Calculation of Beta Value of Stocks of Listed Company from National Stock Exchange's Website to Find Out Better Investment Opportunity

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Abstract: *A company's beta is a measure of the volatility, or systematic risk, of a security, compared to the broader market. The beta of a company measures how the company's equity market value changes with changes in the overall market. It is the slope coefficient obtained through regression analysis of the stock return against the market return.*

Keywords: Beta, systematic risk, unsystematic risk, volatility, security, portfolio

1. Introduction

Every business has Systematic & Unsystematic risks in its operation. Systematic risk is the market risk, which is the uncertainty in the entire market. Systematic risk also referred as volatility, it consists of the day-to-day fluctuations in a stock's price. Volatility is a measure of risk because it refers to the performance of investor's investment. Market movement is the reason so that people can make money from stocks. Volatility is essential for returns, and the more unstable the investment, the more chance that there is dramatic change in either direction. Unsystematic risk is the type of uncertainty that comes with the company or industry investor invests in. It can be reduced through diversification.

Beta and Volatility
Beta is a measure of the volatility, or systematic risk, of a portfolio in comparison to the market as a whole. Beta gives a sense of a stock's market risk compared to the greater market. It is used to compare a stock's market risk to that of other stocks. Investment analysts use the Greek letter 'ß' to represent beta. It is calculated using regression analysis; it is the tendency of a security's returns to respond to swings in the market. Beta is a measure of a stock's volatility in relation to the market. It measures the exposure of risk a particular stock or sector has in relation to the market. If investor wants to know the systematic risk of his portfolio, he can calculate its beta.

Interpretation of Beta
- A beta of 0 indicates that the portfolio is uncorrelated with the market.
- A beta less than 0 indicate that it moves in the opposite direction of the market.
- A beta between 0 and 1 signifies that it moves in the same direction as the market, with less volatility.
- A beta of 1 indicates that the portfolio will move in the same direction, have the same volatility and is sensitive to systematic risk.
- A beta greater than 1 indicates that the portfolio will move in the same direction as the market, with a higher magnitude, and is very sensitive to systematic risk.

1.1 Importance of Study

Beta helps us to understand the concepts of passive and active risk. The graph below shows a time series of returns (each data point labeled "+") for a particular portfolio R(p) versus the market return R(m). The returns are cash-adjusted, so the point at which the x and y axes intersect is the cash-equivalent return. Drawing a line of best fit through the data points allows us to quantify the passive, or beta, risk and the active risk, which we refer to as alpha.
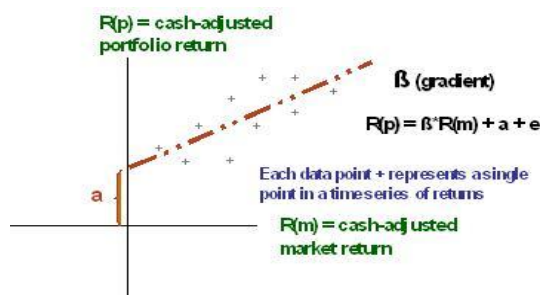
The gradient of the line is its beta. For example, a gradient of 1.0 indicates that for every unit increase of market return, the portfolio return also increases by one unit. A manager employing a passive management strategy can attempt to increase the portfolio return by taking on more market risk (i.e., a beta greater than 1)

Formula:
$$\beta: \frac{Covariance\,(X, Y)}{Variance\,(Y)}$$

Where X & Y are the variables

2. Need of the study

Basically many investors are not ready take a loss on their investments therefore they opt for low volatility investments; some people may take additional risk in the investment because it comes the possibility of increased reward. Investors have not only a good understanding of their risk tolerance, but also know which investments match their risk preferences. By using beta to measure volatility of stocks, an investor may choose those securities which meet his criteria for risk. Investors who are very risk-averse should put their money into investments with low betas such as utility stocks and Treasury bills.

3. Literature Review

1) Kolani Pamane & Anani Ekoue Vikpossi (2014)[1] in "*An Analysis of the Relationship between Risk and Expected Return in the BRVM Stock Exchange: Test of the CAPM",* the author mentioned that Financial risks are a relatively recent phenomenon. An investment's actual return will be different than expected return which includes the possibility of losing some or all of the original investment. Recently the finance discipline has developed much theory about the risk measurement and its use in assessing returns. The two major components of this theory are beta β, takes as a measure of risk, and the CAPM, which uses beta to estimate return.

