International Journal of Applied and Advanced Scientific Research (IJAASR)
Impact Factor: 5.655, ISSN (Online): 2456 - 3080
(www.dvpublication.com) Volume 3, Issue 2, 2018

STOCK PRICE VOLATILITY OF HDFC BANK WITH REFERENCE TO BSE

Dr. R. Hamsalakshmi* & K. Pavithra**

* Assistant Professor, PG and Research Department of Commerce, LRG Government Arts College for Women, Tirupur, Tamilnadu

** Assistant Professor, Department of B.Com (Financial Services), PSGR Krishnammal College for Women, Coimbatore, Tamilnadu

Cite This Article: Dr. R. Hamsalakshmi & K. Pavithra, "Stock Price Volatility of HDFC Bank with Reference to BSE", International Journal of Applied and Advanced Scientific Research, Volume 3, Issue 2, Page Number 38-42, 2018.

Abstract:

The banking sector plays a magnificent role in an economy for the smooth as well as efficient functioning of the different activities of the society. There is a strong relationship between volatility and market performance. Volatility tends to decline as the stock market rises and increase as the stock market falls. When volatility increases, risk increases and returns decrease. The present study is made to find out the stovk price volatility of HDFC bank in the BSE market. The study is based on secondary data collected from BSE website for five years from 2012-2016. The data have been analyzed using the unit root test, ARCH and GARCH models. On the basis of the analysis of stock return dependence in BSE stock market of HDFC returns are sufficiently captured which affirms the model is good enough to prove the volatility clustering and leptokurtic features and found that the stock price movement of HDFC bank in BSE market shows volatile clustering.

Key Words: Stock Market, Volatility, BSE & HDFC

Introduction:

Stock exchange means anybody of individuals, whether incorporated or not, constituted for the purpose of regulating or controlling the business of buying, selling or dealing in securities. Stock exchanges are intricacy inter-woven in the fabric of a nation's economic life. Without a stock exchange, the saving of the community- the sinews of economic progress and productive efficiency- would remain underutilized. Volatility of stock market may impair or affect the smooth functioning of the financial system and adversely affect the economic performance through its effect on individual investment decisions. The major causes of stock market volatility are still very much in doubt by researchers. However, the general consensus that causes volatility is the annual of new, unanticipated information that alters expected returns and stock,

Banks occupies an important place in a nation's economy and is indispensable in a modern society. The principal objective of Indian banking had been the attainment of growth with social justice and equity. Finance which acts as a catalytic agent, is a great necessity. The overwhelming role of finance in the economic development of a country is well recognized and forms the core of the money market in economy. The dire competition in the banking industry between the public and old private sector banks, new generation private sector banks and foreign banks is mainly through technology innovation, upgrading and modernization. The "Privatge Sector Banks" are banks where greater parts of state or equity are held by the private shareholders and not by government.

Financial time series are characterized by dynamic variables which vary with time heteroscedastic variance. This violates the stationarity assumptions of the linear ARIMA models and this is characteristic of the returns on stock prices. Volatility modeling employs the Engle (1982) Autoregressive conditional Heteroscedeastic (ARCH) models which allow the estimation of time varying conditional variance in financial data and the extended to Generalized Autoregressive conditional Heteroscedeastic (GARCH) models which includes lags of the conditional variance of the model. Nelson (1991) proposed the extended version of GARCH which unlike the ARCH and GARCH allows for the symmetry in the responsiveness to shocks, it does not impose the non-negative constraints on parameters and reduces the effect of outliers on the estimation results.

Review of Literature:

Epaminontas Katsikas (2007)[1] analysed the relationship between volatility and auto correction in major European stock futures market. His evidence points show the negative relationship between volatility and auto correction is low during periods and high during calm periods. He analysed that volatility itself is an asymmetric function of past errors in the sense that a negative relationship between volatility and auto correction in major European futures markets. He suggested that the futures prices are non-linearly predictable so that short-term trading could produce abnormal returns.

Manmohan Mall (2011)[2] examines that Volatility is in fact the manifestation of the arrival of fresh information into the market. As new information is received, buyers and sellers will re-assess their perceptions of the values of different securities and the observed prices will then adjust to reflect these changes and this

[1]Epaminontas Katsikas (2007) "Volatility and Auto correction in European Futures Market", Managerial Finance, Vol.33 (3), pp. 236-240.s
[2]Manmohan Mall (2011)"A Study on Stock Index and Stock Index Futures with special reference to S & P CNX NIFTY and NIFTY Futures Siksha O Anusandhan University(Unpublished thesis)

process of adjustment will give rise to volatility. This work investigates the issue for a dynamic emerging market, i.e. National Stock Exchange of India that allows the examination of changes in the nature of volatility and for asymmetric responses to news. The results exhibit that spot price volatility is less affected following the introduction of index futures trading.

