

A COMPARATIVE STUDY ON BENCHMARK (NIFTY, SENSEX, and SX40) OF VOLATILITY IN INDIA

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ABSTRACT: The study of volatility of Indian market has been emphasized on 3 national stock exchanges equity base indices namely NIFTY, SENSEX and SX40. ADF (Augmented Dickey-Fuller Test) has been applied for the stationarity of the data regression models of ARCH, GARCH, TARCH, EGARCH, PARCH indicated that all 3 indices volatility is influenced by each other. Jensen co-integration of the data. The granger casualty test has given result that these indices were effected the economic factors. This analysis is useful for the short term investors like retailer, HNI, FI, MF Manger and FII.

KEYWORDS: NIFTY, SENSEX, SX40, REPO RATE, IIP, GDP, INFLATION.

INTRODUCTION:

Volatility is defined as the degree to which prices of assets tend to fluctuate. It is the changeability or randomness of asset prices. Volatility is usually described as the magnitude of variation in prices. In finance, it is often referred to as Risk. In other words, Volatility is a rate at which the price of a security increases or decreases for a given set of returns. It is measured by calculating the standard deviation of the yearly returns over a period of time. It shows a range to which the price of a security may fluctuate.

There exist two schools of thought that have contradictory views on the reasons of volatility. The economists and their fundamentalist approach argue that these market fluxes can be exclusively explained with the help of the information that is provided to the market. They have made efforts to put forward theories to explain this circumstance and use these theories to predict future revision in the prices. Since the efficient market hypothesis exists, therefore information changes influence the prices. Market volatility keeps modifying as and when new information flows into the market. Some others have argued that the volatility is not related to economic or external factors. The investor reactions exert a higher influence on the markets.

Financial markets show sudden movements, and stock prices may seem to appear too volatile to be rationalized by changes in fundamentals. Volatility as a phenomenon as well as a concept remains central to modern financial markets and research. The association between volatility and risk has been ambiguous to some extent, but stock market volatility is not necessarily undesirable. In fact, fundamentally justified volatility can form the basis for efficient price discovery. In this frame of reference, volatility dependence that implies predictability is acknowledged by traders and medium-term investors. The significance of volatility is comprehensive in the field of financial economics.

Equilibrium prices obtained from asset pricing models are influenced by variations in volatility. Investment management is dependent upon the mean-variance theory, while derivatives valuation is linked with reliable volatility forecasts. Portfolio managers and corporate treasurers, along with risk arbitragers closely monitor volatility trends, as changes in prices could have a considerable impact on their investment and risk-managing decisions.

OBJECTIVES:

1. To find the relationship between SENSEX, NIFTY, SX40.
2. To measure the risk and volatility of the 3 indices (NIFTY ,SENSEX,SX40)
3. To find the impact of 3 indices volatility with each other.
4. To measure the premium of 3 indices and compare with the performance tool.
5. To know the moment of security indices with INDIA economy.

SCOPE: This analysis of volatility has been emphasis from 1994-2014. In this research work 3 national equity stock exchanges base indices data has been considered volatility has been considering India VIX as the benchmark this study focuses on the intra effect of volatility on 3 indices equity market indicators were considered by economies has the mirror of national economy this analysis also focused whether Indian economic situation reflected by the indices during the study period.

NEED: A stock market indices fluctuation is a normal phenomenon because market indices react for every news which are from micro and macro perspective. High volatility of the market is considered as risky trend from the short term investor perspective. India is having three national equity stock exchanges where the investor's decision is also getting influenced by the other two exchanges indices if he prefer to invest in any one exchange. This analysis focused on these three indices intra-effect of volatility on each other, which is causing the investors decision making. There is a need to know the impact of these indices and compare with the volatility index. MCX-sx is also emerging as a leader in the equities market after it got listed in NSE and BSE.

