

THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

Analyzing Price Movement and Stock Volatility of Selected BSE listed Pharmaceutical Companies

Kuldeep Kumar

Associate Professor, IIMT (ISM), School of Management, Gurgaon, Haryana, India

Abstract:

This paper makes an effort to examine the variation in price movement and volatility to predict short term risk and return of stock to four pharmaceutical companies, namely Lupin Pharma, Sun Pharma, Cadila and Cipla Ltd. Further investigation states that Lupin Pharma is providing higher return than Sun Pharma which is followed by Cipla Ltd and Cadila Ltd. respectively. Further the study examines higher volatility in the stock of Cadila Ltd and so it stood at the first position, Sun Pharma stood at the second position, Cipla stood at third and Lupin Pharma stood at the last position with lowest annual volatility. The study concludes that there is a higher risk in Cadila Ltd and Sun Pharma Ltd due to higher volatility and higher return is expected on their stock. Lastly the paper concludes that Lupin Pharma is expected to provide higher returns on its stock while carried out cumulated distribution function.

Keywords: *Volatility, annual volatility, beta, future risk, cumulated distribution function*

1. Introduction

Prices of shares fluctuate depending on the future prospects of the company. Stock prices go up or down in the markets every day. Popularly, a share is said to be volatile if the prices move by large percentages up and/or down. A stock with very little movement in its price would have lower volatility. The relation between volatility and risk has been to some extent elusive, but stock market volatility is not necessarily a bad thing. In fact, fundamentally justified volatility can form the basis for efficient price discovery. In this context volatility dependence that implies predictability is welcomed by traders and medium-term investors. Volatility concept remains central to modern financial markets and academic research. The significance of volatility is vital in the area of financial economics. Equilibrium prices, obtained from asset pricing models, are affected by changes in volatility; investment management depends upon the mean-variance theory, while derivatives valuation forms a base for reliable volatility forecasts. Portfolio managers, risk arbitrageurs, and corporate treasurers closely watch volatility trends, as changes in prices could have a major impact on their investment and risk management decisions.

Volatility can be defined as the degree to which asset prices tend to fluctuate. Volatility is the variability of asset prices. Volatility is rightly described as the rate and magnitude of changes in prices and in finance generally referred to as risk. The Nobel laureate Merton Miller writes “by volatility public seems to mean days when large market movements, particularly down moves, occur. These precipitous market wide price drops cannot always be traced to a specific news event. Nor should this lack of smoking gun be seen as in any way anomalous in market for assets like common stock whose value depends on Subjective judgments about cash flow and resale prices in highly uncertain future. The public takes a more deterministic view of stock prices; if the market crashes, there must be a specific reason.”

There are two schools of thought that have different views on the reasons of volatility. The economists in their fundamental approach argue that these market movements can be explained entirely by the information that is transmitted to the market. They have tried to put forward theories to explain this phenomenon and more still have tried to use these theories to predict future changes in prices. They further explain that since the efficient market hypothesis holds, the information changes affect the prices. Market volatility keeps changing as new information flows into the market. Others have argued that the volatility has nothing to do with economic or external factors. It is the investor reactions, due to psychological or social beliefs, which exert a greater influence on the markets.

So, freely available information is not necessarily already incorporated into a stock market price as the efficient market hypothesis would have proved. The issue of changes in volatility of stock returns in emerging markets has received considerable attention in recent years. The reason for this enormous interest is that volatility is used as a measure of risk. The market participants also need this measure for several reasons. It is considered as an input in portfolio management.

2. Review of Literature

Dawson and Staikouras (2008) examined whether the newly cultivated platform for derivatives volatility trading has altered the variability of the S&P500 index. They noted that the onset of the CBOE volatility futures trading has lowered the equity cash market volatility, and reduced the impact of shocks to volatility. The findings also show that volatility is mean reverting, while market data support the impact of information asymmetries on conditional volatility. Finally, comparisons with the UK and Japanese indices, which have no volatility derivatives listed, show that these indices exhibit higher variability than the S&P500.