Karunanithy, Banumathy and Ramachandran Azhagaiah (2015)[3] in their study, identified volatility of Nifty index return is tested using the symmetric and asymmetric garch models. The daily closing prices of Nifty index for ten years are collected and modelled using four different garch models that capture the volatility clustering and leverage effect for the study period i. e. from 1st January 2003 to 31st December 2012. Garch (1, 1), garch-m (1, 1), egarch (1, 1), and tgarch (1, 1) models are employed in the study after confirming the unit root test, volatility clustering and arch effect. The results show that the coefficient has the expected sign both in the egarch (negative and significant) and in the tarch (positive and significant) models.

Statement of the Problem:

Market volatility has been comprehensively researched in developed stock markets, while few studies are done in the developing stock market to measure the market volatility. Implications based on average return, higher volatility and low correlation in the developed market returns are more predictable that can have significant impact on investors, policy makers, etc. An effort to identify the existence of volatility in the BSE market based on the closing price of HDFC bank is conducted using ARCH family models (ARCH and GARCH) to estimate the volatility in the BSE stock market to understand the persistence and volatility clustering.

Objectives of the Study:

- ✓ To analyse the stock volatility of HDFC bank in the BSE market using GARCH models.

Research Methodology:

The research carried out is descriptive and analytical in nature and the research is based on the secondary data of the select service sector companies collected from the BSE Index for share price movement of HDFC bank during 01-04-2012 to 31-03-2016. Data has been collected from secondary sources. BSE Index considered taking the share price movement of HDFC Bank. Books and journals are also referred for information related to literature, etc. For the purpose of measuring the share price movement the tools such as Unit Root Test, Arch LM, ARCH and GARCH models are used.

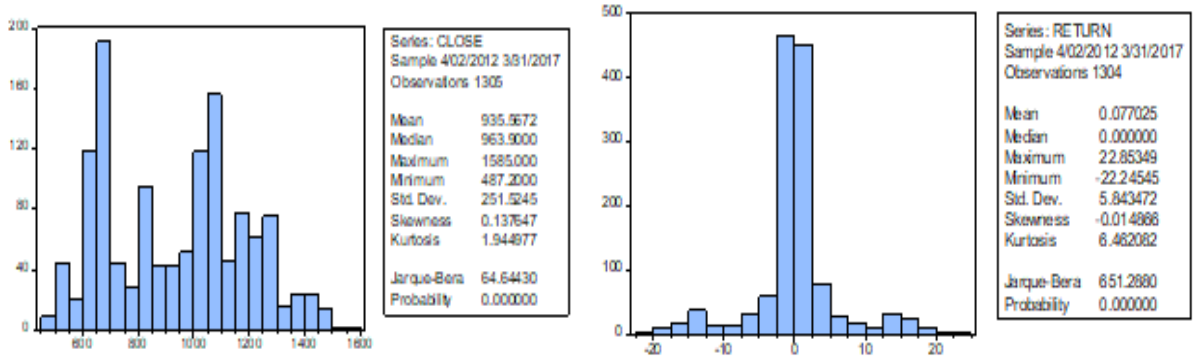
Analysis and Results:

The study conducted taking the volatility of the HDFC bank from National Stock Exchange for the periods from 2012 to the end of 2016. The graph plotted for the level series to understand the volatility of the daily stock (5 days) series presented in the figure 1. The diagram shows the index of HDFC bank in the BSE during 01-04-2012 to 31-03-2016.

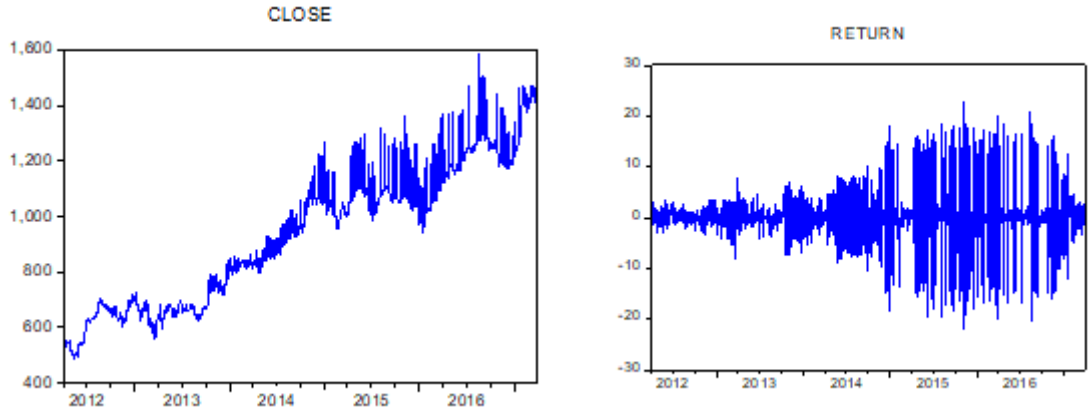
In the first stage, the time series characteristics of HDFC bank in BSE index including descriptive statistics, reliability, test of ARCH effect. The result of the figure-1 shows the stock price movement in the level series shows only positive effect. As per general norm of return larger fluctuation followed by period of calmness is not in line with the study by Fama (1990) stated stock fluctuate thereby exhibiting volatility clustering, large returns complemented by small returns.

