CHAPTER:-3.

RESEARCH METHODOLOGY.
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CHAPTER:-3

RESEARCH METHODOLOGY.

1. INTRODUCTION:

Volatility is the most basic statistical measure of risk. It can be used to measure risk of single instrument or an entire portfolio of instruments. The volatility of assets indicates the variability of its returns. In day to day practice, volatility is calculated for all sorts of random financial variables such as stock prices, interest rates, and the market value of portfolio, etc. stock market volatility means different things to different people. Most academic studies have defined volatility in terms of statistical measures of the variability of stock price changes. These measures are useful because they correspond to standard measures of risk in theories of portfolio selection and asset pricing. Many investors, however, seem more appropriate to define volatility as episodes of extreme or rapid do not obviously affect measures of volatility calculated over longer time periods. Volatility is defined in terms of statistical measures of the variability of percentage price change or rate of return. The most commonly used statistical measure of volatility is standard deviation of returns, or stock price, in part because it is used as a standard measure of risk in theories of portfolio selection and asset pricing. The standard deviation measures the dispersion of returns or the degree to which they vary from period to period, the period being a month, day and even hour or minute. Thus, volatility can be calculated for minute-minute returns. For instance, if the standard deviation based on daily close to close percentage price change for a month is 10%, it is very unlikely (that is, there is about a 5% change ) that an investor will experience return outside a range of plus or minus 20% over that month. An important aspect of volatility is its emphasis on the variability, rather than the direction of price movement. For instance, the price movement could be upward, downward or flat, but in all the three despite the direction of the trend. Hence the variability of price changes, i.e. the volatility, would almost be the same in all the three cases. Generally, there is a concern among investors, regulators, brokers, dealers
and the press over the level of stock market volatility. However, the perception that
prices move a lot is sometimes a reflection of the historically high levels of popular
stock indices. In some cases, this is a reflection of the absolute levels that the local
market indices may have reached in recent years relative to the level at which these
were launched. This creates perceptions of high volatility just by the number of points
involved in a move that in percentages from is relatively small. Another factor in
some markets is that the analysts and traders are now much personally excited about a
2% move in market values because of the large position that they and their firms
carry. The stock exchanges sometimes experience very short lived but sharp changes
in prices of individual stocks. Such sharp changes can result from the demands of an
aggressive fund manager for immediate execution of large orders. Adherence to
insider trading and timely disclosure requirement may also play a role. In effect, less
leakage of information prior to the formal announcement, for example of a takeover
bid or cessation of negotiations, result in sudden changes of market prices. The
relative rate at which the price of a security moves up or down volatility is found by
calculating the annualized standard deviation of daily change in price. If the price of a
stock moves up and down rapidly over shorter time periods, it has volatility daily
those periods. If the price is going (never) change so it has low volatility.

Volatility is a statistical measure of the dispersion of returns for a given
security or market index. Volatility can either be measured by using the standard
deviation or variance between returns from that same security or market index.
Commonly, the higher the volatility the riskier securities. In other words, 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 boost out
over a larger range of values. This means that the price of the security can change
dramatically over a short time period in either direction. A lower volatility means that
a security's value does not fluctuate dramatically, but changes in value at a steady
pace over a period. The concept of volatility refers to a variable degree of
unpredictable change over a time. To most investors risk represents the volatility of an
assists price, it is typically expresses as the standard deviation of the change in value
of assets over a given period typically one year volatility therefore reflects the risk
taken by someone with exposure to said variable or assets. The more volatility the
price of an assets the riskier the assets will be. Volatility is however much more than
the standard deviation of an asset’s price over time. It is a critical input in valuing options and other derivative instruments. As much, measures of volatility historical and prospective impact the valuation and return of a wide range of financial instruments, from interest rates to futures, it also acts as a barometer of investor sentiment while high levels of volatility signals a stronger attitude for risk. It is widely accepted that large fluctuations in returns carry important negative effects on risk adverse investors. Besides, they have important economic implications, especially for the flow of funds from abroad. Volatility is caused by a numbers of factors ranging from technical or short term to fundamental; these included trading practice like the length of settlement cycle, facility for carry forward of transaction, corporate announcements, government budgets, industrial productions, the overall economic condition, including the policies, growth rate etc.

