Capital Asset Pricing Model (CAPM)

Introduction

Whenever an investment is made, for example in the shares of a company listed on a stock market, there is a risk that the actual return on the investment will be different from the expected return. Investors take the risk of an investment into account when deciding on the return they wish to receive for making the investment. The CAPM is a method of calculating the return required on an investment, based on an assessment of its risk. The Capital Asset Pricing Model (CAPM) describes the relationship between systematic risk, or the general perils of investing, and expected return for assets, particularly stocks. It is a finance model that establishes a linear relationship between the required return on an investment and risk. The model is based on the relationship between an asset's beta, the risk-free rate (typically the Treasury bill rate), and the equity risk premium, or the expected return on the market minus the risk-free rate.

Definition

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When to Use it

CAPM for ascertaining risks and returns takes into account systematic risk, which is often left out with other valuation models. Systematic risks are important, as it is an important unforeseen variable that cannot be mitigated. Similarly, CAPM eliminates unsystematic risk by assuming investors hold diversified portfolios.
CAPM is an ideal measurement tool for investment appraisal as it offers a much superior discount rate compared to other models. Simplistic calculations for ascertaining risks and returns are another reason why CAPM stands out. The model can be easily stress tested with a view of coming up with a range of outcomes.

Details

The formula for calculating the expected return of an asset, given its risk, is as follows:

$$ER_i = R_f + \beta_i \, (ER_m - R_f)$$

where:
ER_i = expected return of investment
R_f = risk-free rate
β_i = beta of the investment
$(ER_m - R_f)$ = market risk premium

Example:

For example, imagine an investor is contemplating a stock valued at $100 per share today that pays a 3% annual dividend. Say that this stock has a beta compared with the market of 1.3, which means it is more volatile than a broad market portfolio (i.e., the S&P 500 index). Also, assume that the risk-free rate is 3% and this investor expects the market to rise in value by 8% per year.
The expected return of the stock based on the CAPM formula is 9.5%:
$9.5\% = 3\% + 1.3 \times (8\% - 3\%)$
The expected return of the CAPM formula is used to discount the expected dividends and capital appreciation of the stock over the expected holding period. If the discounted value of those future cash flows is equal to $100, then the CAPM formula indicates the stock is fairly valued relative to risk.

References:

- Investopedia.com
- Stockmaster.com