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BETA VALUES FOR RISK ESTIMATION

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Abstract
One of the most important measures of stock risk or volatility is a stock's beta. The investor or an analyst generally looks at a stock's beta before making a purchase decision. It is a one glance measure that provides stock analysts and investors with an insight on whether the price of that security has been more or less volatile than the market, which is a good variable to comprehend before adding any security to a portfolio. This is an important step to take as part of any robust stock research effort. The article is an attempt to define the concept of beta, the theory upon which it is based, the computation of the measure and an insight into the correct use of beta values in the analysis of a stock. It also explicitly gives a practical explanation on the calculation of beta, as well as a link to a spreadsheet that can be used to calculate these values. The outcome of this paper is to create an overall understanding of how to use this measure in practice

Introduction

Beta measures the unsystematic risk of the company. The measure is one of several values that stock analysts use to get a better feel for a stock's risk profile. It is also sometimes referred to as financial elasticity. The beta value is calculated using price movements of the stock which is analysed. The movements are then compared to the movements of an overall market indicator, such as a market index, over the same period of time.

Beta values are easy to interpret. If the stock's price experiences movements that are greater and more volatile than the stock market, then the beta value will be greater than 1. If a stock's price movements, are less than those of the market, then the beta value will be less than 1. An increased volatility of stock price means more risk to the investor, its reasonable expecting greater returns from stocks with betas over 1. The reverse is true if a stock's beta is less than 1; expect less volatility, lower risk, and therefore lower overall returns.

Capm Theory and Beta

The Capital Asset Pricing Model explains the relationship between risk and expected return. The risk premium equals to the beta of security times a risk premium of the security. (Kuerschner, 2008). Stock beta values are a key element when using the CAPM. According to the CAPM, the risk free rate and the market risk premium was the same for all companies, it is only beta that is different for each company (Koller et. al, 2005) the CAPM is developed as a method to evaluate market risk (Mukherji, 2011; Hillier et al., 2008). For example, by using the following CAPM formula we can calculate the expected rate of return on an investment as:

Expected Rate of Return = r = rf + B (rm - rf)

Where:

- rf = The risk-free interest rate
- B = A stock beta
- rm = The expected market return is the return the investor would expect to receive from a broad stock market index. In the current study it is the BSE SENSEX

Translating this CAPM formula into words:

"The expected return on an investment is equal to the return on a risk-free investment plus the risk premium that's associated with the stock market itself, adjusted for the relative risk of the common stock chosen."

Review of Literature

Academic literature suggests that there are beta is useful for the risk estimation and returns of firms. The following literature provides evidence of the relationship between the calculated beta of stocks and returns from the stock.

Fama and French (1992) examined the relationship between betas and returns between 1963 and 1990 and concluded that there was no relationship. These results had been contested on three fronts. First, Amihud, Christensen, and Mendelson (1992) used the same data, performed different statistical tests, and showed that differences in betas explained the differences in returns during the time period. Second, Kothari and Shanken (1995) estimated betas using annual data and inferred that betas explained a significant proportion of the differences in returns across investments. Third, Chan and Lakonishok (2001) studied a longer time series of returns from 1926 to 1991 and established a positive relationship between betas and returns in the period after 1982. They found that betas were a useful guide to risk in extreme market conditions, with the riskiest firms

(the 10 percent with highest betas) performing far worse than the market as a whole in the 10 worst months for the market between 1926 and 1991.

Objectives of the Study

The following are described as the objectives of the study:

1. To measure the beta value of shares of the selected companies using the spreadsheet program and also estimate alpha arising from the implementation the same with the use of the market index SENSEX.
2. To evaluate the beta value as a risk and performance measure of the firm.
3. To differentiate the domestic and multinational companies in terms of its expected returns with the use of beta values.

Methodology

Beta calculated values are easily available on several databases and websites but the study itself estimates beta values using data for a twelve month period. Share price data from the website moneycontrol.com and market index values of BSE SENSEX from the BSE website had been used in fairly straightforward linear regression technique which is the most preferred approach. Thus beta is computed with the help of a spreadsheet application risk.xls developed by Professor Aswath Damodaran, Stern School of Business, New York which also gives the various statistics for risk and performance assessment. To calculate a stock's beta the data needed includes:

- Closing month-end stock prices for the stock being examined.
- Closing month end prices for the index (BSE SENSEX Index) being chosen as a proxy for the stock market.
- Dividend information

The formula for this metric can be written as:
Beta = Covariance (stock versus market returns) / Variance of the Stock Market

Alpha Values

The spreadsheet also includes the calculation of alpha values, which is a measure of excess returns on an investment, adjusted for risk. This is a commonly used to assess the performance of a portfolio manager as it's an indicator of their ability to provide returns in excess of a benchmark such as the BSE SENSEX Index. For example: If alpha < risk-free investment return, then the firm has destroyed value; if alpha = risk-free investment return, then the firm has neither created nor destroyed value; and if alpha > risk-free investment return, then the firm has created value.

Data Collection

This study is based on secondary data with select multinational and domestic companies which are listed in the Bombay Stock Exchange. Listing on exchange is a prerequisite since the stock price information is required. The study has an inclusive sample of thirty two companies from different industries pertinent for the growth of the economy such as Paints and Varnishes, Pharmaceuticals, Food and Beverages, Automobiles, Computer Software, Electrical Machinery, FMCG and Consumer Durables. As the study aims to draw comparison between the multinational and domestic companies in India, two companies from each of the above category of industries were chosen for the study.