2. THE PROBLEM:

A number of important research works have been done by various researchers on price volatility. In the capital market price volatility is useful theme for research works; it is often used by researchers for measurement of volatility in indices like SENSEX, S&P CNX NIFTY. The volatility is caused by many variables like fundamental factors like inflation, interest rate, taxation policy, export-import of the nation etc. Other side technical variables also causes for volatility in stock market. Volatility is most crucial aspect for investment point of view because volatility of index and individual stock shows variations in return or variability of expected return. Therefore investors can know about returns variability and future path of return. Sometime expert uses analysis volatility for finding most volatile share or index in his or her portfolios. However the volatility of stock cannot be predicted precisely. After reviewing many researches on price volatility researcher has selected the problem for research “Analysis of volatility in Stock price of BSE-100 companies in India.”

3. REVIEW OF LITERATURE:

There are many research related literatures exiting in stock price volatility, for this study purpose the researcher has reviewed articles, journal, reference books, magazines, news papers and other publications like local publication reports on price volatility. Out of all these few have mentions as a literature for study.

This paper shows the rational expectations and price movement theory. In a world of rational expectations, unexpected dividend announcement would transmit messages about changes in earnings potential, which were not incorporated in the market price earlier the re-appraisal that occurs as a result of these signals leads to price movements, which took like responses to the dividends them severs, though they are actually caused by an fundamental revision of the estimate of earnings potential.

(2) Jeffrey M. Lacker, John A. Weinberg, (1990), Takeovers and Stock Price Volatility

In this research paper attempts made to measure the takeover activity and stock price volatility. This paper showed the two crisis periods included 1989, and 1987, there was an atmosphere of takeover activity and stock price volatility, so that study suggested that possible link between takeover activity and stock price volatility.


This empirical paper focused on (1) to separate factors suggested by investment theories and practices and to observe their ability to jointly explain share price volatility on the developing Kuala Lumpur Stock Exchange (KLSE) and (2) to evaluate the applicability of Gordon's share valuation model on the KLSE. The findings suggested that five of the six suggested variables jointly explain 23 per cent of price changes on the KLSE for the period 1975 to 1990, and two of these factors were significant at 5 per cent level. Gordon's model holds well with F-statistics significant at 5 per cent level, R-squared is 70 per cent, and the signed of the coefficient of dividend and earnings growth variables were in the predicted direction. Contrary to popular belief, fundamental factors come out to be a significant force influence share price changes on the KLSE.
This paper presented a comprehensive study of the interactions among returns, volatility, and trading volume between the U.S. and Japanese stock markets by using intraday data from October 1985 to December 1991. By examining the effect of foreign price volatility and trading volume on correlations between foreign and domestic stock returns, the paper aims to distinguish between the market contagion and informational efficiency hypotheses in order to explain the cause of international transmission of stock returns and volatility. Major findings were three-fold: (1) contemporary correlations of stock returns across these two markets were significant and tend to increase during a high volatility period, which supported the informational efficiency hypothesis; (2) lagged volatility and volume spillovers were not found across the two markets; (3) the effect of the New York stock returns on the Tokyo returns exhibited a structural change in October 1987.

This research paper was written by Aggarwal. He examined the events that caused large shifts in volatility in emerging markets. Both increases and decreases in the variance were identified first and then events around the period when volatility shifts occurred were identified. They found the dominance of local events in causing shifts in volatility. Volatility was high in emerging markets and shifts in volatility are related to important country specific political, social, and economic events. Mexican crisis, hyperinflation in Latin America, Marcos- Aquino conflict in Philippines and stock market disgrace in India were some of the local events that caused significant shifts in volatility. Among global events, the October 1987 crash has caused significant volatility shifts during the study period 1985-1995.

This paper examines the ability of rational economic factors to explain Stock market volatility. A simple model of the economy under uncertainty Identifies
four determinants of stock market volatility: uncertainty about the Price level, the riskless rate of interest, the risk premium on equity and the Ratio of expected profits to expected revenues. In initial tests these variables have significant explanatory power and account for over 50 per cent of the variation in market volatility from 1929 to 1989. When the regression coefficients were allowed to vary over time using cluster regression, the four factors explain over 90 per cent of the variation in market volatility. The results are useful in explaining the past behavior of stock market volatility and future volatility.