Micko Tanaka Yamawaki et Al., (2007) have conducted a study on the Adaptive use of Technical Indicators for predicting the Intra-Day price movements. Under this study, a system has been proposed to select the best combination of technical indicators and their parameter values adaptively by learning the patterns from the tick-wise financial data. In this study, the researcher has shown that this system gives good predictions on the directions of motion with the hitting rate at 10 ticks ahead of the decision point as high as 70% for foreign exchange rates (FX) in five years from 1996 to 2000 and 8 different stock prices in the NYSE market in 1993. The study concludes that the tick-wise price time series carry a long memory of the order of at least a few minutes, which is equivalent to 10 ticks.

Recent research shows that volatility and volume are persistent and highly auto-correlated, while shorter time duration between trades indicates higher probability of news arrival and higher volatility (Xu et al., 2006). The findings state that there is an inverse relation between the price impact of trades and duration between trades. A similar relationship is noted for the speed of price adjustment to trade-related information and the time interval between transactions.

Financial markets show dramatic movements, and stock prices may appear too volatile to be justified by changes in fundamentals. Such observable facts have been under study over the years and are still being studied vigorously (LeRoy and Porter, 1981; Shiller, 1981; Zhong et al., 2003).

In a multi aspect investigation, McKenzie et al. (2001) study the systematic risk, asymmetries, and the volatility of ISFs. Their stock-specific empirical findings add to the mixed results of the ongoing literature. They find a clear reduction in beta risk and unconditional volatility, during the post-IFS listing, and offer some mixed evidence regarding the change in conditional volatility, while the asymmetric response is not consistent across all stocks.

Early evidence (Bessembinder and Seguin, 1992) points out that futures trading improves liquidity and depth in the cash equity market, which is corroborated by more recent studies (Board et al., 2001). Analysis of the FTSE100, S&P500, and DJIA indices (Robinson, 1994; Pericli and Koutmos, 1997; Rahman, 2001) shows either a volatility reduction in the post futures phase or no change in the conditional volatility over the two periods. Elsewhere, the findings state that twenty-three international stock indices show either a reduction or no change in volatility during the post-futures period, while the opposite applies to the U.S. and Japanese equity markets (Gulen and Mayhew, 2000).

3. Objectives of the Study

1. To investigate the price movement of selected companies for the study period.
2. To analyze the impact of volatility on future investment decision.
3. To predict future risk and return to stock of selected companies.

4. Research Methodology

The analysis of the study is based on three month data regarding stock price from 1st January to 31st March 2015. The data has been collected from BSE India for the study period. The study uses technical analysis. The different values like Standard Deviation, Beta, and Volatility are calculated to investigate share price movement. Future risk for investment and return on investment with the help of cumulative distribution function has also been calculated.

Computation of Volatility:

Average Return Calculation for three Months: - Average return calculated with the LN formula.

Average Return = (Present day share price/previous day share price - 1) / Total no of days

Average Return (%) = (Present day share price/previous day share price - 1) * 100 / Total no of days

Standard Deviation & Annual Volatility Calculation: - Volatility refers to the amount of uncertainty or risk about the size of changes in a security's value. A higher volatility means that a security's value can potentially be spread out over a larger range of values.

Standard Deviation (SD) = Square root of Variance (V)

Variance = (Sum of squared difference between each monthly return and its mean / number of monthly return data - 1).

Annual Volatility calculation: - In the Annual volatility calculation the standard deviation has been calculated for three months on the basis of return from different companies then multiply with the squareroot of 252 (252 is the number of days taken in a year).

Beta = (Standard Deviation of Fund / Standard Deviation of Benchmark) x R-Square

5. Analysis and Interpretation

Companies	Average Return	% Average Returns
Sun Pharma	0.0036064	.361%
Cipla Ltd	0.002158	.213%
Lupin Pharma	0.00555	.555%
Cadila Ltd	0.00145	.145%

Table 1: Average Stock Return

Table No. 1 shows higher average stock return i.e., .555 per cent in case of Lupin Pharma whereas Cipla Ltd. shows lowest average return on its stock i.e., .213 percent during January 2015 and March 2015.

