VOLATILITY IN INDIAN STOCK PRICES OF IT SECTOR

GURCHARAN SINGH*

In 1996, in one of his speech, Alan Greenspan, Chairman of the Federal Reserve Board in Washington, described volatility as "Irrational Exuberance". Some have referred to it as speculative bubble, some baby boom effect, whereas some have explained it as 'herd behaviour'. So what is it that these people are referring to...? "Volatility" as is called in stock market parlance. This high volatility has given sleepless nights to a lot of investors as well as market regulators. In India, the S&P CNX Nifty is the most scientific Index. The S&P CNX Nifty is a market capitalization – weighted Index i.e., price change in any of the Index securities will lead to a change in the index. All companies to be included in the Index have a market capitalization of Rs.5 billion or more. This necessitates the need for analyzing the risk and return relationship of the selected stocks constituting the Nifty index and their impact on the Nifty index. Furthermore an attempt is made to assess the volatility in selected stocks of IT sector.

I- Introduction

Volatility is difficult to analyze because it means different things to different people. In financial terms, volatility is: The degree to which the price of a security, commodity, or market rises or falls within a short-term period[1] there are several things to note about this definition. Most importantly, the definition specifically mentions price increases and decreases. People are usually most concerned about volatility during periods when prices decrease or go through a "correction." During an extreme bull market, no one (with the possible exception of investors with short positions) seems to care that the markets are exhibiting volatility. If the stock is labeled as volatile then the price will vary greatly over time. Therefore the more volatile a stock is, the harder it is to estimate its future price. Since volatility is directly associated with risk, the more volatile a stock is, the more risky it is. Consequently, the more risky a stock is, the harder it is to say what the future price of the stock will be.

---

* Reader, Punjab School of Management Studies, Punjabi University Patiala–147002

Computing the volatility

The simple measures of volatility are relatively complex because measurement of volatility requires a lot of information. Consequently, using any measure of volatility has both advantages and disadvantages. The two most common (and most useful) measures of volatility: standard deviation and implied volatility.

Significance of volatility

Volatility represents risk and is matter of concern for market participants for the simple reason that as an investor one would like to know how much risk is involved in certain decision making. For instance, a retail trader in stock markets would like to know the extent of risk he is exposed to. In general people don't like risk and hence, small investors will not invest in a volatile market. Volatility is also a matter of concern for the regulators. The volatility of the market influences the functioning of the capital markets. Excess volatility prevailing in the market drives away small investors from the market Besides this, it may strain the market clearing and settlement obligations leading to the investor's loss of confidence, which in turn reduces participation and liquidity of the market.[2]

Reasons of Stock Price Volatility

Investors are drawn to the stock market to make money, which is done by selling stock at a price higher than what it was originally bought for.[3] Since stock prices are largely connected to your moneymaking goals, it helps to understand their inner workings. Stock prices are established in the marketplace, but what exactly causes them to behave the way they do? Here are several factors that influence their movements:

1) *Latest Information on Stock Prices*

   Information is a crucial factor in the movement of stock prices as it is what the market uses to put a value on a stock at a certain price level. These are usually based on all data that the public has been made aware of. As the information is updated, the market adjusts the prices up or down depending on the way the market interprets that the information will affect the company's future earnings ability.

2) *Inflation and Stock Prices*

   Inflation is another influential factor that affects the motion of stock prices. History indicates that there had been a strong inverse correlation between low inflation and valuations. This is

because low inflation propels high multiples, and high inflation drives low multiples.

3) *Economic Strength of Market and Peers*
Company stocks have the propensity to track with the market, as well as with their sector or industry contemporaries. A lot of leading investment firms put significant importance on overall market and sector movements as major factors involved in the movement of prices.

4) *Psychological Issues on Stock Prices*
These prices are also greatly influenced by human behavior. Greed is one trait that can cause stock prices to increase more than it should. New information can elicit a frantic market, may cause an increase in prices, and may make investors disregard rational valuation, preferring instead to buy the stock to ensure they are not left behind. Fear can cause significant decreases in stock prices when investors rush for the exit in an effort to avoid losses.