In this research paper attempt made for a stock price volatility and equity premium, whereas a dynamic general equilibrium model of stock prices was developed which described a stock price volatility and equity premium that were the historical values, non-observability of expected dividend growth rate introduces an element of learning which increases the volatility.


In this paper, she tries to explore many questions with relation to Indian Stock Market indices, and U.S Stock Market Indices. She used daily closing price data of BSE-SENSEX, NSE-NIFTY, NASADAQ and S&P-500 indices for the periods of jan-1993 to march-2003. She used volatility models like GARCH (1.1), EGARCH (1.1) and TARCH (1.1) for analysis of the nature of Volatility and stock return of Indian Stock market indices (SENSEX and NIFTY). The result of the study showed that, (1) Indian stock markets display autocorrelation and negative asymmetry in daily return. (2) Feb and March were high Volatile months and also high return months, December month provided good opportunity to invest because of high and positive return with low volatility. (3) There was no day of the week effect (4) E-GARCH model better fits with BSE-SENSEX, and TARCH model better fits with NSE-NIFY.(5) There was a mixed overflow between U.S market with Indian Market, whereas S&P-500 was significant positive correlation with Nifty return. While NASADAQ return was a significant weak positive correlation with SENSEX, but volatility image was different, there was a negative volatility between U.S markets with Indian Stock markets.

This paper reports on case study the measure of variability that is based on past prices that conforms to the present variability has been conceptualized as “volatility” in financial market. Thus, volatility as a concept can be treated as synonymous with variability in general or variance in particular. In this paper an attempt made to examine the volatility at the level of specific industries or companies in an industry. Computer Software and Drugs & Pharmaceuticals industry have been taken. From the analysis we found that Computer industry is highly volatile while the drug is a stable one.


In this paper they analyzed stock market return and volatility of emerging markets and developed market with the help of stastical techniques for long run period, they found amongst emerging markets except India and china, all other markets provided low return and high volatility. Indian provided high return in long run period whereas China provided high return in short run period. They also found that large asymmetry in developed markets whereas Indian market showed lower skewness and kurtosis, Indian markets becoming more informational in recent time; it reduced intraday volatility compare to past time.


She used 50 different sector companies from the both indices, she used daily closing price of the both indices as well as individual stocks, result explored that there was a leverage effect presence, she used ARCH, and GARCH (1.1) models, where as she found strong evidence of ARCH effect in stock prices, and indices return, where as GARCH (1.1) suggested persistence of volatility and shock of conditional variance takes a long time to die out. The result revealed that electronic sector companies high volatile than other sectors companies during the study period.

In this research article, study covered periods of 1935 to 1992, and spread over 58 years time period. He used average level of stock price volatility and compared with current period, for analysis purpose he used capital stock and share index. It calculated and published by capital magazine on a monthly basis for the period of 1935 to 1960, and other Economic Time index number. It is calculated and published on daily basis for the period of 1961 to 1992, volatility of stock were compared with the help of standard deviation of daily stock returns’ difference. He used monthly return’s deviation as volatility for the period of 1935 to 1992. Their decade analysis showed that in 40’s was a high change in volatility cluster in that booming period, and share mania in 80’s which continued up to 1992. The result explored that out of 25 volatile months, only 2 months was relevant to the composed period of 60’s and 70’s. It was a concluded that there was high increased in volatility in 1992, so it suggested that government should takes secure steps for reform stock market activities for reduce future volatility in market.


This empirical evidence suggested that we present a theory of excess stock market volatility, in which market movements are due to trades by very large institutional investors in relatively illiquid markets. Such trades generate significant spikes in returns and volume, even in the absence of important news about fundamentals. We derive the optimal trading behavior of these investors, which allows us to provide a unified explanation for apparently.