Company	S.D. (%)	Annual Volatility Calculation (%)
Sun Pharma	1.8157	28.82329
Cipla Ltd.	1.8092	28.7204
Lupin Pharma	1.529	24.277
Cadila Ltd.	1.913	30.362

Table 2: Standard Deviation (%) & Annual Volatility:

Table No. 2 indicates higher volatility, i.e., 30.36 percent in case of Cadila Ltd and lowest volatility, i.e. 24.27 per cent has been noted in case of Lupin Pharma.

5.1. Price Return Movement of Selected Companies

It can be observed from the figure 1 that the prices of shares of Sun Pharma moved up and down throughout the period and price changes were ranging from -2.978% to 6.62%. The calculated historical volatility is 1.816 % for the period. Shares of Cipla Ltd. Moved steadily upwards and the price changes were between -2.96 and 6.89 percent. The historical volatility has been noted 1.809 percent. Shares of Lupin Pharma moved steadily downwards and the price changes were between -2.496 percent and 4.496%. In this case the historical volatility is found out 1.529%. Shares of Cadila Ltd. Moved up and down with smaller percentage change, ranging between -4.11 % and 4.481% with historical volatility 1.91%. Higher rate of return shows high volatility & high return on investment with higher risk & lower rate of return of share price shows the lower return with low risk on investment.

