Finance - Capital Asset Pricing Model (CAPM)

Introduction

The Capital Asset Pricing Model (CAPM) is used to determine the expected return on an asset based on its beta (systematic risk) and the expected market return. The formula used in CAPM is:

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

Where:
$E(R_i)$ is the expected return on the asset.
R_f is the risk-free rate.
β_i is the beta of the asset.
$E(R_m)$ is the expected return on the market.

Given Data

Risk-free rate (R_f) = 2.3%
Expected market return ($E(R_m)$) = 8.3%
Company A: $\beta_A = 0.74$, Expected return = 6.39%
Company B: $\beta_B = 1.08$, Expected return = 9.28%
Company C: $\beta_C = 1.24$, Expected return = 9.74%

Step-by-Step Solution

Step 1: Calculate the Expected CAPM Return for Each Company

Step 1.1: Calculate the expected return for Company A:

$$E(R_A) = R_f + \beta_A (E(R_m) - R_f)$$ $$E(R_A) = 2.3\% + 0.74 \times (8.3\% - 2.3\%)$$ $$E(R_A) = 2.3\% + 0.74 \times 6\%$$ $$E(R_A) = 2.3\% + 4.44\%$$ $$E(R_A) = 6.74\%$$

Explanation: The expected return for Company A is calculated using the CAPM formula. It uses the risk-free rate, the beta of Company A, and the market return.

Step 1.2: Calculate the expected return for Company B:

$$E(R_B) = R_f + \beta_B (E(R_m) - R_f)$$ $$E(R_B) = 2.3\% + 1.08 \times (8.3\% - 2.3\%)$$ $$E(R_B) = 2.3\% + 1.08 \times 6\%$$ $$E(R_B) = 2.3\% + 6.48\%$$ $$E(R_B) = 8.78\%$$

Explanation: The expected return for Company B is calculated using the CAPM formula. It uses the risk-free rate, the beta of Company B, and the market return.

Step 1.3: Calculate the expected return for Company C:

$$E(R_C) = R_f + \beta_C (E(R_m) - R_f)$$ $$E(R_C) = 2.3\% + 1.24 \times (8.3\% - 2.3\%)$$ $$E(R_C) = 2.3\% + 1.24 \times 6\%$$ $$E(R_C) = 2.3\% + 7.44\%$$ $$E(R_C) = 9.74\%$$

Explanation: The expected return for Company C is calculated using the CAPM formula. It uses the risk-free rate, the beta of Company C, and the market return.

Step 2: Compare the Calculated Expected Returns with the Given Expected Returns

Step 2.1: Company A:

Calculated $E(R_A) = 6.74\%$
Given Expected Return = 6.39\%
Since 6.74% ≠ 6.39%, Stock A is **not correctly priced**.

Explanation: The calculated return for Company A does not match the given expected return, indicating it is not correctly priced.

Step 2.2: Company B:

Calculated $E(R_B) = 8.78\%$
Given Expected Return = 9.28\%
Since 8.78% ≠ 9.28%, Stock B is **not correctly priced**.

Explanation: The calculated return for Company B does not match the given expected return, indicating it is not correctly priced.

Calculated \[E(R_C) = 9.74\% \]
Given Expected Return = 9.74\%
Since 9.74% = 9.74%, Stock C is **correctly priced**.

Explanation: The calculated return for Company C matches the given expected return, indicating it is correctly priced.

Final Solution:

Stock A is **not correctly priced**.
Stock B is **not correctly priced**.
Stock C is **correctly priced**.

This solution has demonstrated the step-by-step calculation using the CAPM formula and a detailed comparison to find which stocks are correctly priced based on the given data.