GARCH BASED VOLATILITY MODELING IN BANK'S STOCK

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ABSTRACT

Volatility in the stock return is an integral part of stock market with the alternating bull and bear phases. In the bullish market, the share prices soar high and in the bearish market share prices fall down and these ups and downs determine the return and volatility of the stock market. Volatility is a symptom of a highly liquid stock market. Volatility of returns in financial markets can be a major stumbling block for attracting investment. In this study, we use the Generalized Autoregressive Conditional Heteroskedasticity (GARCH) model to model volatility. The analysis was done using a time series data for the period 1st January 2008 to I0th April 2012 on 18 banks in India and empirical findings revealed that all banks stock return series reports an evidence of time varying volatility which exhibits clustering and high persistence.

Keywords: ARCH Model, GARCH Model, Volatility, Volatility Persistence.

INTRODUCTION:

Wide swings in stock market prices in India in recent years have revived the financial community interest in the concept of volatility. As a concept, volatility is simple and intuitive. It measures to what extent the current price of an asset deviates from its average past values. Merton Miller (1991), the Nobel Prize winner in Economics in 1990 wrote in his book Financial Innovation and Stock Market Volatility "By volatility public seems to mean days when large market movements, particularly down moves, occur. These precipitous market wide price drops cannot always traced to a specific news event. Nor should this lack of smoking gun be seen as in any way anomalous in market for assets like common stock whose value depends on subjective judgment about cash flow and resale prices in highly uncertain future. The public takes a more deterministic view of stock prices; if the market crashes, there must be a specific reason".

Modeling volatility has been subject of many theoretical and practical studies due to three main reasons i.e. firstly; volatility is an essential factor in derivative security (option) pricing formula of Black- Scholes model. Secondly, volatility index (VIX) recently becomes a popular financial instrument since its starting of trading in futures i.e. in 2004. Thirdly, volatility plays an important role for investors by helping them in taking good investment decisions. As a proxy of risk, volatility is not only of great concern for investors but also for policy makers. Investors are interested in knowing the impact of time varying volatility on the pricing of securities and the policy makers are mainly focused on the effect of volatility on the stability of financial markets and on the growth of economy. Volatility may impair the smooth functioning of the financial system and adversely affect economic performance. Stock market volatility affects the economy through its impact on consumer spending and business investment. The impact of stock market volatility on consumer spending is related via wealth effect. Increase in stock market will increase consumer wealth and this will drive up consumer spending. On the other hand, a fall in stock market will weaken consumer confidence and thus drive down consumer spending. Equity investment becomes more risky when stock market volatility is increasing. So investors shift their investment from high volatile securities to low volatile securities. Thus stock market volatility can be a sticking point in the way to attract investments in an emerging economy. Due to a number of its applications in financial market, volatility is deserved of plentiful studies for accurate estimation and forecast. Although there has been a huge number of studies that focused on estimating stock price volatility but the emerging capital markets has been paid little attention, comparable to developed capital markets. This paper measures the conditional and unconditional volatility of 18 commercial banks in India. The remaining paper is organized as follows: section-2 includes literature review, section-3 presents the methodology of the study, section-4 offers empirical results and discussion and finally section-5 presents the concluding remarks.

LITERATURE REVIEW:

Volatility is defined as tendency of the assets price to fluctuate either up or down. Increased volatility is perceived as indicating a rise in financial risk which can adversely affect investor assets and wealth. (Campbell, 1996) stock market volatility has negative impact on consumer spending. The impact of stock market volatility on consumer spending is related via the wealth effect. Increased wealth will drive up consumer spending. A fall in stock market will weaken consumer confidence and thus drive down consumer spending. (Zuliu, 1995 and Arestis et al 2001) Stock market volatility may also affect business investment and economic growth directly. Rise in stock market volatility can be interpreted as a rise in risk of equity investment and thus a shift of funds to less risky assets. This move could lead to a rise in cost of funds to firms. Investor frequently uses the volatility of equity returns as an instrument for measuring risk. A crude measure of volatility i.e. standard deviation is the standard tool applied in the financial markets. This measure estimates the sample standard deviation of the returns over a sample period. The problem with this approach lies with the choice of sample period. If the sample period is too long it may not be relevant for today and if it too short, it will tend to be too noisy. Parkinson (1980) by using the day's high and low prices calculate an estimate of real volatility. But volatility is characterized by some special features that are well documented and widely accepted. Firstly, the volatility of many series is not constant over time. Although the widely used assumption in conventional financial econometrics models is constant volatility, this is clearly not the case for many time series. For instance, the US producer price index during the 1970s more dramatically fluctuated than the 1960s and 1980s (Enders, 2004). These characteristics of volatility or financial data are not captured by standard deviation. Secondly there exist volatility clusters which is the tendency for volatility in financial markets to appear in bunches. Large return is expected to follow large return. This implies that future volatility can be predicted by past and current volatility (Fama, 1965). Following the work of Fama (1965), many researchers such as

