Semester: VIII Subject: AIEB Academic Year: 2024-25

CAPITAL ASSET PRICING MODEL (CAPM):

The CAPM is a widely used financial theory that describes the relationship between the expected return of an asset and its risk. It helps investors to understand how the risk of an asset affects its expected return.

CAPM FORMULA:

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f)$$

where,

$E(R_i)$ = Expected Return of an asset i.

R_f = Risk free Rate.

β_i = Beta of the asset.

$E(R_m)$ = Expected return of the market.

$E(R_m) - R_f$ = Market risk premium.

Key Components of the CAPM MODEL:

(1) Risk free Rate:

Risk free rate represents the return on an investment with zero risk. These assets carry no default risk and their returns are known with certainty.

(2) Beta (B):

→ Beta is a measure of an assets' risk in relation to the overall market.

→ B = 1, the asset is expected to move in line with the market.

→ B > 1, the asset is more volatile than the market (more risk)

→ B < 1, the asset is less volatile than the market (less risk).

(3) Market Risk Premium (E(Rm) - Rf):

The market risk premium is the return expected from the market in excess of the risk-free rate. It compensates investors to take on the additional risk on investing in the market compared to a risk-free asset.

Example:

Let's assume you are analyzing a stock having the following information:

The risk free rate (Rf) = 4%.

Expected market rate E(Rm) = 10%

Beta of the stock $\beta = 1.5$

Solution:

Using the CAPM formula:

$$E(R_i) = R_f + \beta_i (E(R_m) - R_f).$$

Substitute the values:

$$E(R_i) = 4\% + 1.5 (10\% - 4\%)$$
$$= 4\% + 1.5 (6\%)$$

$$\boxed{E(R_i) = 13\%}$$

The expected return of the stock is 13%. This means that, based on its beta of 1.5 and the market's expected return of 10% the investor should expect to earn a return of 13% on this stock, considering both the risk-free and the additional risk due to market volatility.