REVIEW OF LITERATURE:

1. Rouf Ahmad Mir and Arshad Nabi Wani: Two nationalized stock exchange in India are (BSE) Bombay Stock Exchange and (NSE) National Stock Exchange. Stock index is considered as barometer of nation's economic health. Market price reflects expectations of the economy's performance. It measures overall market sentiment through a set of stocks which are representative in market and provides information to the investors regarding the average share price of the market. The index BSE and NSE that is both SENSEX and NIFTY reflects overall market, it shows up when economy is good and shows down when economy is in depression. Both these indices referred as benchmark indices of Indian economy.

2. M.Thenmozhi And Abhijeet Chandra: The Indian Volatility Index and Stock Market Returns have asymmetric relationship between them. The Nifty returns in India VIX levels are negatively relate. In case of high upward movement in the market returns on two indices will move independently. If the market takes a downward turn the relationship is not significant for higher quantities. The derivative products based on volatility index is used for portfolio insurance against bad declines. India VIX captures stock market volatility better than traditional measures including the ARCH/GARCH class of models; the property of this makes it deal as a risk management tool. The changes in the Indian VIX can be used as signal for switching portfolios is tested. If the Indian

volatility index increases by certain percentage then it will be used full in maintaining positive return on a portfolio.

3. Suhasini Subramanian: The impact of index futures on volatility and noise trading. Derivatives are considered as key cause of the October 1987 US market crash. Several studies say that index futures cause an increase in spot volatility because of dominance of rational or noise investors at futures segment. On the other hand several studies say that dominance of rational traders in futures market gives greater efficiency in future pricing, by reducing spot volatility. Also analyses theoretical approaches and empirical evidences relating to issues, and issues remain unsolved have gone into investigating the impact of index futures.

4. Anuragmehtal: The present project describes about the mutual fund industry in general. Based on total Asset Under Management (AUM). To find out the standard deviations of the funds the Net Asset Value (NAV) of mutual funds for the last one year are taken into account to measure return of those funds. Benchmark index is used to compare those returns. Beta co-efficient of each of them is calculated by using NAV values of mutual funds to know whether they are highly risky, average risky, less risky funds. Alpha also calculated to know the risk and return of the selected funds. Portfolio analysis of the funds will also be used and their shares of investments in different sectors will help us to analyze which sectors hold the major investments of the funds. To understand the awareness of people as a diversified investment instrument primary data is also collected using questionnaire.

5. K Chan Ga Karolyi: We examine relationship between returns and returns volatility in stock index and stock index futures markets in intraday. Our results indicate strong inter market dependence in volatility of the case and future returns. Price innovations originate in either the stocks or future markets can predict the future volatility in other market. We show this relationship to persist even during periods in which the dependence in returns themselves appears to weaken. The findings are strong in controlling the potential market frictions such as asynchronous trading in the stock index. Our results have implications between two markets for understanding the pattern of information flows.

6. Namita Rajput, Ruhi Kakkar, Geetanjali Batra: Important instruments of price discovery ,portfolio diversification and risk hedging are derivative products like futures and options. The impact of introduction of index futures on spot market volatility on S&P CNX Nifty using Bi-Variance EGARCH techniques. This model shows volatility split over between spot and futures markets is unidirectional from spot to futures and spot to futures and spot market dominates futures market in terms of return and volatility. At 5% level the volatility persistence is found significant and bi directional. A better understanding of mean and variance dynamics of spot and futures market can improve risk management and investment decision of market agents. Findings have implications for policy makers, hedgers and investors. For emerging markets in India the research contributes to literature.

7. T. Mallikarjunappa1 and Afsal E: This is studies the benchmarking (nifty 50, sx40, sensx) volatility index in India by volatility implications of the introduction on stock market. In this return series to account for n non-constant error variance. In the conditional variance equation incorporating future and options dummy variables are fitted by a GARCH model. Before and after derivatives here we find clustering & persistence of volatility, market volatility have no effects because while listing seems to have no stabilization or destabilization. The sensitivity of the index returns to market returns

is shown by the period of post-derivatives period and effects have disappeared by any day of the week. During the post-derivatives period the nature of the volatility patters has altered.