5) *Supply and Demand*
Stocks that trade smaller volumes of shares do not have the liquidity of the more popular stocks. So, prices for these smaller ones are prone to fluctuations because of supply and demand. When a large shareholder wants to sell a large quantity of shares into a market with weak liquidity, that shareholder can considerably move share price.

6) *Uncertainty*
The movement of stock prices is also affected by a vague future. Prices do tend to bounce around a bit due to market apprehension and the unpredictable future. Because of the ambiguity of a company's future, volatility in stock prices is possible even without new information.

II- Literature Review

Various studies taken place throughout the globe. Some of the important contributions are as follow:

Chowhan and Shukla (2000) examined the fundamentalist view put forward by economists who argue that volatility can be explained by Efficient Market Hypothesis. On the other hand, the view that volatility is caused by psychological factors is tested. An empirical study of BSE Sensex and a set of representative stocks are carried

out to find the changes in their volatility in the last two years. The stock market regulation in introduction of rolling settlement and dematerialization as a measure of reducing volatility is put to test. Thus, the paper will help the investors as well as market regulators to make the markets more efficient

Beltratti and Morana (2004) study the relationship between macroeconomic and stock market volatility, using S&P500 data for the period 1970-2001. They found evidence of both long memory and structural change in volatility and a twofold linkage between stock market and macroeconomic volatility. In terms of the break processes, results show that there are frequent cases where the break in the volatility of stock returns is associated within few months with breaks in the volatility of the Federal funds rate and M_1 growth.

Kaur (2004) investigates the nature and characteristics of stock market volatility in India. The volatility in the Indian stock market exhibits characteristics similar to those found earlier in many of the major developed and emerging stock markets.

Singh (2005) analyzed effect of exchange rate on the capital market basically on the Sensex, concluded that there has a negative correlation in exchange rate and capital market .To justify the correlation he use the F test ,which also prove the both variables are dependent hence they have some relation.

Porwal and Gupta (2005) study examines the hot issue of volatility in the Indian stock markets and concluded that predicting stock market behavior is perhaps the hardest of tasks. Of all phenomena that occurs, the movement of share prices is arguably the toughest to anticipate or foresee-market movements can be driven by political, economic, social and, most importantly, psychological factors Though it cannot be eliminated, there are some ways to deal with volatility in a global economy.

Dua and Sen (2006) examines the relationship between the real exchange rate, level of capital flows, volatility of the flows, fiscal and monetary policy indicators and the current account surplus for the Indian economy for the period Q2 of 1993 to Q1 of 2004. The estimations indicate that the variables are co integrated and each granger causes the real exchange rate. The generalized variance

decompositions show that determinants of the real exchange rate, in descending order of importance include net capital inflows and their volatility (jointly), government expenditure, current account surplus and the money supply.

Joshi and Pandya (2006) examined the nature of volatility in Indian stock market. Various volatility estimators and diagnostic tests suggest certain stylized facts about volatility such as volatility clustering and mean reverting.

Sinha (2006) study models the volatility present in the inter day returns in the stock of the two major national indices of India. Sensitive Index or Sensex related to Bombay Stock Exchange (BSE) and Nifty associated with National Stock Exchange (NSE). The objective is to model the phenomena of volatility clustering and persistence of shock using asymmetric GARCH family of models. Research showed that EGARCH model successfully models the Sensex (BSE) data whereas it is GJR-GARCH which was able to explain conditional variance in the returns from Nifty (NSE).

Sonpal (2006) examines the most hazardous effect of the stock market meltdown, particularly if it continues over a period of times with the FIIs pulling out of the market progressively, is its impact on exchange rate .A depreciation of the rupee with a rise in the international oil prices, is bound to cause inflationary pressure in the economy.

Chaudhuri (2007) examines relationship between macroeconomic factors and stock market movements of Indian economy. It further uses the tools of technical analysis to examine the current state of Indian stock market and analyzes the movements in the market index.

Das and Pattanayak (2007) study reveals various explanatory variables, which are acting as major determinants of the stock price movements, are condensed into a few critical factors by the factor analysis and the relevance of these factors in influencing the stock market movements is explained in detail. These factors can be used as major analytical tools by the investors, corporates and the brokers to make rational and intelligent investment decisions.

The research study was undertaken with the following objectives. Along with the objectives the purview of the study and the tools used for analyzing the data are explicitly stated.