Hagerman (1978) and Kim and Kon (1994) studied the kurtosis and skewness of the stock return distribution. They found that the kurtosis of stock return is larger than the kurtosis of normal distribution and the stock return distribution is skewed either positive or negative. Asymmetry and mean reversion is also the common seen in volatility of financial time series. Volatility tends to react asymmetrically to stock price increase and decrease, referred to as the leverage effect (Tsay, 2005). A time series exhibits mean reversion when it tends to converge to it mean. Moreover, volatility is seen to be statistically stable. In other word, volatility normally varies in a certain range. ARCH (Autoregressive Conditional Heteroskedasticity) model suggested by Engle (1982), was the first attempt to capture the above characteristics without the assumption of constant variances which commonly exists in many conventional financial econometrics models. The ARCH model is simple. However, many parameters are required to estimate the volatility of stock returns. The problem of parsimony among the other problems of ARCH model such as how to specify the value of p and the violation of non-negativity constraints led to more general framework GARCH (p,q) proposed by Bollerslev (1986) and Taylor (1986). Extending the framework of Engle (1982), Bollerslev (1986) and Taylor (1986) generalized the ARCH (q) model to GARCH (p, q) in which they added the q lags of past conditional variance into the equation. GARCH (p, q) model allows for both autoregressive and moving average components in the heteroskedastic variance. Although GARCH model has been the most popular volatility model, it has three main problems. Firstly, non-negativity constraint may be violated by the estimated models. Secondly, GARCH model does not take into account the leverage effect and not allow for feedback between the conditional variance and conditional mean (Brook, 2002).

RESEARCH METHODOLOGY :

Main objective of this paper is to measure conditional and unconditional volatility of bank stocks. Generalized Autoregressive Conditional Heteroscedasticity (GARCH) model was employed to measure or model the conditional volatility of all commercial bank stocks. This model is proposed by (Bollerslev, 1986) to capture the conditional variance of returns as a linear function of lagged conditional variance and past squared error terms. The advantage of a Garch model is that it captures the tendency in financial data for volatility clustering. Specifically, log likelihood ratio tests on a Garch model for p, q ε {1, 2, ….., 5} are employed to in order to find the garch representation of the conditional variance of returns. The garch (1, 1) model can be specified as follows:

$R_t = \beta_0 + \beta_1 R_{t-1} + \varepsilon_t$ (1)

$\sigma^2_t = \alpha_0 + \alpha_1 \varepsilon^2_{t-1} + \alpha_2 \sigma^2_{t-1}$ (2)

Where R_t is the return of each individual banking stock at time t which is calculated as follows:

$R_t = \log (p_t - p_{t-1})$

Unconditional volatility

$\sigma^2_{uv} = \sqrt{\alpha_0 / 1-(\alpha_1+\alpha_2)}$

- Where
- α_0 = constant coefficient in variance equation
- α_1 = arch coefficient in variance equation
- α_2 = garch coefficient in variance equation

R_{t-1} is a proxy for the mean of R_t conditional on past information. σ^2_{t-1} denotes the estimation of the variance of the previous time period that stands for the linkage between current and past volatility. In other words, it measures the degree of volatility persistence of conditional variance in the previous period.

DATA DESCRIPTION:

The data employed in this paper comprise daily observations on the closing prices of eighteen commercial bank stocks during the sample period from 1st January 2008 to 10th April 2012. The data has been taken from the national stock exchange website. In this paper volatility is defined as the variance of stock returns, so data has been transformed into daily stock returns using logarithmic transformation such as:

$R_t = \log (P_t - P_{t-1})$

Where R_t is the return of the bank stock at time t. P_t and P_{t-1} denotes the closing market price at the current day and previous day respectively.

