NPTEL

Course Name: Security Analysis and Portfolio Management

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Session 23: Capital Market Theory-I

1. What is the meaning of Capital Asset Pricing Model?

Ans.

Asset pricing theory helps us to understand the cross-sectional differences in expected returns for a given set of assets. It offers a framework to identify and measure risk as well as assign rewards for risk bearing.

- The Capital Asset Pricing Model (CAPM) indicates what should be the expected or required rates of return on risky assets. It helps to value an asset by providing an appropriate discount rate to use in dividend valuation models. It can be used to compare an estimated rate of return to the required rate of return implied by CAPM for over/under valued securities CAPM will allow you to determine the required rate of return for any risky asset. This helps to value an asset by providing an appropriate discount rate to use in dividend valuation models

Major Assumptions:

i. All investors are Markowitz efficient investors who want to target points on the efficient frontier.
ii. Investors can borrow or lend any amount of money at the risk-free rate of return (RFR).
iii. All investors have homogeneous expectations; that is, they estimate identical probability distributions for future rates of return.
iv. All investors have the same one-period time horizon such as one-month, six months, or one year.
v. All investments are infinitely divisible, which means that it is possible to buy or sell fractional shares of any asset or portfolio.
vi. There are no taxes or transaction costs involved in buying or selling assets.
vii. There is no inflation or any change in interest rates, or inflation is fully anticipated.
viii. Capital markets are in equilibrium. This means that we begin with all investments properly priced in line with their risk levels.

2. How Risk-Free Asset can influence portfolio expected risk and return prospective?

Ans.

Risk-Free Asset:

- An asset with zero standard deviation
- Zero correlation with all other risky assets
- Provides the risk-free rate of return (RFR)
- Will lie on the vertical axis of a portfolio graph
- The existence of a risk-free asset resulted in deriving a capital market line (CML) that became the relevant frontier
- The covariance of the risk-free asset with any risky asset or portfolio will always equal zero. Similarly the correlation between any risky asset and the risk-free asset would be zero.
- Combining a Risk-Free Asset with a Risky Portfolio
  Expected return: the weighted average of the two returns is a linear relationship.

$$E(R_{port}) = W_{RF}(RFR) + (1 - W_{RF})E(R_i)$$

- Therefore, the standard deviation of a portfolio that combines the risk-free asset with risky assets is the linear proportion of the standard deviation of the risky asset portfolio.

3. What is the difference between Capital Market Line and Securities Market Line?

- Capital Market Line: Slope of the CML is the market price of risk for efficient portfolios, or the equilibrium price of risk in the market. Relationship between risk and expected return for portfolio P (Equation for CML):

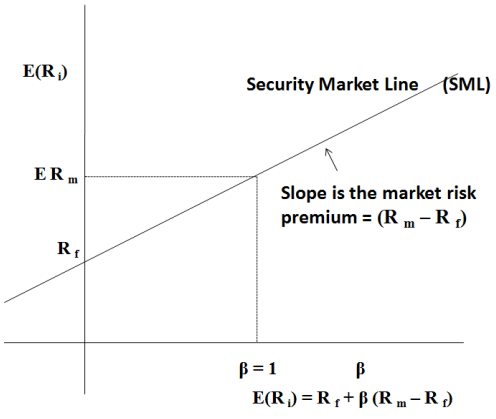
$$E(R_p) = RF + \frac{E(R_M) - RF}{\sigma_M}\sigma_p$$

- The CML leads all investors to invest in the M portfolio. Individual investors should differ in position on the CML depending on risk preferences. Risk averse investors will lend part of the portfolio at the risk-free rate and invest the remainder in the market portfolio

Security Market Line (SML): SML estimates the return of a single security relative to its exposure to systematic risk. It helps to find out that whether the expected return on the securities is better than the risk which he is taking.

The Security Market Line (SML):

$$E(R_i) = RFR + \frac{R_M - RFR}{\sigma_M^2}(Cov_{i,M})$$



Implication of SML for determining the Expected Rate of Return for a Risky Asset

- In equilibrium, all assets and all portfolios of assets should plot on the SML
- Any security with an estimated return that plots above the SML is underpriced
- Any security with an estimated return that plots below the SML is overpriced

- A superior investor must derive value estimates for assets that are consistently superior to the consensus market evaluation to earn better risk-adjusted rates of return than the average investor
- Compare the required rate of return to the expected rate of return for a specific risky asset using the SML over a specific investment horizon to determine if it is an appropriate investment

CML a special case of SML. While CML represents Return potential and risk involved in all financial asset across the Capital market, SML is the linear relationship between the expected return of security and its systematic risk, the expected return comparing a risk-free return plus a risk premium.

4. What are the Characteristics of the Market Portfolio?

Ans.

Characteristics Market Portfolio:

- All risky assets must be in portfolio, so it is completely diversified: Includes only systematic risk
- All securities included in proportion to their market value
- Contains worldwide assets: Financial and real assets

Most important implication of the CAPM

- All investors hold the same optimal portfolio of risky assets
- The optimal portfolio is at the highest point of tangency between Capital Market Line (CML) and the efficient frontier
- The portfolio of all risky assets is the optimal risky portfolio
- Called the market portfolio