This paper was on volatility of daily stock return of Indian stock market during the period of 46 years (1961-2005). He analyzed combined data set of script and index (Economic Times and S&P CNX Nifty) ,he used two models for testing the return volatility in two different period ,pre-1990 and post 1990 through GARCH(1,1) and TARCH(1,1).first model he used and found that volatility is only time varying, and he found that there was slightly reduction in volatility pre-1990 due to bad news, whereas he also found that there was a substantially increased in volatility in post-1990 due to bad news(EMH),there was only an asymmetry in volatility.


In this paper attempt is made to measure two models like asymmetric model, and symmetric models, application for volatility, by considering four major market indices like SENSEX, BSE-100, S&PCNX-500 and S&P CNX Nifty for period of 1995 to 2005. In this comparison, he found that Exponential GARCH (EGARCH) is empirically proved as the suitable model to explain the asymmetric behavior of these indices. The study also traces the news impact curves (NIC) for these indices to make sense of the nature of asymmetric volatility.

Under this research paper emphasis made on daily stock prices during the fiscal year 2005/06 (July 16, 2005 through July 16, 2006), this paper described the stock price behavior of commercial banks in Nepal stock market. The results of serial correlation and run tests concluded that the proposition of Random Walk Hypothesis (RWH) in Nepal stock markets does not hold true. This conclusion corroborates with the conclusions of the past studied carried out in Nepalese context.


This paper explained the dynamics of stock price changes of emerging stock markets, (Bangladesh, U.S.A, Japan, and India) whereas they used daily closing price data for the periods of Jan-1990 to Dec-2000. The major index was taken of selected nation stock exchanges like DSE, BSE-30, and NIKKI 225 S&P 500 etc. They used two major approaches like Johansson Multivariate Co-integration and vector error correction model, for measurement of Long run relationship and short run relationship between international stock markets. Vector Autoreggration model was used to assess the shocks of these markets and their impact of own market as well as other markets. The result showed that there was a evidence of long run co-integration between these markets and suggested that there was a randomness in shocks of these stock exchanges. It also showed that stock price large changes of U.S Market had impact on DSE where as heavily change in Indian Stock Market hadn’t impact on DSE as well as NIKKI 225 also hadn’t impact on DSE.

The intention of this paper was to apply the GARCH model to the major stock exchanges of the India like BSE-SENSEX, NSE-NIFTY. GARCH model was applied to analyze the nature of the volatility of the indices in both markets. The findings suggested both the Indian stock exchanges were significant ARCH impact and found leverage effect that means the investors in these markets are not grown well and they will be heavily affected by bad and good information.


This study seeks to examine the relationship between dividend policy and stock price volatility. By using the cross-sectional regression analysis after controlling for earning volatility, payout ratio, debt, firm size and growth in assets, this paper identified that there was an evidence of positive, but non-significant relationship between stock price Volatility and dividend yield. An important implication of this study was that, the share price reaction to the earnings announcement is not similar to that of other developed countries.


In this paper investigation is made for analyze the impact of macroeconomic uncertainly on stock price volatility in Ghana stock market. The method of analysis is in two stages, the first stage estimated univariate volatility models for each macroeconomic variables, namely consumer index(inflation) exchange rate, money supply interest rates, oil price gold price, and cocoa price using the (E GARCH) model, and in second stage volatility effect of macro variables on stock prices is estimated using the most recent squared residual from the mean-conditional variance of macroeconomic variables as
exogenous variables in the conditional variance equation of stock price, the result of the study showed that high volatility in cocoa price and interest rates.

(21) Dr Mrs. Punithavathy Pandian and Dr Sir Queenly Jeyanthi (Jan-2009). “Stock market volatility in Indian stock exchanges.”

This research paper is based on two major Indian stock exchanges like BSE, NSE where as researcher has used SENSEX and NIFTY as standard indicator of market volatility and Market return. They used various techniques in this paper for study propose, the result of this paper showed last ten year (1998 to 2008) situation of induces return and volatility and also difference phases of market like bear and bull during the study period.


This paper examined the volatility in the individual stocks which listed at National Stock Exchange. They used daily closing price data of 29 companies, which was covered periods of 1996-97 to 2006-07. They used standard deviation of daily return of stocks, whereas they found that ACC, HDFC, ITC, MTNL, SBIN, and SIENENS were less volatile than other securities. Other side other securities like BAJAJAUTO, DRREDDY, GLAXO, GRASIM, HDFCBANK, INFOSYSTC, M&M, TATAPOWER and VSNL were high volatile during the study period, further study revealed that after 2000-01 volatility comparatively less in all individual securities than preceding period.