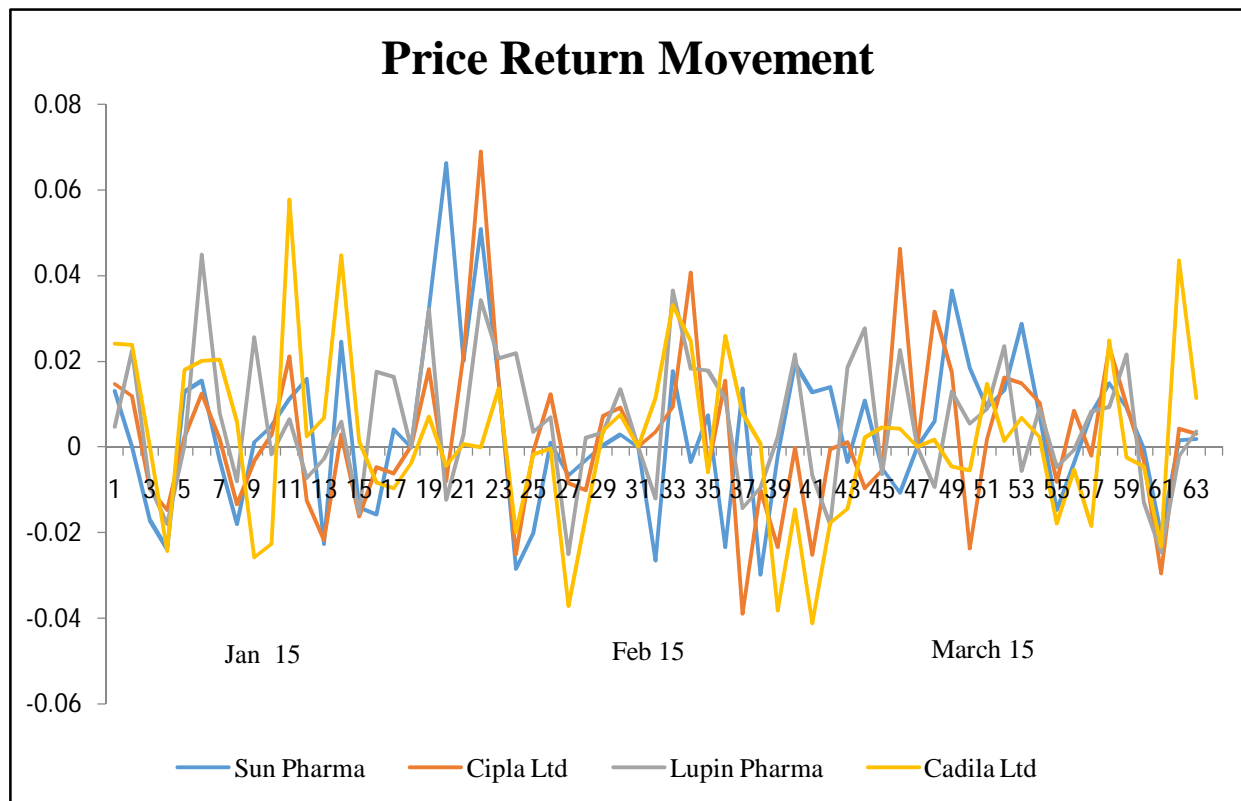


Figure 1

5.2. Volatility and Annual Volatility of Selected Companies

The figure 2 shows that the Cadila Ltd stock has high volatility (1.91) & a high annual volatility (30.36). Sun Pharma has second highest volatility (1.82) & an annual volatility (28.82) followed by Cipla Ltd. with 1.81 percent volatility and 28.72 annual volatility. Lastly, Lupin Pharma’s stock volatility and annual volatility were noted 1.53 % and 24.28 % respectively.

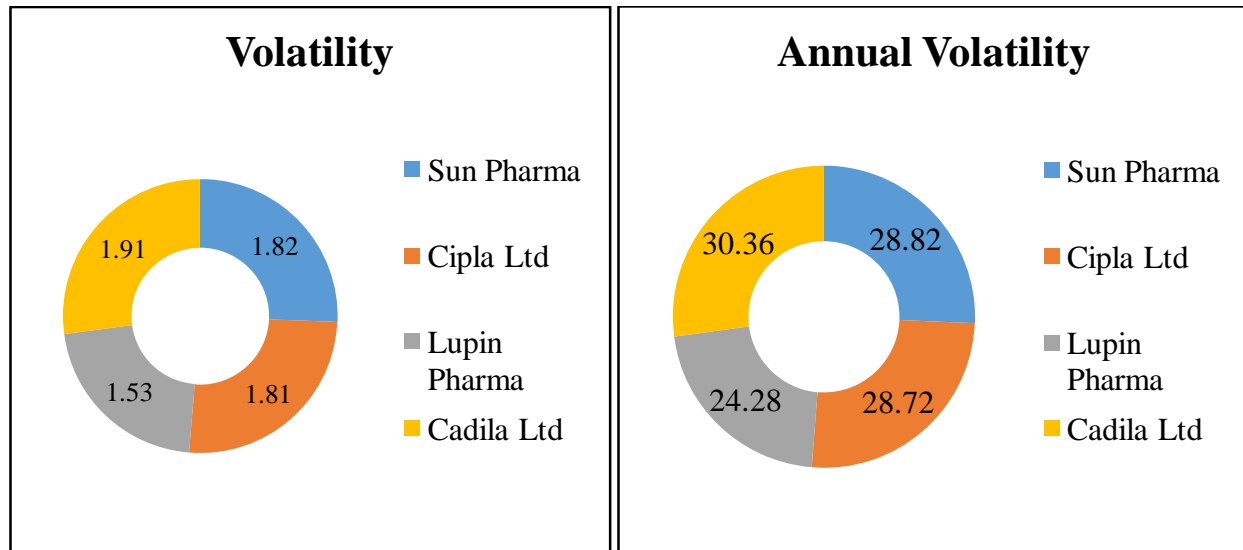


Figure 2

5.3. Volatility & Beta of Selected Companies

Beta is a measure of a stock's volatility in relation to the market. High-beta stocks are supposed to be riskier but provide a potential for higher returns; low-beta stocks pose less risk and also lower returns. Figure 3 shows the values of Beta & their Volatility with respect to four selected companies combined with each other. Cadila Ltd v/s Cipla Ltd has higher volatility of Beta in this parameter which provides an opportunity to get more return with higher risk. Sun Pharma v/s Cadila has also had same market volatility, but with lower beta.