III- Objectives of the Study

- To analyze the return pattern of selected securities to examine their volatility.
- To compare the performance of the stock with that of the Nifty index.
- To assess the impact of the securities return on Nifty index performance.

IV- Research Methodology

Scope of the Study
Study was undertaken to analyze the performance of the selected companies from IT sector for the year 2007-08 and tried to compare their performance with Nifty index in the same period.

Research design:
The study was carried out to compare the selected industrial securities with the Nifty index using their returns, and to analyze the risk involved in each company in the sector and risk involved in the sector for investment. Thus the study undertaken was Descriptive study.

Sample size
IT sector was selected for the study and three companies i.e. Wipro, Infosys and TCS were selected based on the availability of the data and their consistent performance in the nifty index.

Sampling method
Judgmental sampling was used as sampling method. The sector and the companies in the sector were selected based availability of data and other factors like the investor base, volume of trading.

Collection of Data

The data were collected by means of Secondary data that include Internet, India Bulls Records NSE site and various magazines.

V- Analysis and Interpretation

The raw data collected, from the secondary sources, was processed. Various tables, graphs and tests have been made and conducted in order to do the analysis. The results of the analysis and interpretation have been shown below:

Table 1.1.A:

Return pattern of the companies in the IT Sector from 1st Feb, 2007 to 31st Jan, 2008

Name of the company/ Months	Wipro	Infosys	TCS
Feb	-0.083	-0.076	-0.066
Mar	-0.005	-0.028	0.034
Apr	0.022	0.016	0.026
May	-0.049	-0.062	-0.046
Jun	-0.046	0.003	-0.049
Jul	-0.041	0.016	0.006
Aug	-0.030	-0.061	-0.080
Sep	-0.046	0.021	-0.004
Oct	0.102	-0.029	-0.021
Nov	-0.092	-0.128	-0.025
Dec	0.141	0.104	0.064
Jan	-0.196	-0.153	-0.189

Source: The calculations have been done on data obtained from NSE website.
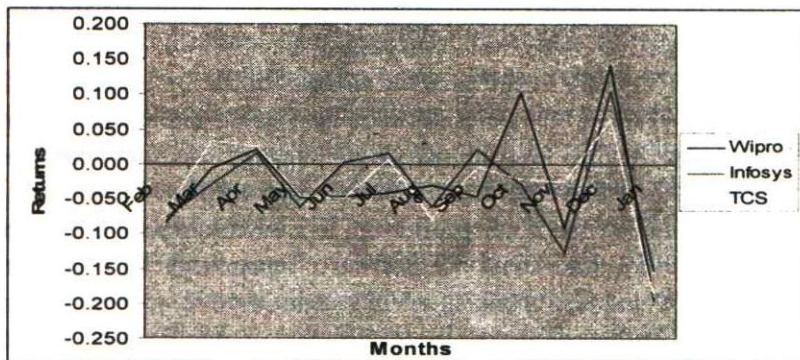
Source: Compiled from Table 1.1A

Chart 1.1.A
Return pattern of the companies in the IT Sector
from 1ˢᵗ Feb, 2007 to 31ˢᵗ Jan, 2008

Table 1.1.B:
Standard Deviation (Volatility) and Beta Values of the
companies in the IT sector from 1ˢᵗ Feb, 2007 to 31ˢᵗ Jan, 2008

Months	Wipro		Infosys		TCS	
	Standard Deviation	Beta	Standard Deviation	Beta	Standard Deviation	Beta
Feb	0.02657	1.37070	0.02033	0.92345	0.01759	0.93812
Mar	0.03442	1.40305	0.02582	1.03025	0.02871	1.14530
Apr	0.02665	1.08250	0.01991	0.74909	0.01918	0.66419
May	0.01123	0.48372	0.01284	0.73541	0.01117	0.48608
Jun	0.01020	0.30320	0.00890	0.07336	0.00880	0.14849
Jul	0.01553	0.89885	0.01635	0.38478	0.01992	0.84944
Aug	0.02139	0.72630	0.02058	0.59152	0.01935	0.74557
Sep	0.01767	0.49447	0.02060	0.54277	0.01700	0.66476
Oct	0.01835	0.17521	0.02405	0.17338	0.02055	0.08312
Nov	0.02364	0.91989	0.02430	0.85684	0.01970	0.82829
Dec	0.02851	1.02437	0.02459	0.52246	0.02312	0.89730
Jan	0.02519	0.37050	0.02666	0.52124	0.03393	0.81763

Source: The calculations have been done on data obtained from NSE website.