Descriptives:

Descriptive statistics and its empirical results are shown in the table reveals the daily observations of HDFC bank in BSE during the period from 2012-13 to 2016-17 (5 years) periods and the results are observed based on the mean, median, max, min, skewness, kurtosis and Jarque Bera.



[3]Karunanithy Banumathy and Ramachandran Azhagaiah (2015) Modelling Stock Market Volatility: Evidence from India Managing Global Transitions Vol13 (1)2015, pp 27–42



The return mean is positive indicating increase in price over a period of time. Skewness statistics are positive, indicating that the returns are asymmetric and distribution has a long right fat tail. The kurtosis less than 3 suggesting that the underlying time series data is heavily tailed and sharply peaked when compared to a normal distribution, and do not follow a normal distribution which is evident from To make the series stationary and achieve normal distribution, the BSE return of HDFC bank is converted from level series to logarithmic return series. From the results of the graph-2 confirms the periods of low and high volatility of HDFC bank.

Descriptive statistics revels that the close series observed mean of daily return series of HDFC bank is 0.077% compared to that of close series which is not normally distributed. The standard deviation measures the volatility of the HDFC bank return series in the BSE market had a deviation at 5.84% is acceptable compared to the close series (251.52%). The market is found volatile, with the higher chances of getting higher rate of returns with more risk. Both close and return series measured the Jarque Bera shows the stock returns are not normally distributed and skewed.

Unit Root Test:

Table 1: Unit Root test confirming non-stationary in Level Close series and stationary in return series of HDFC Stock price movement

ADF Statistics	**HDFC Level Close Series**	**HDFC Return Series**
Critical Value	-0.634444	-23.46697
Prob.*	0.8604	0.0000
Test critical values:		
1% level	-3.435176	-2.566743
5% level	-2.863559	-1.941067
10% level	-2.567894	-1.616535

*MacKinnon (1996) one-sided p-values.

The level of probability is found to be less than 0.05, therefore the return series is found to be stationery. Further, GARCH model is applied to find the ARCH effect

Arch Model:

The F versions as well as LM statistics are significant suggesting the presence of ARCH in the HDFC stock return data series. The lag order of q=5 is carried out to find the results

Heteroskedasticity Test: ARCH				
F-statistic	596.4565	Prob. F(1,1301)		0.0000
Obs*R-squared	409.5919	Prob. Chi-Square(1)		0.0000
Included observations: 1303 after adjustments				
	Coefficient	Std. Error	t-Statistic	Prob.
C	15.00199	1.991931	7.531380	0.0000
RESID^2(-1)	0.560663	0.022957	24.42246	0.0000
R-squared	0.314345	Mean dependent var		34.14611
Adjusted R-squared	0.313818	S.D. dependent var		79.79778
S.E. of regression	66.10136	Akaike info criterion		11.22179
Sum squared resid	5684576.	Schwarz criterion		11.22973
Log likelihood	-7308.996	Hannan-Quinn criter.		11.22477
F-statistic	596.4565	Durbin-Watson stat		1.863564
Prob(F-statistic)	0.000000			

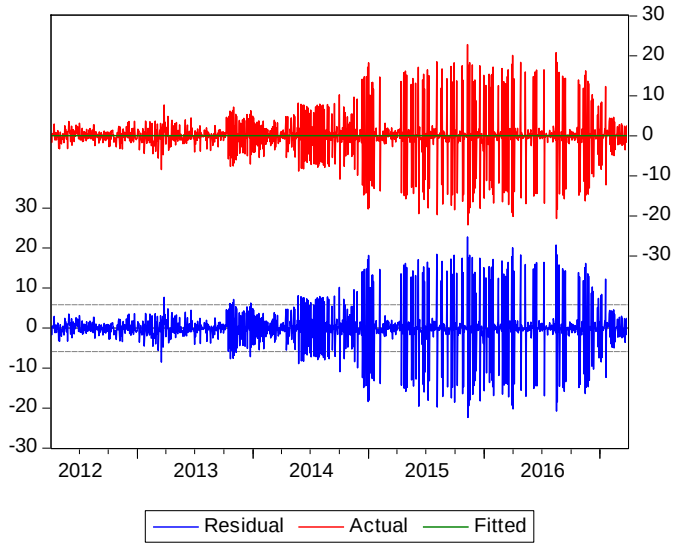
The ARCH (1) model was estimated to the daily returns of HDFC Bank and the results are shown in the Table. The daily returns of the market were on an average of 0.560 times dependent on their own lag. Further, the error terms of today were also statistically significant dependent on its own lag. The Observed R square is 409.59 and corresponding p-value is less than five percent to reject null hypothesis which means there is ARCH effect, which means, periods of low and high volatility is observed in the study therefore, leads to proceed with the ARCH family model to find the ARCH effects. Small sum of coefficients reveals large positive return in future forecast of the variance for a prolonged periods.