DATA ANALYSIS, RESULTS AND DISCUSSIONS:

To specify the distributional properties of all bank daily return series, various descriptive statistics has been

calculated. Table No.1 presents the result of descriptive statistics of returns series of all commercials bank stocks. The table result depicts that the mean returns of Allahabad Bank, Andhra Bank, Axis Bank, Bank of Baroda, Canra Bank, Federal Bank, J & K Bank, Union Bank are positive and Bank of India, Corporation Bank, ICICI Bank, IDBI, IOB, Karnataka Bank, Orient Bank, State Bank of India, Syndicate Bank and Vijaya Bank mean returns are negative. Standard deviation of all bank stocks ranges between 0.023684 to 0.034403 which indicates that the volatility nature of the all bank stocks is found to be higher. Investor invests in that stock in which mean return is higher and standard deviation is low. Andhra bank and Union bank has the highest mean return and comparatively less standard deviation, so these stocks are more preferred by the investors. Skewness statistics of all stocks are significantly different from zero i.e. either it are skewed to the right or to the left. Also the excess kurtosis values indicates that all bank stocks return series are fat tailed or leptokurtic compared to the normal distribution. In addition Jarque Bera test statistics probability value of all bank return series is less than 5%, so the null hypothesis of normality of return series of all bank stocks has been rejected. Hence it can be concluded that the return series of all bank stocks are significantly departures from normality.

Table No. 1: Descriptive Statistics

Bank's Name	Mean	Maximum	Minimum	Standard deviation	Skewness	Kurtosis	Jarque Bera statistics
ALBK	0.000345	0.170809	-0.153556	0.028375	1.59E-01	6.629683	585.8159*
ANDHRABANK	7.81E-05	0.140258	-0.184677	0.02685	-0.16577	7.933654	1078.894*
AXISBANK	0.000161	0.17753	-0.15887	0.032582	0.097062	5.36E+00	247.2252*
BANKBARODA	0.000472	0.151031	-0.122288	0.026737	0.291455	6.360835	513.394*
BANKINDIA	-2.22E-05	0.161436	-0.133846	0.031181	-0.180732	5.01E+00	184.8705*
CANRABANK	0.000273	0.141268	-0.158322	0.02874	-0.088355	5.875943	366.3378*
CORPBANK	-4.55E-05	0.147684	-0.12359	0.023684	0.152899	7.141107	760.8156*
FEDERALBANK	0.000246	0.138409	-0.132971	0.025557	0.080517	5.506531	278.3682
ICICIBANK	-0.000333	0.207324	-0.221355	0.034403	-0.084505	7.544138	912.4059*
IDBI	-0.000432	0.161226	-0.229596	0.032001	-0.050748	8.075678	1137.225*
IOB	-0.000674	0.184086	-0.172854	0.030281	-0.017499	6.357553	497.4823*
J&KBANK	1.59E-05	0.168654	-0.12393	0.024106	0.579276	8.78577	1536.317*
KTKBANK	-0.000854	0.132777	-0.111226	0.027483	0.191113	5.477869	277.3668
ORIENTBANK	-0.000101	0.140907	-0.185808	0.030043	-0.193375	5.598076	304.443*
SBIN	-9.68E-05	0.182544	-0.129849	0.027458	0.222869	6.234593	470.4288*
SYNDIBANK	-7.64E-05	0.127435	-0.15729	0.027683	-0.384188	6.926133	706.2172
UNIONBANK	8.31E-05	0.20092	-0.121469	0.028311	0.273889	7.015773	724.8189*
VIJAYABANK	-0.000391	0.159869	-0.185209	0.028806	-0.047048	7.236057	792.1778*

Note: * indicates significance at 1% level, ALBK- Allahabad Bank, CORPBANK- Corporation Bank, IDBI- The Industrial Development Bank of India, IOB- Indian Oversease Bank, J&KBANK- Jammu and Kashmir Bank, ORIENTBANK- Oriental bank of commerce, SBIN- State Bank of India, SYNDIBANK- syndicate bank, UNIONBANK- Union Bank of India, ICICIBANK- Industrial Credit and Investment Corporation of India