The share prices and dividend information for a period of twelve months from 1st April 2015 to 31st March 2016 was collected from www.moneycontrol.com. The market index values for BSE SENSEX were taken from www.bseindia.com. BSE SENSEX was chosen because it is regarded as the pulse of the domestic stock market with thirty most actively traded stocks representing the various industrial sectors of the Indian economy.
The results of the computation of beta and alpha values are depicted in the following table:

Table 1: Computed values of beta and Alpha as risk parameters

	Intercept (Alpha)	**Slope (Beta)**	**Rf (1- Beta)**	**Intercept - Rf (1-Beta)**
Co1	0.007197439	0.474931728	0.002297929	0.00489951
Co 2	0.005457404	0.668504661	0.001450769	0.004006635
Co 3	0.009427177	0.443067564	0.002437381	0.006989796
Co 4	0.00140139	0.576351467	0.001854072	-0.000452682
Co 5	-0.006373355	1.360766827	-0.001578874	-0.004794481
Co 6	0.004204227	1.223857344	-0.000979698	0.005183925
Co 7	-0.008165635	0.24713168	0.003294882	-0.011460517

Co 8	0.034726502	1.939426212	-0.004111341	0.038837844
Co 9	0.038538007	2.161304054	-0.005082376	0.043620383
Co 10	-0.011616433	2.179526956	-0.005162127	-0.006454305
Co 11	-0.004383587	-0.133116105	0.004959013	-0.009342601
Co 12	-0.030448918	3.01559248	-0.008821117	-0.021627801
Co 13	-0.050154954	0.680520919	0.001398181	-0.051553135
Co 14	0.060746645	3.074525101	-0.009079032	0.069825677
Co 15	0.022261346	0.383796439	0.002696777	0.019564569
Co 16	-0.006737733	0.978004912	9.62602E-05	-0.006833993
Co 17	0.018347968	1.283404163	-0.001240301	0.019588269
Co 18	0.021954435	0.5179539	0.002109645	0.01984479
Co 19	0.030555253	2.26395283	-0.005531612	0.036086865
Co 20	-0.00743211	0.944895643	0.000241161	-0.007673271
	Intercept (Alpha)	**Slope (Beta)**	**Rf (1- Beta)**	**Intercept - Rf (1-Beta)**
Co 21	-0.00743211	0.944895643	0.000241161	-0.007673271
Co 22	-0.003551632	0.930708811	0.000303249	-0.003854881
Co 23	0.010635782	1.253778867	-0.001110648	0.01174643
Co 24	0.015551853	2.421912744	-0.006222914	0.021774767
Co 25	0.013201943	1.250466082	-0.001096149	0.014298092
Co 26	0.019188355	0.73718809	0.00115018	0.018038175
Co 27	0.000194073	0.673829457	0.001427465	-0.001233392
Co 28	-0.010862846	-3.56712675	0.01998775	-0.030850596
Co 29	-0.006565006	-1.353154561	0.010298437	-0.016863443
Co 30	0.023193005	1.91120719	-0.003987842	0.027180847
Co 31	0.001968375	1.699773933	-0.003062518	0.005030892
Co 32	0.006156181	1.03477669	-0.000152198	0.006308379

The regression model for calculating the beta is useful as it provides a means of performance evaluation. If there is a regress of (R-Rf) on (Rm-Rf), then the intercept of the regression, or the "alpha", provides an estimate of the amount by which the stock or a portfolio has beat the market after adjusting for the beta risk. The intercept of the regression will be equal to [alpha + Rf(1 - beta)]. So alpha = intercept – Rf (1-beta). A positive alpha means that the portfolio has outperformed the market. A negative alpha means that it has lagged behind
the market.

The companies that are found to have a negative alpha total 14 in number with nearly 60% poor performers in the MNC category. The industries in which two companies reveal poorer performance than the market are Food & Beverage, Pharmaceutical ,Electrical machinery and FMCG sectors. Out of these 14 companies which report a negative alpha, nine are those with high betas over .90 which explicitly brings out the relationship between the riskier stocks and poor performance stocks. Twelve stocks with high betas have produced returns higher than the market while low betas have resulted in positive returns. Thus the companies which high beta values can outperform or underperform in the market but those with low beta values can be considered to be safe provide lower but positive returns. Three stocks report negative betas which show that the stock moves in the opposite direction to
the SENSEX.

Investor Implications

Volatility may be a blessing or a curse based on the investor's reaction to it. Buying when everyone else is buying (the price is high) and selling in a panic when everyone else is selling (the price is low) makes volatility a curse. However if the nvestor anticipates volatility it is a blessing. The key is to remain focused on buying investments with a margin of safety. That means being disciplined in your approach to buying and selling. If you maintain a margin of safety it persuades one to buy at a low price and sell when the price exceeds its value.

Purchasing a high beta stock for more that it is worth means that the risk of losing your principal is very high (even greater than if you buy a low beta stock). The time to buy any asset which has a high beta stock is when the price is well below its real value. The risk is lower and your probability of a positive return is exponentially higher. Whether one is buying high beta stocks or dividend stocks; patience is required as investments should be made only when the price is less than the real value of the asset as this lowers risk substantially. Real risk lies is losing your principal. If you have an investment that is worth Rs.10,000 but only pay Rs.7,500 you have a 33% (Rs. 2,500 / Rs7,500) margin of safety.

When calculating any values using price movements over the past three years, it's important to remember the "past performance is no guarantee of future returns" rule applies to beta too. Value investing is important in conducting stock research that focuses on a company's fundamentals and an understanding of financial ratios before investing in a stock

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