8. Prof. R. Palaniswamy, K. Lakshminarayanan, V.Venkatesh: In march 2008 the volatility index is introduced, the behavioral and psychological aspects of traders as captured by volatility index. The ultimate purpose of trading& hedge through introducing is to avail a new instrument. To change in near month it can also be used. To find the primary object of relationship prevailing between market and volatility indices is the primary objective of the research. From November 2007 to February 2009 data is collected from NSE. This data is analyzed using correlation and it resulted in -0.677 it is necessary to judge two nifty contracts is inferred by 3VIX contracts.

RESEARCH METHODOLOGY:

1. Volatility: Standard deviation or variance between the returns from that same security or market index is used to calculate volatility. When volatility is high, risk for security is also high.

$$\text{VOLATILITY} = (\text{sqrt}(\text{SD}/\text{period}))$$

2. Augmented Dickey Fuller Test: In time series sample for unit root augmented dickey-fuller test is used. For Dickey-Fuller test it is an augmented version.ADF statistics used in this test is a negative number.

$$\text{ADF: } \Delta Y_t = \alpha + \beta T + \delta Y_{t-1} + u_t$$

3. Co-integration: It can be defined as statistical property of time series variables. There exists co integration between two or more time series when they share common stochastic drift.

$$\text{COINTEGRATION: } Y - Bx = u$$

4. Jensen’s Performance Measure: It is concerned with market index, i.e. each security’s performance in the market and its effect in the portfolio return and market coefficient.

$$\text{JPM} = (\text{Return of portfolio} - (\text{risk-free rate} + \beta * (\text{return of market} - \text{risk free rate})))$$

LIMATATIONS:

1. MCX-SX40 data has been considered from 2010-2014.
2. (NSE) India VIX has been considered as the volatility Benchmark.
3. CPI data has been considered for the Inflation.
4. Repo rate has been considered as a Risk free Rate of Return.

DATA ANALYSIS:

1. To find the relationship between SENSEX, NIFTY, SX40.

Correlations

		NIFTY	SENSEX	SX40
NIFTY	Pearson Correlation	1	.371*	.979**

	Sig. (2-tailed)		.010	.000
	N	47	47	47
SENSEX	Pearson Correlation	.371*	1	.327*
	Sig. (2-tailed)	.010		.025
	N	47	47	47
SX40	Pearson Correlation	.979**	.327*	1
	Sig. (2-tailed)	.000	.025	
	N	47	47	47

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Interpretation: Bi variant correlation has been applied between the national equity indices of sensex, nifty and sx40 whereas sensex is having moderate correlation with other indices during analysis period. All the indices relationship was observed slightly too moderately correlated in a positive mode.

2. To measure the risk and volatility of the 3 indices (NIFTY, SENSEX, SX40)

YEARS	NIFTY		SENSEX		SX40	
	RISK	VOLATALITY	RISK	VOLATALITY	RISK	VOLATALITY
2010-2011	-0.00357	3.350286996	-0.00697	2.01264406	-0.00175	4.63177137
2011-2012	-0.00913	3.272133429	-0.01608	1.807611505	-0.00513	4.55797855
2012-2013	-0.00822	3.367171767	-0.01414	1.82947397	-0.00411	4.68565595
2013-2014	-0.00618	3.493107955	-0.02077	1.709097314	-0.00199	4.93300501
average	-0.00677	3.370675037	-0.01449	1.839706712	-0.00324	4.70210272

Interpretation: When we compare the risk for 3 indices we can say that SX40 having less risk and in volatility SX40 is high compared to others.