In the literature, it is well posited that time series must be stationary. Augmented dickey fuller test is employed for checking the stationary of all return series. Table no.2 shows the result of ADF test. All the variables t statistics is higher than the t statistics critical value at 5% level. So the null hypothesis of unit root is rejected and all the return series are stationary at level i.e. I (0). Existence of heteroscedasticity in residuals is an essential condition before applying the generalized autoregressive conditional heteroscedastic (GARCH) model. ARCH test is applied for checking the existence of heteroscedasticity in the residuals of the returns series. Table no. 2 shows the results of heteroscedasticity test. Table no. 2 results reveal that all bank residual series (derived from equation (1)) F statistics and observed R squared probability value is less than 5% so the null hypothesis of presence of no arch is rejected. Thus confirms the presence of arch effect in the time series analyzed. In addition Jarque Bera test shows that all banks return series are not normally distributed but all return series are stationary as shown by augmented dickey fuller test. All the return series follows a stationary process even though they fail to be normally distributed because of the presence of arch effects. In summary, the return series of all banks stock seems best described by an unconditional leptokurtic distribution and possess significant conditional heteroscedasticity. Hence garch model is deemed fit for modeling the return volatility. So this paper employed garch model to estimate the conditional volatility of all banks stocks in India and its results are presented in table no. 3 and table no.4.

Table No. 2: Results of Unit Root & Heteroscedasticity Test

Banks	Augmented Dickey-Fuller Test (T-Statistics)	Hetroscedasticity Test			
		F-Statistics	Prob. (F-Statistics)	Obs*R Squared	Prob. (Chi Square)
ALBK	(29.93161)*	31.10616	0	136.2071	0
ANDHRABANK	(28.98923)*	42.3604	0	177.2019	0
AXISBANK	(31.88486)*	18.84074	0	86.92908	0
BANKBARODA	(30.33517)*	19.88853	0	91.3446	0
BANKINDIA	(29.90854)*	17.49095	0	81.18098	0
CANRABANK	(30.18277)*	8.402563	0	40.62476	0
CORPBANK	(29.8683)*	10.77438	0	51.53139	0
FEDERALBANK	(29.04266)*	16.28701	0	75.996	0
ICICIBANK	(29.57755)*	23.72558	0	107.1754	0
IDBI	(30.28147)*	51.77295	0	208.7771	0
IOB	(27.96528)*	37.60934	0	160.3509	0
J&KBANK	(28.96082)*	4.533331	0.0004	22.31381	0.0005
KTKBANK	(29.17653)*	9.638965	0	46.33971	0
ORIENTBANK	(29.58295)*	10.41232	0	49.88167	0
SBIN	(29.04659)*	12.98899	0	61.50528	0
SYNDIBANK	(29.13172)*	21.31313	0	97.28352	0
UNIONBANK	(29.77526)*	11.48025	0	54.7321	0
VIJAYABANK	(28.31502)*	31.87271	0	139.1206	0

Note: * indicates significance at 1% level

Table No. 3: Mean equation results of GARCH (1, 1) Model

Banks	β_0	β_1
ALBK	0.000873	0.110369*
ANDHRABANK	0.000111	0.118055*
AXISBANK	0.000877	0.052976***
BANKBARODA	0.000971	0.053728**
BANKINDIA	-9.85E-05	0.080427*
CANRABANK	0.000866	0.092244*
CORPBANK	-9.90E-05	0.139224*
FEDERALBANK	0.000625	0.117356*
ICICIBANK	0.000554	0.066522**
IDBI	-0.000353	0.066341**
IOB	-0.000544	0.164267*
J&KBANK	0.000649	0.127566*
KTKBANK	-0.000822	0.103672*
ORIENTBANK	9.89E-05	0.084046**
SBIN	3.25E-05	0.10459*
SYNDIBANK	0.00077	0.109318*
UNIONBANK	0.000506	0.087831*
VIJAYABANK	0.000111	0.146691*

Note: * indicates significance at 1% level, ** indicates significance at 5% level and *** indicates significance at 10% level