The stock prices of the companies in IT sector have been underperforming during most of period under study. These stocks gave negative returns almost during every month expect for a few positive returns. The major reason is the rupee appreciation of 10-15% in the last year. Such companies get most of their business from

US and other countries and due the deprecation in their value, the profit margin of major IT companies like Wipro, Infosys has declined. With every decrease in the value of dollar by 1%, the profit margin for every IT company declined by 0.25%.[15] This has become major cause for the low returns in this sector. Another reason is Budget 2007-08 have sprung an unwelcome surprise by imposing MAT of 11.23% on book profits on this sector. Apart from that Government did not extend the Software Technology Park benefits beyond 2009 and also included ESOPs under the Fringe Benefit Tax which has further impacted the sector in the worst way[16]. It is observed that company like Infosys' net margins will be impacted by 1.5% due to MAT. Moreover high employee remuneration put some pressure on the stock prices in short term .Such as IT majors hiked salaries in the range of 15-16 per cent for offshore employees, and about three-five per cent for onsite staff.[17] Though it is quite possible that companies may find it difficult to pass on such cost increases to clients in case of a slowdown in the US and another reason is high attrition rate in this sector, company's profits come under pressure and hence a decline in the stock prices is seen, like in IT services attrition moved up by 320 bps to 20.1% seems to be at high-end. Furthermore, addition of employees increase the cost as TCS added 5,827 employees (gross addition 8,613) during the fourth quarter, and the company has made 12,000 campus offers for FY08 it put some pressure on the stock prices.[18]

The return pattern of these companies is almost the same. Infosys and TCS are even closer and share the same pattern. Besides the above stated reasons the stock prices of both the companies are range bound. The returns vary from 10% to 10% (Table 1.1.A), thus keeping a return pattern stable.. In case of Wipro, the situation is no different just that it showed a sudden rise towards the end during the period of Oct and Dec, 2007. The company gave positive returns during the month of Oct after giving negative returns of around 4% for four to five months. The returns then rose to new hikes in Dec when the returns were 14% during the month. One of the probable reasons could be that in spite of the problems faced by the IT sector the company could boost up to the strong fundamentals. Another

could be the rumour which spread around that Wipro may bid for a French computer firm. Another reason is the strong business momentum should help companies cope with margin pressures, if any. Increase business from existing and · new clients make it optimistic about the long term earning potential like Infosys added 34 new clients last year, and the number of clients contributing over $1 million increased from 221 to 275, over FY07 and also Infosys continues to capture larger share of client through offering more services to drive growth. Similarly, TCS added 172 new clients, with the number of clients contributing in excess of $1 million increasing from 256 at the end of FY06 to 297 in FY07.

The beta values for all the three companies is less than one during whole of the period under study except for a month or two in a particular company. The stock of Wipro proved to be little risky during the months of Feb (-1.37), March (-1.40) and April (-1.08), as the beta was greater than one (Table 1.2.B). This means that it was fluctuating more than the market index and hence proved to be riskier than other two companies. In the later period the beta value of Wipro become stable and fluctuated less than the market index but was always more than the Infosys as its beta value never exceeded 0.026. Moreover this stock gave the least returns. So, Wipro stock always proved risky to invest in.

The standard deviation in the month of Mar and Apr, 2007 of Wipro, Infosys and TCS was 3.5% and 2.7%, 2.5% and 1.9%, 2.8% and 1.9% respectively. This reveals that the stocks of Wipro are most volatile. But later during the Jan, 2008 even TCS jumped into the race and became very volatile with standard deviation of 3.4%. This is because they showed larger difference between the actual value (closing price of the stock) and average value of the stock. These stocks are generally less volatile as the investors have lost their confidence in such stocks. The reason attributed to it that the stocks are laggard as the there is a slowdown in US markets, the place which gives most of the business to the IT companies. (Table 1.1.A and 1.1.B)