This paper is used ANOV technique and GARCH, TGARCH and Eagle-Ng (1993) tests to examine stock price volatility of 36- integrated firms in upstream and downstream sectors of global oil supply chain. The result showed that companies in R&M sector have significantly higher profit margins and higher return to equity shares. Other Sid, R&M companies
exhibit a significantly higher degree of volatility than all price volatility of all companies. These findings suggest that upward and downward streams companies did not differ from one another in terms of their response to market based information.


In this paper they examined the short run lively relation between daily institutional trading and stock market volatility in retail investor in dominated emerging stock markets. The study revealed that there was a negative lively relation between volatility and net trading by Institutional investor due to unforeseen trading by the Institutional investor. The result showed that relational between stock price volatility and trading by in situational investor were determined by the informational and non-informational trading, there was a negative relation between the stock price volatility and trading by institutional investor due to informational trading by them.


In this research work, attempt is made to measure the stock price volatility, whereas a simple overlapping generations model with constant fundamental in which the stock price volatility and negative autocorrelation even without changes in dividend. Result showed that the aggregate consumption wealth ratio predicts the assets return. This framework may be useful in understanding different stylized facts in assets pricing.


This research paper described the nature and Volatility of National Stock Exchange(NSE) main indices S&P CNX NIFFY , by taking into account daily price data from Jan-2000 to Sep-2007, Various models used and they
described some facts like volatility clustering, Mean reverting ,and asymmetry. This paper also suggested asymmetry volatility through family of ARCH models wherein he found that GARCH Model best fits with data than ARCH model or EGARCH and TARCH model were better than the Traditional GARCH Models. The Forecasted TARCH and EARCH measures showed that impact of news was asymmetric, it indicated that there was existence of leverage impact in future stock price, the leverage impact was found best with TARCH model in Nifty whereas ARCH-M Model found that there was no evidence for High return during the high Volatility period.


In this paper attempt made to determine association between stock market and economic variables variability. Where as they used various model like AR (k)-EARCH (p,q), LA-VAR and Granger Causality, they tested Nigeria stock Exchange data for 1986 to 2010 using time serious data. The result found that there was a fundamental relationship between the stock market volatility and real GDP, but there was not found fundamental relationship between the Interest rate and inflation rate. This paper suggested that in order to reduce the stock market volatility government should takes pro-active position in construction of a steady market through the interest of public in the market.


In this paper investigation made on political crisis and performance of the companies, in examining the effects of corporate governance and performance on price volatility and the markets overreaction during the political crisis in Taiwan in 2004, result showed that companies with better corporate governance or performance having less stock price volatility during a political crisis, but result also show that corporate performance and ownership structure have significant effects on stock price volatility.

In this study investigation made between two stock Markets,(Indian Stock Market, and Canada Stock Market, whereas they taken data of daily closing price for the periods from Jan-2002 to July-2009, Various volatility analytic tests suggested certain details about volatility like volatility clustering, and mean reverting behavior. ARCH L-M test suggested presence of conditional heteroscedasticity in both stock markets, the result showed that the GARCH (1.1) model successfully confine the time varying volatility in the both stock markets. Finally result showed that presence of volatility in Indian stock market was marginally less than that of Canadian stock market.


In this research article he used various model in Indian stock markets return volatility, models like ARCH, GARCH and EGARCH (1.1), TARCH. The study found that there was a strong evidence of ARCH effects in return of markets in high stock return volatility period, and also large variability in volatility. Asymmetric effects found in almost all indices in study. The study also showed that there was leverage impact as well in the market, investors in Indian markets are no mature and they are easily affected by good and bad information, also volatility was more responsive in bad information period. In the entire study periods EGARCH (1.1) model appeared strong than GARCH (1.1) and TARCH (1.1) models, where as conditional variance were modeled with ARCH and GARCH model.