Table No.4: Variance equation results of GARCH (1,1) Model

Banks	α_0	α_1	α_2
ALBK	0.0000336*	0.115316*	0.843861*
ANDHRABANK	0.000037*	0.12301*	0.827177*
AXISBANK	0.00000503***	0.068916*	0.926722*
BANKBARODA	0.00000723*	0.067269*	0.922087*
BANKINDIA	0.0000187*	0.101795*	0.882259*
CANRABANK	0.0000131*	0.089455*	0.898391*
CORPBANK	0.00000696*	0.059594*	0.927668*
FEDERALBANK	0.000032*	0.091584*	0.859481*
ICICIBANK	0.00000875*	0.075384*	0.916419*
IDBI	0.0000146*	0.103853*	0.885269*
IOB	0.0000228*	0.100491*	0.872816*
J&KBANK	0.0000124*	0.04833*	0.929263*
KTKBANK	0.0000431*	0.105849*	0.839719*
ORIENTBANK	0.000116*	0.140677*	0.733399*
SBIN	0.000013*	0.074964*	0.90892*
SYNDIBANK	0.0000486*	0.107697*	0.831296*
UNIONBANK	0.0000399*	0.159783*	0.799486*
VIJAYABANK	0.0000415*	0.068566*	0.878622*

Note: * indicates significance at 1% level, ** indicates significance at 5% level and *** indicates significance at 10% level

Table no. 3 shows the mean equation results. The mean equation results of garch (1, 1) model reveals that returns of ALBK, ANDHRABANK, BANKINDIA, CANRABANK, CORPBANK, FEDERALBANK, IOB, J&KBANK, KTKBANK, SBIN, SYNDIBANK, UNIONBANK, VIJAYABANK exhibits positive autocorrelation at lag 1 of the time series at 1% level of significance, BANKBARODA, ICICIBANK, IDBI, ORIENTBANK return series shows positive correlation at 1 lag of time series significant at 5% level of significance and AXISBANK return series also has positive correlation at 1 lag but it is significant at 10% level. GARCH (1, 1) model parameters i.e. ARCH coefficient and GARCH coefficient give estimates of volatility persistence and mean reversion. The process is mean reverting or stationary if the sum of parameters is less than one and more the sum of parameters is closer to unity, greater the volatility persistence. In the variance equation the arch term measures the reaction of volatility on market movements. Higher values for this coefficient would generate more spiky diagram of returns i.e. conditional volatility would show large reaction and low persistence. The GARCH coefficient in the volatility equation measures the persistence of volatility. Higher values for this coefficient means that innovations to conditional variance will take longer time to die out i.e. conditional volatility would show low reaction and large persistence. Table No. 4 shows variance equation results of all banks stock. ARCH coefficient (α_1) and GARCH coefficient (α_2) of all banks are significant at 1% level. This means that stock volatility of all banks is influenced by previous day stock price information and volatility. As for the stationarity of the variance process, it can be observed that sum of arch and garch coefficient is less than unity, indicating no violation of the stability condition. However the sum is closer to one, which indicates a long persistence of shocks in volatility. ARCH coefficient of all banks ranges between 0.04833 to 0.159783, suggesting low reaction to the recent news on the volatility and Conditional volatility of all banks stock ranges between 73.34 % to 92.93 %. Conditional volatility of state bank of India, ICICI bank ltd, bank of Baroda, Axis bank ltd, Corporation bank ltd and Jammu and Kashmir bank ltd is more than 90% which means that volatility persistence is higher in these banks i.e. old news take longer time to die out. Andhra bank, syndicate bank, Karnataka bank, Allahabad bank, federal bank, Indian overseas bank, Vijaya bank, bank of India, IDBI and Canra bank conditional volatility ranges between 80 % to 90 %, oriental bank and union bank, Canra bank conditional volatility ranges between 70 % to 80 % which means that in these banks old news take lesser time to die out as compared to above banks. In all banks, J&K bank has the highest volatility persistence and orient bank has lowest volatility persistence.

Table No. 5: Model goodness of fit through ARCH LM test

Banks	ARCH-Heteroscedasticity Test			
	F-Statistics	Prob. (F-Statistics)	Obs*R-Squared	Prob. Chi-Square
ALBK	1.710086	0.1294	8.529788	0.1294
ANDHRABANK	0.698105	0.6249	3.498854	0.6236
AXISBANK	1.296638	0.2629	6.48022	0.2623
BANKBARODA	1.051612	0.3859	5.261766	0.3848
BANKINDIA	1.452131	0.1524	14.47273	0.1525
CANRABANK	0.57213	0.7214	2.869195	0.7201
CORPBANK	0.456238	0.8089	2.289269	0.8078
FEDERALBANK	1.85181	0.1002	9.23051	0.1002
ICICIBANK	0.586951	0.71	2.943315	0.7087
IDBI	3.095094	0.0088	15.33758	0.009
IOB	1.23191	0.2919	6.158618	0.2911
J&KBANK	4.533331	0.0004	22.31381	0.0005
KTKBANK	0.801395	0.5487	4.014564	0.5473
ORIENTBANK	0.21868	0.9546	1.098512	0.9542
SBIN	0.317336	0.9027	1.593353	0.9021
SYNDIBANK	1.034088	0.3094	1.035033	0.309
UNIONBANK	0.578648	0.7164	2.901796	0.7151
VIJAYABANK	1.752948	0.1199	8.741808	0.1198