3. To find the impact of 3 indices volatility with each other.

	Nifty&Sensex	Nifty&Sx40	Sensex&Nifty	Sensex&Sx40	Sx40&Nifty	Sx40&Sensex
Heteroskedasticity Test Probablity:	0	0	0	0	0	0
ARCH Probablity	0	0	0	0	0	0
AIC	15.52692	11.14859	13.19517	13.27488	12.46641	16.93897
SIC	15.64387	11.26554	13.31212	13.39183	12.58336	17.05592
GARCH Probablity	0	0	0	0	0	0
AIC	15.57232	11.61704	13.19286	13.298	12.86635	17.50429
SIC	15.72825	11.77297	13.34879	13.45394	13.02228	17.66022
TARCH Probablity	0	0	0	0	0	0
AIC	15.56385	11.62484	13.2702	13.33676	12.94686	17.54906
SIC	15.75876	11.81975	13.46512	13.53168	13.14177	17.74397
EGARCH Probablity	0	0	0	0	0	0
AIC	15.58251	11.20092	13.21678	13.31351	12.51957	17.00213
SIC	15.73844	11.35686	13.37271	13.46944	12.67551	17.15806
PARCH Probablity	0	0	0	0	0	0
AIC	15.63118	11.41273	13.27061	13.35528	12.5765	17.03431
SIC	15.8261	11.60765	13.46553	13.5502	12.77142	17.22922
BEST MODEL	ARCH	ARCH	GARCH	ARCH	ARCH	EGARCH

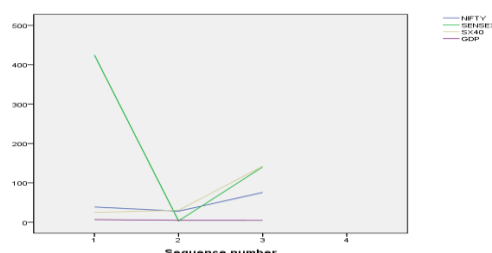
Interpretation: The above table shows the volatility of 3 indices (NIFTY, SENSEX, SX40). All the indices are fluctuating with each other. ARCH, GARCH, TARCH, PARCH, EARCH out of that ARCH model is best in (NIFTY with SENSEX and SX40, SENSEX and SX40, SX40 and NIFTY).Where as GARCH is found to be best model for (SENSEX and NIFTY). All indices volatility are getting effected each other.

4. To measure the premium of 3 indices and compare with the performance tool.

YEAR	JENSEN VALUE		
	NIFTY	SENSEX	SX40
2010-2011	4.157387	-18.03	4.9358716
2011-2012	20.43111	-15.809	-9.593452
2012-2013	-26.9094	2.43392	10.881272
2013-2014	7.036665	10.5469	16.72714
Average	1.178947	-5.2146	5.7377077

Interpretation: The above table depicts the JENSEN test on the NIFTY, SENSEX, and SX40. SX40 is considered as best when compared to the averages of the 5 years with other indices.

5. To know the moment of security indices with INDIA economy.



	Minimum	Maximum	Mean	Std. Deviation
NIFTY	27.84	75.51	47.3384	24.98894
SENSEX	3.25	424.66	1.8943E2	214.94228
SX40	24.64	142.14	65.6364	66.30953
GDP	4.60	6.60	5.3000	1.12694

Interpretation: Spectral analysis has been applied on Indian GDP values with 3 national indices. The result indicates the moment of all the indices were observed in the direction of Indian economic indicator GDP. The standard deviation is observed high sensex lowest in the nifty then it is compared with the GDP values.

FINDINGS:

1. Nifty is having strong correlation with Sx40.
2. Risk and Volatility of Sx40 is found to be high comparatively with Sensex and Nifty.
3. Regression ARCH, GARCH, TARARCH models are indicating all the indices of national level are having intra effect on each other volatility.
4. IIP is having a significant impact on all three select indices. Inflation is found to be non-significant with all the indices.
5. Nifty, Sensex, Sx40 are found to be reflecting the Indian economy.

CONCLUSION: We conclude the analysis of volatility of Indian market. In this analysis all 3 stock exchanges indices were considered. Nifty, Sensex and sx40 were intra correlated and the volatility of these indices were affected by the each other performance of Sx40is Stronger than the older stock exchange indicators which are Nifty and Sensex. Risk levels were observed in negative with all the 3 indices. Hence there is a further scope to do research on these 3 market indices from the investors perspectives to take better decision.

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