4. METHODOLOGY:

The problem:

The problem for the study “Analysis of volatility in Stock price of BSE-100 companies in India.”
Objectives of the study:

(1) To study price volatility in BSE-100 companies.
(2) To understand price volatility trend of stock market indices.
(3) To find most volatile shares in BSE-100,
(4) To study the co-relationship among the EPS, P/E ratio, and market price of stock.

Universe of the study

The universe of the study is consisted all listed companies in stock exchange of India.

Sample design:

BSE-100 Companies.

Hypothesis for the study:

(1) Ho: There would be no significant difference between in share’s Average prices within sample units during the study period.
(2) Ho: There would be no significant difference between in share’s high prices within sample units during the study period.
(3) Ho: There would be no significant difference between in share’s low prices within sample units during the study period
(4) Ho: There would be no significant difference between in volumes of Shares within sample units during the study period.
(5) Ho: There would be no significant difference between in Number of Trades within sample units during the study period.
(6) Ho: There would be no significant difference between in Turnover Within sample units during the study period.
(1) **Average:**

Average is most commonly used tool for analysis also known as arithmetic mean, briefly referred as mean. The average can be found by adding the values of all variables and dividing it by total number of variables.

(2) **Standard deviation:**

The concept of standard deviation was introduced by Karl Pearson in 1823. It is most widely used measure of dispersion. It is denoted the Greek letter “σ” called as sigma.

(3) **T-test**

T-test is based on t-distribution and is considered an appropriate test for judging the significance of a sample mean or for judging the significance of difference between the means of two samples in case of small sample(s) when population variance is not known (in which case we use variance of the sample as an estimate of the population variance). In case two samples are related, we use paired t-test (or what is known as difference test) for judging the significance of the mean of difference between the two related samples. It can also be used for judging the significance of the coefficients of simple and partial correlations. The relevant test statistic, t, is calculated from the sample data and then compared with its probable value based on t-distribution (to be read from the table that gives probable values of t for different levels of significance for different degrees of freedom) at a specified level of significance for concerning degrees of freedom for accepting or rejecting the null hypothesis. It may be noted that t-test applies only in case of small sample(s) when population variance is unknown.
(4) Analysis of variance

Prof. R.A. Fisher was the first man to use the term variance and in fact, it was he who developed a very elaborate theory concerning ANOVA, explaining its usefulness in practical field, ANOVA is essentially a procedure for testing the difference among different groups of data for homogeneity. There may be variation between samples and within samples items. ANOVA consist in splitting the variance for analytical purpose. Hence it is a method of analyzing the variance to which response is subject into its variance components corresponding to variance sources of variance.

Period of study, Data collection and data analysis:

The study will be based on secondary data published by BSE, in their websites as well as reports. In addition to that, financial literature and published articles on the related aspect will be also included. The study will be made for last six years from 2005-06 to 2010-11. The collected data will be duly edited, classified and analyzed by using all type of relevant statistical techniques and employing the most appropriate parametric and non-parametric test.

Outline of chapter plan:

The study divided in five different chapters, these chapters are as under.

Chapter: - 1

Conceptual framework of capital market & price volatility

It consisted by all conceptual aspect of capital market likes history, functions, significance. It also disclosed all conceptual frame work of price volatility.

Chapter: - 2

Profile of the samples:

It included overviews of BSE-100 Companies in Detail.
Chapter: - 3

Research methodology:

This chapter includes problem identification, review of literature statement of problem, objective of study, hypothesis, scope of study, sampling design, period of study, data collection and data analysis, tools and techniques for analysis of price volatility and limitations of study.

Chapter: 4

Data Analysis & Interpretation

This chapter will disclose data’s classification, tabulation according to need of analysis. It will also include interpretation of data, statically results like hypothesis testing.

Chapter: 5

Summary, Findings, and Suggestions.

This chapter will include summary part of all chapters and finding part on the basis of data analysis and suitable suggestions.

Limitations of the study:

(1) This study is based on secondary data taken from publisher reports of BSE day to day on website. So it depends entirely on the accuracy and reliability of such types of data.
(2) The researcher studied only BSE-100 companies, these will not show full volatility trend of Indian stock market.
(3) The researcher studied only on Equity shares price volatility.
(4) The researcher adapted some of the formula used in study, the randomness, if any, in the alteration of the formula will also affect the results of the study
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