ANALYSIS OF VOLATILITY OF EQUITY SHARE PRICES OF MAHINDRA AND MAHINDRA LTD BY USING STANDARD DEVIATION AS A TOOL

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ABSTRACT:

Valuation is used for stock selection, concluding market expectation, evaluating corporate events, evaluating business strategies, as a communication among management. One of the key indicators to evaluate a performance of organization is volatility of stocks. Volatility is the statistical measure of dispersion of returns for a given security or index. Standard deviation is a statistical term that measures the amount of volatility or dispersion around an average. More volatile assets are considered riskier than less volatile assets because the price is expected to be less predictable.

KEYWORDS: *Beta coefficients, option pricing, standard deviations.*

1. INTRODUCTION:

Valuation of equity share guides to the manager to run their companies in an increasingly competitive world. By integrating accounting and performance measures with strategic thinking and day-to-day operations, managers can learn to take decisions that enhance their businesses and add real value. Now a day's Investors are paying great attention to non-financial factors in their efforts to assess the value of corporations. If the economic environment of particular country is unstable, then there is much risk in investment, because it affects on market value of company and investor may suffer loss in future. There are many different ways to measure volatility of stocks, including standard deviations beta coefficients, option pricing etc.

1.1 Definition of Volatility

"It is a rate at which the price of a security increases or decreases for a given set of returns. Volatility is measured by calculating the standard deviation of the annualized returns over a given period of time. It shows the range to which the price of a security may increase or decrease".

1.2 Importance of Study

Volatility in a stock has a bad implication, many buyers and investors seek out higher volatility investments in order to make higher profits. If a price of stock does not move, it has low volatility, but it also has a low potential to make capital gains. A stock with a very high volatility level can have tremendous profit potential, but the risk of loss is quite high. Volatility is related to standard deviation, or the degree to which prices differ from their mean. Volatility and standard deviation are closely linked. Historical volatility is an annualized figure, so to convert the daily standard deviation calculated, it is multiplied by an animalization factor based on the period used. The animalization factor is the square roots of however many periods exist in a year.

1.3 Tools available to check the volatility of equity shares
 i. **Standard Deviation**

It is a statistical term that measures the amount of variability or dispersion around an average. Standard deviation is also a measure of volatility. Dispersion is the difference between the actual value and the

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average value. The larger the dispersion or variability is, the higher the standard deviation. The smaller the variability is, the lower the standard deviation. Business analysts use the standard deviation to measure expected risk and determine the significance of certain price movements.

Instability alludes to the measure of vulnerability or hazard identified with the extent of changes in a security's esteem. A higher instability implies that a security's esteem can possibly be spread out over a bigger scope of qualities. This implies the cost of the security can change drastically over a brief span period in either heading. A lower instability implies that a security's esteem does not vary significantly, and will in general be steadier.

From a financial point of view, the standard deviation can help investors to quantify how risky an investment is and to determine minimum required return on the investment. If the investor is risk-loving and is comfortable with investing in higher-risk, higher-return securities and can tolerate a higher standard deviation, he may consider adding in some small-cap stocks or high-yield bonds. For investment purpose, standard deviation of return is used as a measure of risk. The higher the value, the higher is the volatility of return of a particular asset and vice versa.

ii.   Annualizing volatility

To present this volatility in annualized terms, analysts multiply company's daily standard deviation by the square root of 252. This assumes there are 252 trading days in a given year. The formula for square root in Excel is =SQRT().

Instead of annualized volatility, we could calculate the monthly volatility by multiplying the daily volatility by the square root of 21. We use 21 because there were 21 trading days in a month.

iii.   Beta Coefficient

One proportion of the overall instability of a specific stock to the market is its beta. A beta approximates the general instability of a security's profits against the profits of a pertinent benchmark (typically the S&P 500 is utilized).