Garch Model:

Dependent Variable: RETURN				
Method: ML - ARCH (Marquardt) - Normal distribution				
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)				
	Coefficient	Std. Error	z-Statistic	Prob.
C	0.086593	0.076014	1.139183	0.2546
	Variance Equation			
C	0.038717	0.012539	3.087813	0.0020
RESID(-1)^2	0.066927	0.004243	16.40977	0.0000
GARCH(-1)	0.933620	0.001936	482.2295	0.0000
R-squared	-0.000003	Mean dependent var		0.077025
Adjusted R-squared	-0.002310	S.D. dependent var		5.843472
S.E. of regression	5.850219	Akaike info criterion		5.684483
Sum squared resid	44492.57	Schwarz criterion		5.700352
Log likelihood	-3702.283	Hannan-Quinn criter.		5.690436
Durbin-Watson stat	3.219336			

GARCH (1, 1) model is tested to find the changing variance. The parameters of GARCH model measures the return series of HDFC bank closing stock shows positively significant at 1% level, which means the null hypothesis rejected and accept that there is existence of volatility clustering the return series of HDFC closing stock in the BSE. The result suggests that volatility from the previous periods have a power in explaining current volatility condition based on the coefficients of $\alpha + \beta$ (0.066+0.933) in GARCH model is found persistent to volatility and shocks. The results reveal (0.99) is closer to unity (one) means more persistent in the stock to conditional variance. That means, shocks may prevail for many future periods shows HDFC return series have both volatility clustering and persistence.

Residual Graph:



Low fluctuation is observed during the years from 2012-2013 while, there is a moderate volatility observed during 2013 to 2014 and the constant increase in closing price during the remaining periods from 2014 to 2016 proves increase in price volatility consistent for a prolonged period.

Findings and Conclusion:

Skewness and kurtosis confirmed that the underlying time series data is heavily tained and sharply peaked during normal distribution. Jarque-Bera test shows significant at 1% level that validates the series of HDFC bank is not normally distributed. Augmented Dickey Fuller test is conducted to measure the stationarity

of the HDFC closing stock returns. In the first order of close series the ADF test series (-0.634, Sig.0.860) accepts the null hypothesis. Whereas, the HDFC bank return series confirms stationarity to further conduct ARCH family model. The variance intercept 'c' is less than the ARCH parameter for the BSE Index of HDFC bank which shows the Arch Term 0.0669 is less than the GARCH term 0.933 implies that the GARCH model has the conditional volatility and persistent. Graphically, it is clear to observe the autoregressive nature of the residuals with the constant variance. Arch Residual Graph shows the estimated error closely fit the actual errors. Both the estimated and the actual returns follow the same pattern which is statistically significant. The value of β=0.933 shows highly volatile of HDFC return series in the BSE stock market due to persistence. Whereas, a low value of α=0.066 means that recent news has less impact on HDFC closing stock in BSE market. Coefficient of β reveals past news and it is found to be higher in the HDFC stock returns in the BSE market suggesting old news has a significant influence in the market price volatility. The dynamic stock return dependence in BSE stock market of HDFC returns are sufficiently captured which affirms the model is good enough to prove the volatility clustering and leptokurtic features and found that the stock price mofement of HDFC bank in BSE market shows volatile clustering. Further, TARCh and EGARCH methods can be used to identify the asymmetry and leverage effects in the BSE stock return price of HDFC bank.

References:

1. Epaminontas Katsikas (2007) "Volatility and Auto correction in European Futures Market", Managerial Finance, Vol.33 (3), pp. 236-240.s
2. Manmohan Mall (2011) "A Study on Stock Index and Stock Index Futures with special reference to S & P CNX NIFTY and NIFTY Futures Siksha O Anusandhan University (Unpublished thesis)
3. Karunanithy Banumathy and Ramachandran Azhagaiah (2015) Modelling Stock Market Volatility: Evidence from India Managing Global Transitions Vol13 (1)2015, pp 27–42