2) Domagoj Karacic & Ivana Bestvina Bukvic "*Research of Investment Risk Using Beta Coefficient"* Faculty of Economics, Josip Juraj Strossmayer University of Osijek, 2010.

3) This paper describes the usefulness of the beta coefficient in the different types of investments risk analysis. They found that, in the period 2003-2010, according to analyst projections, the investments in capital projects were, in average, less risky compared to investing in a portfolio of selected stocks. It was also found that the expected return on investment in a portfolio of selected stocks is 1.4 times greater than the average expected return on investment in capital projects (measured by the CAPM model).

4) John Y. Campbell & Tuomo Vuolteenaho *"Bad Beta, Good Beta",* Harvard University Cambridge, Massachusetts, August 2003, in this paper, the authors have broken the CAPM beta of a stock into two components, first about the market's future cash flows and second which reflects market's discount rates. They concluded that the beta of stock's market future cash flow should have a higher price of risk; thus beta comes in "bad" and "good" varieties.

3.1 Research Gap

Those investors who are willing to take more risk may want to invest in stocks with higher betas. Many brokerage firms calculate the betas of securities they trade, and then publish their calculations in a beta book. These books offer estimates of the beta for almost any publicly-traded company. The problem is that most of investors don't have access to these brokerage books, and the calculation for beta can often be confusing, even for experienced investors. However, there are other resources like by visiting NSE or BSE websites, investors can calculate beta of Target Company.

3.2 Steps in Systematic risk (Beta) calculation:

a) Steps to be followed for calculation of Equity stock index of Target Company
Step 1: Go to https://www.nseindia.com/
Step 2: Go to products and under Capital market tab select Equities option.
Step 3: Under Equities choose Historical data
Step 4: Under Historical data, go to Security wise price/volume archive tab
Step 5: In Security wise price/volume archive tab click on search option

Step 6: Enter the Symbol of Target Company ex. BAJAJ – AUTO, for Bajaj Auto Limited.
(Investor can search company name and symbol on the same page above)
Step 7: Select the series i.e. EQ (that is equity stock index of target company)
Step 8: Investor can select an option of period/ time period, if he/she select a time period option
In the form of **From –To**, it should be minimum 1 day & maximum 365 days.
Ex 1st April 2018 to 31st March 2019 or less than.
(Investor should select a time period of one week, one month, one quarter or one year).
Step 9: Select the option of Get data & download file in csv format,
Step 10: Record date wise closing price of equity stocks.

b) Steps to be followed for calculation of Nifty Index
Step 1: Go to https://www.nseindia.com/
Step 2: Go to products and select Capital market tab and click on Indices tab.
Step 3: Select Historical data tab
Step 4: Go to Historical data index and click on search
Step 5: Select Index NIFTY 50
Step 6: Select time period, in the form of From –To, it should be minimum 1 day & maximum 365 days. Ex. 1st April 2018 to 31st March 2019 or less than.
(Investor should select a time period of one week, one month, one quarter or one year).
Step 7: Select the option of Get data
Step 8: After pressing get data option, you can download file in csv format,
Step 9: Record date wise closing price of NIFTY Index

c) Steps to be followed for calculation of Systematic risk Beta
Step1: After getting Equity Stock Index and Nifty Index, compare daily returns of NIFTY & Equities of Target Company.
Step 2: Calculate daily return of Nifty and Target Company.
Daily returns= (Closing stock price of next day minus Closing stock price of previous day)/ (Closing stock price of previous day)*100.
Step 3: in Microsoft Excel, choose formula of Slope.
Slope = Daily returns from first day to last day of NIFTY index with Daily returns first day to last day of equities of Target company.
Step 4: Select the data in above range and press and enter, you will get slope value which is nothing but beta.

3.3 Research Methodology

Researcher has designed step by step process of calculation of Beta value of Target Company. Sample of one company i.e. Bajaj Auto Limited is taken for analysis. Daily closing stock index of NEFTY and daily closing equity stock price of Bajaj Auto Limited has been noted from the date 3rd December 2018 to 7th January 2019 (approx. one month), from this data, daily returns are calculated. From the calculated data of daily returns of NIFTY and Bajaj Auto limited, formula of slope is used to calculate beta value.