After applying GARCH (1, 1) model its goodness of fit is measured by applying ARCH- LM test. A model is good if there are no arch effects in the series after applying GARCH model. ARCH-LM test results indicates that F statistics and observed- R Squared p value of ALBK, ANDHRABANK, BANKINDIA, CANRABANK, CORPBANK, FEDERALBANK, IOB, J&KBANK, KTKBANK, SBIN, SYNDIBANK, UNIONBANK, VIJAYABANK, BANKBARODA, ICICIBANK, ORIENTBANK and AXISBANK is more than 5% so the null hypothesis of no arch effects can be rejected. IDBI and J&KBANK F statistics and observed- R Squared P value is less than 5% so we cannot reject the null hypothesis of no arch effects. Hence arch effects are still existed in the return series of IDBI and J&KBANK after applying GARCH (1, 1) Model. Therefore more lag term GARCH model is useful.

Table no. 6: Unconditional volatility

Banks	Unconditional Volatility
ALBK	2.87%
ANDHRABANK	2.73%
AXISBANK	3.40%
BANKBARODA	0.27%
BANKINDIA	0.43%
CANRABANK	0.36%
CORPBANK	0.26%
FEDERALBANK	0.57%
ICICIBANK	0.30%
IDBI	0.38%
IOB	0.48%
J&KBANK	0.35%
KTKBANK	0.66%
ORIENTBANK	1.08%
SBIN	3.61%
SYNDIBANK	0.70%
UNIONBANK	0.63%
VIJAYABANK	0.64%

Long run average volatility or unconditional volatility results are given in Table No. 6. Unconditional volatility of all banks ranges between 0.26 % to 3.61 %. BANKBARODA, BANKINDIA, CANRABANK, CORPBANK,

ICICIBANK, IDBI, IOB and J&KBANK unconditional volatility ranges between 0 % to 0.50 %, KTKBANK, SYNDIBANK, UNIONBANK, VIJAYABANK, FEDERALBANK unconditional volatility ranges between 0.51% to 1%, ORIENTBANK unconditional volatility ranges between 1.01% to 2%, ALBK and ANDHRABANK unconditional volatility ranges between 2.01% to 3% and AXISBANK and SBIN unconditional volatility is above 3%.

CONCLUSION:

Understanding stock market risk and return behaviour is important for all countries but it is of more importance to developing countries especially where the market consist of risk averse investors. The degree of volatility presence in the stock market would lead investors to demand a higher risk premium, creating higher cost of capital, which impedes investment and slows economic development. GARCH model was employed to measure the conditional and unconditional volatility of selected eighteen commercial banks stock in India. The empirical analysis conducted for the daily closing prices of each stock of commercial bank for the time period 1st January 2008 to 10th April 2012 and it is retrieved from the national stock exchange (NSE) website. The analysis reveals that daily returns series has leptokurtic distribution instead of normal distribution; Serial correlation exists in the daily return series signifying that past returns might be useful in predicting current returns. The empirical results observed indicate the evidence of time varying volatility which exhibits clustering and high persistence. Conditional volatility (GARCH coefficient α_2) of all banks stock ranges between 73.34 % to 92.93 %. Higher values of GARCH coefficient shows low reaction and large persistence i.e. conditional variance take longer time to die out. J&K bank has the highest volatility persistence and orient bank has lowest volatility persistence. Unconditional volatility or long run average volatility of all banks ranges between .26% to 3.61%. Unconditional volatility is high in Axis bank. Investors use this information for taking investment decisions. Investors, who are seeking higher risk-adjusted returns with minimum loss of principal amount, prefer to invest in low volatile stocks. There is a considerable evidence for at least the last two decades, across global and regional equity markets that investors could have earned higher returns by investing in lower risk stocks (Ang, Hodrick, Xing and Zhang)

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