2. *Comparing the performance of the stock with that of the Nifty index.*

Table 2.1:
T Values of the companies in the IT sector from 1st Feb, 2007 to 31st Jan, 2008

Company Returns\ Months	Index Returns	Wipro Returns	Infosys Returns	TCS Returns
Feb	-0.08264	-0.083	-0.076	-0.066
Mar	0.02036	-0.005	-0.028	0.034
Apr	0.06970	0.022	0.016	0.026
May	0.05086	-0.049	-0.062	-0.046
Jun	0.00524	-0.046	0.003	-0.049
Jul	0.04876	-0.041	0.016	0.006
Aug	-0.01432	-0.030	-0.061	-0.080
Sep	0.12485	-0.046	0.021	-0.004
Oct	0.17511	0.102	-0.029	-0.021
Nov	-0.02337	-0.092	-0.128	-0.025
Dec	0.06522	0.141	0.104	0.064
Jan	-0.16309	-0.196	-0.153	-0.189
Mean Values	0.02306	-0.02690	-0.03143	-0.02903
t - Values		-1.43425	-1.72088	-1.68619

Source: The calculations have been done on data obtained from NSE website.

Hypothesis
H_o: The returns of the particular stock and the S&P CNX Nifty are moving in the same direction.
H_a: The returns of the particular stock and the S&P CNX Nifty are not moving in the same direction.

The above table was used to compare the performance of the different stocks with that of the Nifty Index. With the help of t-test, the return pattern of the stock and the index can be compared as the t-values help to compare the difference between the mean values. All the t-values are less than the t-table value, which means that the null hypothesis is accepted. This means that the there is no difference between the mean returns of the stock and the mean of the Nifty index. Thus, the performance of all the companies is comparable to the index. (Table 2.1)

3. Assessing the impact of the securities return on Nifty index performance

Table 3.1:
R Square Values of the companies in the IT sector
from 1ˢᵗ Feb, 2007 to 31ˢᵗ Jan, 2008

Company\ Months	NIFTY RETURNS	WIPRO	INFOSYS	TCS
Feb	-0.08264	-0.08292	-0.07554	-0.06612
Mar	0.02036	-0.00533	-0.02835	0.03389
Apr	0.06970	0.02181	0.01595	0.02606
May	0.05086	-0.04881	-0.06210	-0.04554
Jun	0.00524	-0.04644	0.00289	-0.04883
Jul	0.04876	-0.04070	0.01644	0.00605
Aug	-0.01432	-0.03016	-0.06137	-0.07952
Sep	0.12485	-0.04582	0.02060	-0.00395
Oct	0.17511	0.10190	-0.02922	-0.02089
Nov	-0.02337	-0.09169	-0.12787	-0.02486
Dec	0.06522	0.14110	0.10446	0.06441
Jan	-0.16309	-0.19576	-0.15303	-0.18902
R^2		0.35000	0.29000	0.42000
Weightage (%)		0.02080	0.02890	0.02880

The impact of the securities return on Nifty index is also not to a great extent even. In the above case only 35% of the variation in the dependent variable i.e. Nifty Index has been explained by the independent variable, the stock returns of Wipro. In the same way Infosys and TCS has impacted the Nifty Index by 29% and 42% respectively. The overall impact is less due a number of reasons. One of the reasons is that the stock prices of the IT Sector shares are range bound. Also due to the rupee appreciation in last one year, profit margins are declining, stocks of this sector are laggard, and hence the overall impact is less. Out of the above three stocks taken into consideration the share prices of TCS have the greatest impact on the Nifty Index. (Table 3.1)

VI- Findings

In this study an attempt has been made to see the return pattern and volatility of the selected securities. Some findings are as follows:

- The returns of the various stocks vary from time to time as this time span can be as short as a minute to even a longer period.
- The stock prices of the companies in IT sector have been underperforming during most of period under study. The main reasons of underperforming are:
  - ➢ Rupee appreciation
  - ➢ Higher employee costs subdue margins
    - ⚓ Salary Hike
    - ⚓ High Attrition Rate
    - ⚓ Addition of Employees
  - ➢ Disappointing Budget
- Besides the above stated reasons the stock prices of Infosys and TCS are range bound. The main reasons of outperforming are:
  - ➢ Increased business from existing and new clients
  - ➢ New added services offering to drive growth
  - ➢ Robust business growth momentum
  - ➢ Cash generating capacity of the business.
- The beta values for all the three companies is less than one during whole of the period under study except for a month or two in a particular company.
- The stocks of Wipro are most volatile. But later during the Jan, 2008 even TCS jumped into the race and became very volatile with standard deviation of 3.4%.
- These stocks are generally less volatile as the investors have lost their confidence in such stocks.
- There is a significant relationship between the performances of the stock prices of different companies as compared to the Nifty Index.
- The impact of the securities return on Nifty index is not *even* to a great extent.
- Wipro, Infosys and TCS have impacted the Nifty Index by 35%, 29% and 42% respectively.
- Out of the three stocks under study, the share prices of TCS have the greatest impact on the Nifty Index.

REFERENCES

Gary E. Mullins (2003), "Stock Market Volatility: Measures and Results", www.uwsp.edu /business/cwerb/3rdQtr00/SpecialReportQtr3_00.htm - 30k

Narayan sah Ash (2006) "Trend in Stock Market Volatility in recent Years", *Portfolio Organizer,* pp.31-34

Bohart, Allen (2007), "The Top 6 Stock Price Volatility Causes" *EzineArticles,*http://ezinearticles.com/?The-Top-6-Stock-Price-Volatility-Causes&id=781181

Chowhan Piyush and Shukla Vasant (2002), "Volatility in Indian Stock Market" ideas.repec.org/p/wpa/wuwpfi/0004010.html

Beltratti Andrea and Morana Claudio (2004), "Breaks and Persistency: Macroeconomic Causes of Stock Market Volatility",ideas.repec.org/p/upo/upopwp/20.html

Kaur Harvinder (2004), " Time Varying Volatility in the Indian Stock Market",*Vikalpa,* Vol. 29,No.4,pp. 25-42

Singh Shailender (2005), Effect of Exchange Rate on Capital Market (A case of Bombay Stock Market)",The *Gumbad Business Review,* Vol. 1,No 1, pp.*75-85*

Porwal Hamendra & Gupta Rohit (2005), "The Stock market volatility", *The Journal of Accounting & Finance,* Vol. 20 ,No.1,pp. 31-44(computing the volatility)

Dua Pami and Sen Partha(2006), "Capital Flow Volatility and Exchange Rates: The Case of India", econpapers.repec.org/paper/cdecdewps/144.htm

Joshi Prasant and Pandya Kiran(2008), "Exploring Movements of stock Prices Volatility in India", *The ICFAI Journal of applied Finance,*Vol.14,No. 3,pp 5-35

Sinha Bhaskkar (2006), "Modeling Stock Market Volatility in Emerging Markets: Evidence from India", papers.ssrn.com/sol3/papers.cfm? abstract_id=954189

Sonpal Amy(2006), "Butterfly effect on the stock markets", *Treasury Management,* pp23-28

Chaudhuri Tamal(2007), "Why does the Indian stock market move the way it does?", *Portfolio organizer*

Das Nilandri and Pattanayak J K (2007), "Factors Affecting Market Price of Sensex Shares", *The ICFAI Journal of Applied Finance,*Vol.13, No. 8, pp.33-49

BS Reporter,(2007),"Depreciating $ ", *Business Standard,* p.5

Singh Om Prakash(2007), "Budget disappoints IT sector", http://news.moneycontrol.com/india/news/economy/itsector/matunwelcomesur/market/stocks/article/269357

Mehta Dipesh (2008), "IT Sector Update", http://www.valuenotes.com/ksl/KSL_IT_12May08.asp?ArtCd=133597&Cat=1&Id

Mehta Dipesh (2008), "Tata Consultancy Services (TCS)", www.moneycontrol.com /news_html_files/news_attachment/2008/Dy150408%20(Khandwala).pdf

Niren Shah (2007), "Why a strong Re is no threat to IT cos", http://www.rediff.com/money/2007/may/02it.htm

Nandita Datta (2003), "Wipro: Under pressure" http://www.outlookmoney.com/scripts/IlH021C1.asp?sectionid=1&categoryid =9&articleid=4399