3.3.1 Type of Research: Analytical/ Case Study

3.3.2 Type of data required: Secondary data

3.3.3 Source of data collection: National Stock Exchange Website

3.3.4 Tools used for data analysis: Regression Analysis (Slope)

3.4 Data Analysis

Calculation of Beta Factor of Bajaj Auto Ltd.					
Nifty Index			Bajaj Auto Equity Index		
Date	Close price	Daily Returns	Date	Close Price	Daily Returns
3-Dec-18	10883.75		3-Dec-18	2736	
4-Dec-18	10869.5	-0.13	4-Dec-18	2763.85	1.02
5-Dec-18	10782.9	-0.80	5-Dec-18	2764.1	0.01
6-Dec-18	10601.15	-1.69	6-Dec-18	2718.1	-1.66
7-Dec-18	10693.7	0.87	7-Dec-18	2786.2	2.51
10-Dec-18	10488.45	-1.92	10-Dec-18	2725.1	-2.19
11-Dec-18	10549.15	0.58	11-Dec-18	2739.6	0.53
12-Dec-18	10737.6	1.79	12-Dec-18	2848.4	3.97
13-Dec-18	10791.55	0.50	13-Dec-18	2836.1	-0.43
14-Dec-18	10805.45	0.13	14-Dec-18	2823.15	-0.46
17-Dec-18	10888.35	0.77	17-Dec-18	2840.95	0.63
18-Dec-18	10908.7	0.19	18-Dec-18	2840.9	0.00
19-Dec-18	10967.3	0.54	19-Dec-18	2863	0.78
20-Dec-18	10951.7	-0.14	20-Dec-18	2887.2	0.85
21-Dec-18	10754	-1.81	21-Dec-18	2808.45	-2.73
24-Dec-18	10663.5	-0.84	24-Dec-18	2724.65	-2.98
26-Dec-18	10729.85	0.62	26-Dec-18	2734.6	0.37
27-Dec-18	10779.8	0.47	27-Dec-18	2737	0.09
28-Dec-18	10859.9	0.74	28-Dec-18	2717.5	-0.71
31-Dec-18	10862.55	0.02	31-Dec-18	2720.15	0.10
1-Jan-19	10910.1	0.44	1-Jan-19	2726.65	0.24
2-Jan-19	10792.5	-1.08	2-Jan-19	2692	-1.27
3-Jan-19	10672.25	-1.11	3-Jan-19	2701.35	0.35
4-Jan-19	10727.35	0.52	4-Jan-19	2734.2	1.22
7-Jan-19	10771.8	0.41	7-Jan-19	2658.55	-2.77

Slope/Beta	**0.41**

Source: Self generated through Microsoft Excel

3.5 Interpretations

1) Above table represents performance of Equity Index with NIFTY Index, by comparing these two indices in slope we can get value of slope (Beta).
2) Slope value (Beta) is 0.41. It shows that Nifty indices and Equity indices of Bajaj Auto limited are moving in the same direction.
3) If there is increase in Nifty Index, Equity share price of Bajaj Auto Ltd, increases on that day, and if there is decrease in Nifty index, Equity share price of Bajaj Auto Ltd, decreases on that day.
4) Value of beta/slope is 0.41; it shows that share is not so much volatile with respect to market. Hence there is less risk in investment in such company.
5) For long term investment purpose, investor should calculate slope of more than one year.

4. Findings

1) Regression analysis can be conducted for listed companies because historical stock-return data is used.
2) It is not useful to check the volatility of private companies because due to the lack of market data on stock prices of private companies, it is not possible to estimate stock beta. Therefore, other methods are required to estimate such company's beta.

5. Conclusion

Most provided betas use the American standard of the S&P 500 Index. If investment portfolio contains equities which extend beyond U.S. borders, like a company that is based and operated in China or India, the S&P 500 may not be the best measure of the market. By calculating investor's own beta by above method, he can adjust for these differences and create a more encompassing view of risk. One distinct advantage of calculating the beta yourself is the ability to gauge the beta's reliability. This is a powerful tool that can determine how well calculated beta measures risk.

References

[1] Kolani Pamane & Anani Ekoue Vikpossi ,in "*An Analysis of the Relationship between Risk and Expected Return in the BRVM Stock Exchange: Test of the CAPM*" March 1, 2014 Research in World Economy, Vol. 5, No. 1.
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Websites
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