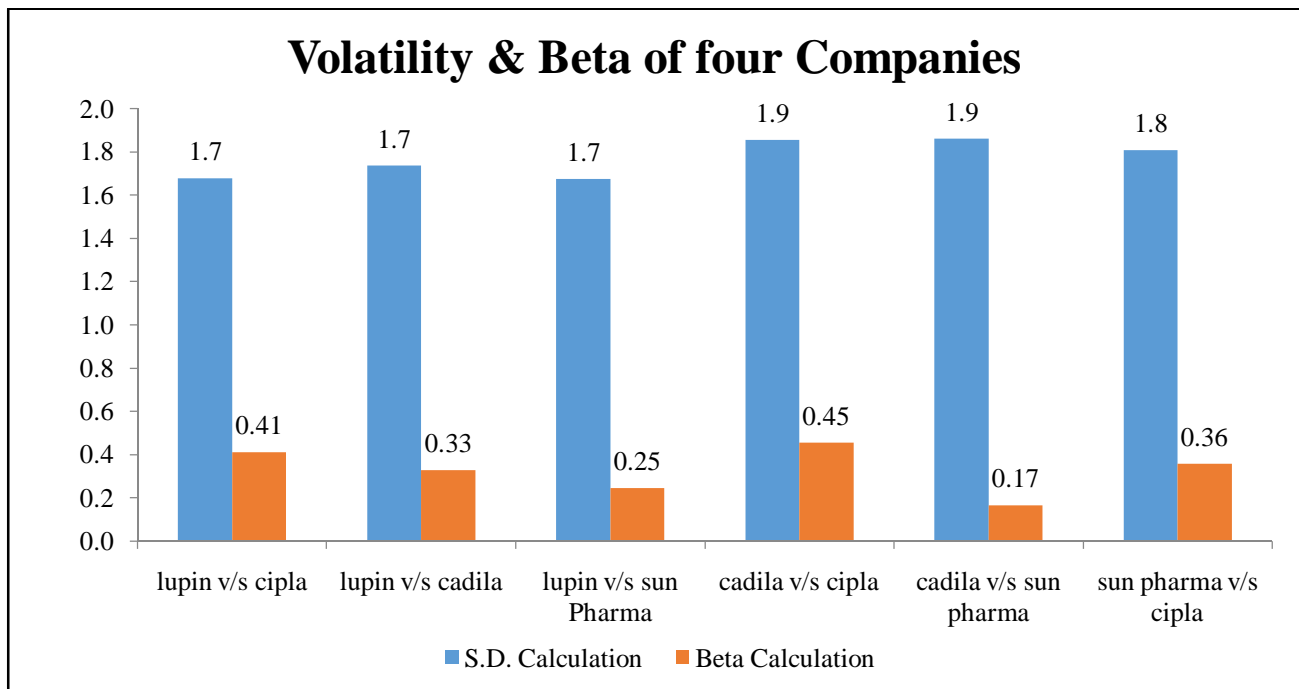


Figure: 3

5.4. Future Risk and Return on Stock with probability at different levels

The % change sort value has been calculated on the basis of return change with the help of excels function and probable cumulative distribution carried out to predict future risk with different parameter.

Company	Future Stock Return Prediction with Probability					
	40%	50%	60%	70%	80%	90%
Sun Pharma	0	0.1819505	0.7714561	1.2934558	1.5478516	2.4636391
Cipla Ltd	-0.118168	0.107867	0.34426	0.972222	1.509291	2.138963
Lupin Pharma	0.0498	0.36779	0.83477	1.35628	2.15816	2.57553
Cadila Ltd	-0.0356	0.06209	0.38188	0.71518	1.80579	2.48747

Table 3: Prediction on Future Stock Return with CDF

Table No 3 shows that Sun Pharma, Cipla Ltd. And Cadila Ltd. all have shown no or negative return at 40 percent probability. Only Lupin Pharma has shown a higher return with 40 percent probability. With 50 percent probability Lupin Pharma and Sun Pharma have shown higher return. At 60 percent probability higher return is expected on stock of Lupin and Sun Pharma companies. Overall Lupin Pharma is expected to provide higher return with 70 percent, 80 percent and 90 percent probability.

