

# **CFA LEARNING OUTCOMES DECODED**

In our series *Learning Outcomes Decoded*, we break down a single Learning Outcome Statement (LOS) from the CFA level 1 curriculum. This article is written by Andrew White, CFA. Andrew is a portfolio manager at Awaken Capital and a Content Developer on the CFA team at the Princeton Review.

# PORTFOLIO MANAGEMENT: CAPITAL ASSET PRICING MODEL: APPLICATIONS

**LOS: Calculate and interpret the expected return of an asset using the CAPM**

---

This LOS is a major point in the implementation section of the learning module. It is highly testable material. Understanding this LOS requires a knowledge of the Capital Asset Pricing Model on both conceptual and quantitative levels.

## The Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is a significant development in portfolio theory that builds on Markowitz's work on diversification and modern portfolio theory. The CAPM provides a linear expected return–beta relationship that determines the expected return of an asset, given the beta of that asset.

The CAPM asserts that the expected returns of assets vary only by their systematic risk as measured by beta. Two assets with the same beta will have the same expected return irrespective of the unique risks of those assets. Given the relationship between risk and return, all assets are therefore defined only by their beta risk, as described by the CAPM using the following equation.

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

Where

$E(R_i)$  = Expected return for asset  $i$

$R_f$  = Risk-free rate of return

=  $\beta_i$  = Beta of asset  $i$

$E(R_m)$  = Expected return for the market

# PORTFOLIO MANAGEMENT: CAPITAL ASSET PRICING MODEL: APPLICATIONS

**LOS: Calculate and interpret the expected return of an asset using the CAPM**

---

## Assumptions of the CAPM

To gain insight into the pricing of assets, the CAPM makes various assumptions that simplify the reality of financial markets and therefore limit the applicability of the model.

- Investors are risk-averse, utility-maximizing, rational individuals.
- Markets are frictionless, including no transaction costs and no taxes.
- Investors plan for the same single holding period.
- Investors have homogeneous expectations or beliefs.
- All investments are infinitely divisible.
- Investors are price takers.

Nonetheless, the CAPM offers powerful predictions about risk and the relationship between risk and return. The expected return, which can and does differ from actual realized return, can be and is used in capital budgeting. Expected return, also known as required rate of return, is used to discount a series of future cash flows to evaluate a proposed project.

## Example: CAPM Expected Return

Suppose the risk-free rate is 3%, the expected return on the market portfolio is 13%, and the beta of asset to the market is 1.4. Calculate the asset's expected return.

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f] = 3\% + 1.4 \times (13\% - 3\%) = 17\%$$

## PORTFOLIO MANAGEMENT: CAPITAL ASSET PRICING MODEL: APPLICATIONS

**LOS: Calculate and interpret the expected return of an asset using the CAPM**

---

### PRACTICE QUESTION

The US risk-free rate is 4%, the expected return on the market portfolio is 9%, and the beta of an asset to the market is 0. What is the expected return of the asset?

- A. 0%
- B. 4%
- C. 9%

**B is correct.** As the asset has a beta of 0 to the market, its expected return is effectively the same as the risk-free-rate of return, using the CAPM.

$$4\% + 0 * (9\% - 3\%) = 4\%$$