1.4 Characteristics of Standard Deviation

1. The standard deviation estimates the scattering of a dataset with respect to its mean which is determined as the square base of the change.
2. It is determined as the square base of difference by deciding the variety between every datum direct relative toward the mean.
3. If the information focuses are from the mean, there is a higher deviation inside the informational index;
4. thus, the more spread out the data, the higher the standard deviation.
5. Standard deviation is a factual estimation in account that, when connected to the yearly rate of return of a speculation, reveals insight into the verifiable instability of that venture.

The more noteworthy the standard deviation of a security, the more prominent the change between each cost and the mean, which demonstrates a bigger value extend. For instance, an unstable stock has an elevated requirement deviation, while the deviation of a steady blue-chip stock is generally rather low.

1.5 Formula of Standard Deviation

$$SD = \sqrt{\frac{\sum (r_i - r_{avg})^2}{n-1}}$$

Where
Ri – The return observed in one period (one observation in the data set)
Ravg – The arithmetic mean of the returns observed

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n –Number of observations in the dataset

Interpretation
- ➢ The smaller an investment's standard deviation, the less volatile and hence risky it is.
- ➢ The larger the standard deviation, the more dispersed those returns are and thus the riskier the investment is.

2. REVIEW OF LITERATURE
i. Robert C. Merton(1974) in research paper *"On the pricing of corporate debt: The risk structure of interest rates"* he said that, the value of a particular issue of corporate debt depends on the required rate of return on riskless debt , the various provisions and restrictions contained in the indenture & the probability that the firm will be unable to satisfy some or all of the indenture requirements.
ii. Richter Frank, Herrmann Volker (2003) in research paper "*Pricing with performance controlled multiples"*, they said that the multiples derived from comparable companies which are traded and priced in the market are frequently used as a point of reference in business valuation. In their research while calculating valuation, they used specific control factors such as growth and profitability to select "comparable assets". They also guided about diverse methods of estimating multiples from comparable sets.
iii. Chaney Paul K., Lewis Craig M. (1995) in research paper *"Earnings management and firm valuation under Asymmetric information"* they developed a valuation model under asymmetric information which predicts the high-value firm's smooth income and adopt income-increasing accounting treatments relative to other firms. They concluded that, firm value is based on the ability to generate economic earnings; firms have high value when investors expect high economic earnings.

Research Gap
Business analysts are still facing estimation challenges due to lack of clear guidelines about estimation practices. There is a need of more accurate and suitable tool which will minimize risk in valuation by giving same value of business.

3. RESEARCH METHODOLOGY
3.1 Research Type:
This research comes under exploratory research type, because it is an analysis of historical value of equity stock price of the targeted company.

3.2 Objectives of the study
i.   To evaluate volatility of the equity stock.
ii. To study performance of target company.

3.3 Hypothesis of the Study
H0: Equity prices of Mahindra and Mahindra Ltd are not volatile.
H1 Equity prices of Mahindra and Mahindra Ltd are volatile.

3.4 Target population
Here researcher has selected automotive companies operating around Pune region which are listed at National Stock Exchange.

3.5 Sampling Technique
This research comes under Non-Probability sampling type where researcher has used Convenience Sampling method for selecting a sample.

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3.6 Determination of Sample Size

There are 23 listed automotive companies in Pune region; here researcher has selected Mahindra & Mahindra Ltd. for the study purpose.

3.7 Data Collection:

Equity closing prices of Mahindra and Mahindra Ltd are taken from period 22nd April 2019 to 22nd May 2019 (one month) from NSE website for calculating standard deviation in equity prices and daily return.

