H_0: \beta_1 \beta_2 = 0$
$H_0: \beta_1 \beta_2 \neq 0$

Where, $\beta 1$, β_2 are returns of the Healthcare and Sensex stocks in volatile period

T - TEST FOR April2008 onwards till December, 2010

	Healthcare	SENSEX
Mean	1.4922	.4303
St. Dev.	8.19626	9.76068
t Stat	-1.082	
Lower confidence level	-3.05482	
Upper confidence level	.93093	

From the above test it can be said that there is no evidence to reject the null hypothesis. As the confidence interval is -3.05482 to .93093 and the value for t-statistics is -1.082.
Since, the Healthcare Index has no significant difference with Sensex during the period of volatility in the stock market. Therefore, we can affirm that the Healthcare Sector gives good return in the volatile markets.

(Test 2)

H0: There is no significant difference in return from Healthcare Index and sensex.

H1: There is difference in return from Healthcare Index and sensex.

$H_0: \beta_1 \beta_2 = 0$

$H_0: \beta_1 \beta_2 \neq 0$

Where, $\beta 1$, β_2 are returns of the Healthcare and Sensex stocks.

T - TEST FOR
April2004 Dec.2010

	Healthcare	SENSEX
Mean	1.5276	1.9269
St. Dev.	7.44057	8.15621
t Stat	.658	
Lower confidence level	-.80761	
Upper confidence level	1.60611	

Since, the t-value of the test lies between the confidence interval (-.80761,1.60611) it can be said that the return in Healthcare Sector on the basis of Healthcare Index is not significantly different from the return in Sensex.

From the above test, it can be said that there is no evidence to reject the null hypothesis.

5.6 Findings

It has been found that the Healthcare Sector is changing its behaviour. Previously, it was a thumb rule to consider the investment in healthcare sector to be the safest one. But, considering the student t-test on the healthcare index and market benchmark during the volatile period of the market and also during the entire period of study it has been found that there is no much significant difference between the behaviour of healthcare sector in reference to the market benchmark i.e. Sensex.

Even, while comparing both the indices it was found that the standard deviation in the return of Sensex is 8.16% while the standard deviation of Healthcare Index is just 7.44%. There is no major difference between both of them. And, both are prone to almost similar level of risk. So, considering the healthcare sector to be safer for investment without proper analysis will be very imprudent behaviour on the part of the investor (Knight 1921).

In the fallout of stocks in the year 2008, it was noticed that Sensex fell by 110.29% while stocks like Aurobindo, Biocon, OPTO circuits and Orchid Pharma fell by 223.48%, 148.56%, 235.81% and 210.33% respectively indicating that they were negatively impacted even more than the market benchmark.
Considering the stocks it has been found that except Biocon and Aurobindo the other stocks are comparatively safer as compared to them. So, an investor on the basis of his risk potential can decide on the stocks.

And, considering the volatile period even it was found that healthcare is the hot sector for the purpose of investment and comparing it with other sectoral indices it has been found it is one of the most high return giving sector of around 25% in the 2010 fiscal year and when looked at the sudden down surge of market in the first 15 days of the January month in the year 2011 it was found that the healthcare sector just dipped around 3.5% which is much below the other sectors (Harris 2002).

So, it can be asserted that the healthcare sector is changing its nature and it will be wise on the part of the investor to evaluate the scrip before investing. A wise decision can help to gain windfall returns while a wrong decision will vanish the entire invested money.

CONCLUSION

The Pharmaceutical stocks have offered the prospects of high returns as compared to SENSEX stocks. Thus by investing in Pharmaceutical group companies investors can get a good bargain which lead to higher value creation for investors over a period of time (Shiller 1981 and Schwert 1989).

Stable returns from Pharmaceutical stocks are accompanied by lesser level of total risk (Gort & Klepper 1982). The returns from Pharmaceutical stocks are independent of market conditions while in case of sensex stocks significantly depend upon the market conditions. In case of sensex stocks, the perception of investor about expected return from stock in these sectors at the given level of risk are highly correlated, that is investors expectation of returns from these stocks is higher for the higher level of risk. Also dependence expected return of Pharmaceutical stocks on changes in market returns is very less as compared to sensex stocks (Klepper 1996).

Pharmaceutical stocks give higher return to investors over a long period of time but also have lower volatility level (Ederington 1993). In case of different economic and market conditions the investors expectations of return from Pharmaceutical stocks does not change, while the expectation of return for the sensex firms depend upon the market return (Womack 1986).

So it will be advisable for an investor to have a proper mix of defensive stocks like pharmaceuticals, FMCG and other highly growth shares in his portfolio depending on his risk appetite, return desired and the time horizon.

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End Notes

1. The term must not be confused with "defense stock", which refers to stock in companies which manufacture things like ammunition, weapons, and fighter jets. A 'defensive stock' in capital market is one whose price remains stable under difficult economic conditions. Defensive stocks is synonymous to non-cyclical stocks, or companies whose business performance and sales are not highly correlated with the larger economic cycle. These companies are seen as good investments when the economy sours.