



BETA

A Measure Of Market Risk

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Introduction

As the determination of the correct measure of the risk has implications on valuation, portfolio selection and capital budgeting, this issue has received ample attention in the financial literature. Capital Asset Pricing Model of Sharpe, Lintner and Mossin is undoubtedly the most popular approach to model risk-return relationship.

Types of Risks

In the context of CAPM, the risk of an asset can be decomposed into two components.

UNSYSTEMATIC RISKS

Specific to individual asset and can be eliminated by means of diversification.

SYSTEMATIC RISKS

Related to overall market and diversification cannot eliminate it.

Beta: Meaning

- We cannot reduce market risks or systematic risks but we can have a measure of these risks with the help of beta.
- With the help of beta we can approximately tell how much a particular stock will move if we know how much the whole stock market is going to move.
- Thus, beta tells us what the volatility is in a particular stock with respect to movements in the stock market.

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- Beta is also referred to as financial elasticity, and can be referred to as a measure of the sensitivity of the asset's returns to market returns.
- It does not measure the risk of an investment held on a stand-alone basis, but the amount of risk the investment adds to an already-diversified portfolio.
- In the CAPM, beta risk is the only kind of risk for which investors should receive an expected return higher than the risk-free rate of interest.

Beta: Definition

“The Beta Coefficient in terms of finance and investing is a measure of the systematic risk of a stock or portfolio. It quantifies relative volatility in relation to the overall market, which is defined as having a beta of 1.”

Calculation

- Beta is calculated on historical basis with the help of historical returns on a particular stock and historical returns on the stock market.
- The whole method consists of finding covariance between the market returns and stock returns and dividing it by the variance of market returns.

Steps in Calculation

Step 1	Step 2	Step 3
<p>Download the historical prices for the stock and the benchmark index</p>	<p>Calculate the percentage returns for both the stock and the index.</p>	<p>Calculate Stock's Beta using the following formula</p>

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- It is calculated with the help of the following formula:

$$\beta_i = \frac{\text{Cov}(R_i, R_m)}{\text{Var}(R_m)}$$

- Where :
 - R_i measures the rate of return of the stock
 - R_m measures the rate of return of the portfolio
 - $\text{Cov}(R_i, R_m)$ is the covariance between the rates of return

How to Interpret Beta

- The market itself has an underlying beta of 1.0, and individual stocks are ranked according to how much they deviate from the market.
- A stock that swings more than the market (i.e. more volatile) over time has a beta whose absolute value is above 1.0.
- If a stock moves less than the market, the absolute value of the stock's beta is less than 1.0.
- For e.g. when the market has an overall decline of 3% a stock with a beta of 2 will fall 6%, and vice versa.

Value of Beta	Interpretation	Example
$\beta < 0$	Asset moves in the opposite direction as compared to the index	An inverse exchange-traded fund
$\beta = 0$	Movement of the asset is uncorrelated with the movement of the benchmark	Fixed-yield assets
$0 < \beta < 1$	Movement of the asset is in the same direction , but less than the movement of the benchmark	Stable, "staple" stock such as a company that makes soap.
$\beta = 1$	Movement of the asset is in the same direction as, and about the same amount	A representative stock
$\beta > 1$	Movement of the asset in the same direction, but more than the movement of the benchmark	Stocks strongly influenced by day-to-day market news

Beta – Uses and Facts

- Beta is calculated on historical prices thus it does not provide the exact picture for future and are backward looking
- Beta has no upper or lower bound, and betas as large as 3 or 4 will occur with highly volatile stocks.
- Beta can be zero. Some zero-beta assets are risk-free, such as treasury bonds.
- A negative beta simply means that the stock is inversely correlated with the market.

Beta - Criticisms

- Past price fluctuations cannot completely describe the risk in a security as past fluctuation cannot give exact picture of future.
- Doesn't tells us about the return interval to be used for the purpose of estimating beta.
- Doesn't tell us about the time period to be measured for calculation.
- Beta views risk solely from the perspective of market prices, failing to take into consideration specific business fundamentals or economic developments.

Conclusion

- Beta is quantifiable, which makes it easy to use to work with and to communicate.
- It helps us to analyze in a broad range how much your stock returns can deviate.
- The past security price volatility does not reliably predict future investment performance and therefore beta is not the perfect measure of risks.
- It is an integral part of capital asset pricing theory which is used to calculate required returns on a stock.

Thank you!