## 3.8. Tool used for Data Analysis

Standard Deviation

4. Data Analysis
Company Name: Mahindra & Mahindra Ltd.
4.1 Historical Equity Prices performance

Date	Equity Close Price (Rs)	Daily returns
22-Apr-19	673.4	
23-Apr-19	665.75	-0.011
24-Apr-19	668.15	0.004
25-Apr-19	665.15	-0.004
26-Apr-19	659.45	-0.009
30-Apr-19	645.3	-0.021
02-May-19	645.9	0.001
03-May-19	645.8	0.000
06-May-19	638.5	-0.011
07-May-19	636	-0.004
08-May-19	621.65	-0.023
09-May-19	625.45	0.006
10-May-19	628.75	0.005
13-May-19	617.6	-0.018
14-May-19	614.25	-0.005
15-May-19	609.65	-0.007
16-May-19	605.25	-0.007
17-May-19	619.65	0.024
20-May-19	653.25	0.054
21-May-19	639.15	-0.022
22-May-19	640.55	0.002
Standard Deviation in Equity Closing prices (Calculated)	20.2905	-------
Standard Deviation in daily return	-----------	0.017

Table 1: Self generated from NSE Website

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4.2 Graphical Representation

Equity prices from 22nd April to 22nd May 2019
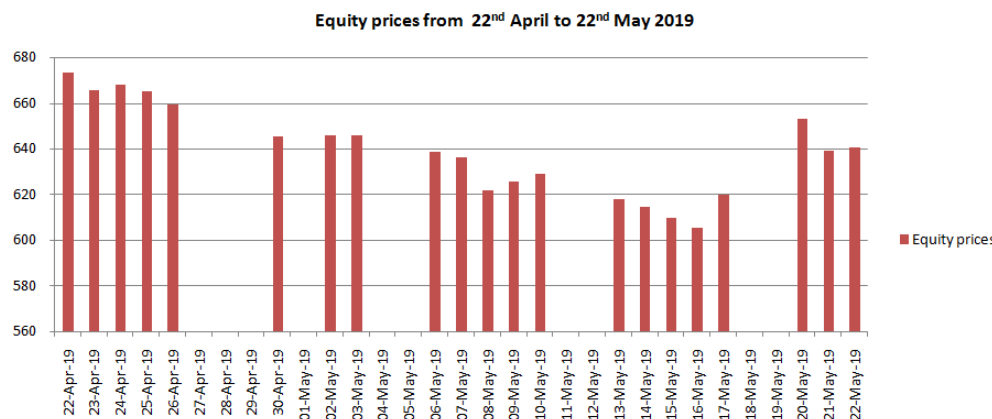
Graph 1   (Source: Table 1)

During above period National Stock Market was closed on 27th, 28th, 29th April 2016 and on 4th, 5th, 11th, 12th 18th and 19th May 2019, due to holidays, so for these dates in bar diagram don't appear.

4.3 Interpretation
i.   If the prices of a security fluctuate rapidly in a short time span, it is termed to have high volatility. If the prices of a security fluctuate slowly in a longer time span, it is termed to have low volatility.
ii. Above table 1 represents that, Standard deviation in equity prices is Rs 20.295 in twenty one working days in the period of one month, it shows that equity prices are of Mahindra and Mahindra Ltd are not volatile, it accepts the null hypothesis i.e. Equity prices of Mahindra and Mahindra Ltd are not volatile.
iii. Table 1 shows Standard deviation in daily return is 0.017, it shows that there is less dispersion in daily returns which finally tells that share prices are less volatile, because of good performance and hence it's better to the investors to invest in this company.

5. Findings
i.   Equity share price performance of Mahindra & Mahindra Ltd. is very good, there is no risk in investment in this company.
ii. Due to less volatility of share prices, daily returns are also less volatile because of steady growth rate.
iii. Investors can hold this investment for long tern purpose.

6. LIMITATIONS OF STUDY:
i.   Here researcher has taken a data of one month and calculated standard deviation in volatility of equity share prices. Investors/ analyst can calculate standard deviation for 252 stock working days, which will show clearer picture of company before investment.
ii. Volatility does not measure the direction of price changes. This is because when calculating standard deviation (or variance), all differences are squared, so that negative and positive differences are combined into one quantity.

7. CONCLUSION
Standard deviation is an especially useful tool in investing and trading strategies as it helps to measure stocks volatility and predicts performance trend. Volatility measures the risk of a security. It indicates the pricing behavior of the security and helps estimate the fluctuations that may happen in a short period of time.

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