6. Conclusion

Based on Price movement and stock volatility analysis higher stock volatility has been noted in Cadila Ltd. which is placed at the first position, Sun Pharma stood at the second position, Cipla Ltd. at third position and Lupin Pharma at last position with respect to their volatility. So the study concludes that there is a higher risk in Cadila Ltd and in Sun Pharma Ltd. Further, based on future prediction of stock return and risk with cumulative probability distribution, Lupin Pharma is expected to provide a higher return on its stock. Return share price movement of 'Cadila Ltd' has moved up steadily, whereas shares of 'Cipla Ltd', 'Sun Pharma', and 'Lupin Pharma' moved down steadily. Lastly we can conclude that the future risk on stock is high for Cadila Ltd followed by Sun Pharma, Cipla Ltd and Lupin Pharma respectively.

7. References

- i. BSE, N. &. (2008, jAN 22). www.bseindia.com. Retrieved April 5, 2015, from <http://www.bseindia.com/downloads/faqsrs.pdf>
- ii. Board, J., G. Sandmann, and C. Sutcliffe. (2001): "The effect of futures market volume on spot market volatility", Journal of Business, Finance and Accounting, Vol. 28, pp. 799–819
- iii. Clark, P. K. (1973): "A subordinated stochastic process model with finite variance for speculative prices", Econometrica, Vol. 41, pp. 135–55.
- iv. Clure, B. M. (2004). www.investopedia.com. Retrieved April 5, 2015, from <http://www.investopedia.com/articles/stocks/04/113004.asp>
- v. Devenow, A., and I. Welch.(1996): "Rational herding in Financial economics",
- vi. European Economic Review, Vol. 40, pp. 603–15.
- vii. finance, y. (2015, April 2). www.yahoofinance.com. Retrieved April 4, 2015, from <https://in.finance.yahoo.com/q/hp?s=SUNPHARMA.BO>
- viii. finance, y. (2015, April 2). www.yahoofinance.com. Retrieved April 4, 2015, from <https://in.finance.yahoo.com/q/hp?s=LUPIN6.BO>
- ix. finance, Y. (2015, April 2). www.yahoofinance.com. Retrieved April 4, 2015, from <https://in.finance.yahoo.com/q/hp?s=CIPLA.BO>
- x. finance, Y. (2015, April 2). www.yahoofinance.com. Retrieved April 4, 2015, from <https://in.finance.yahoo.com/q/hp?s=CADILAHC.BO>
- xi. Gannon, G.L. (2010): "Simultaneous Volatility Transmission and Spill over Effects", Review of Pacific Basin Financial Market and Policies, 13(1): 127-56.
- xii. Gulen, H. and Mayhew, S. (2000): "Stock Index Futures Trading and Volatility in International Equity Markets," The Journal of Futures Markets, Vol. 20, No. 7, 661-685.
- xiii. Ltd, C. (2014). www.cadilapharma.com. Retrieved April 4, 2015, from <http://cadilapharma.com/about-us/>
- xiv. Mieko Tanaka – Yamawaki and Saiji Tokuoka, Knowledge Based information and Engineering Systems (Volume4693, PP 597-603, 2007).
- xv. Merton, R. C. (1995): "Financial innovation and the management and regulation of financial institutions", Journal of banking and Finance, Vol. 19, pp. 461–81.
- xvi. Miller, M. H. (1993): "The economics and politics of index arbitrage in the US and Japan", Pacific Basin Financial Journal, Vol. 1, pp. 3–11.
- xvii. Mishra, P. K., (2010): "A GARCH Model Approach to Capital Market Volatility: The Case of India", Indian Journal of Economics and Business, Vol.9, No.3, pp.631-641,
- xviii. Pharma, S. (2014). www.sunpharma.com. Retrieved April 4, 2015, from <http://www.sunpharma.com/about-us/milestones>
- xix. Pharmaceuticals, L. (2010). www.lupinpharmaceuticals.com. Retrieved April 4, 2015, from <http://www.lupinpharmaceuticals.com/about.htm>
- xx. Staff, I. (2014, April). www.investopedia.com. Retrieved April 3, 2015, from <http://www.investopedia.com/university/stocks/stocks4.asp>
- xxi. www.ciplaltd.com. (2013). Retrieved April 4, 2015, from <http://www.cipla.com/about>
- xxii. www.investopedia.com. (2010). Retrieved April 5, 2015, from <http://www.investopedia.com/terms/b/beta.asp>