NPTEL

Course Name: Security Analysis and Portfolio Management

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Capital Asset Pricing Model-II

1. What is the meaning of Market Risk Premium and how to calculate it?

Ans:

Market Risk Premium (ERP) is calculated based on historical data as the difference between the average return on stocks and the average risk free rate. It is the expected excess of the aggregate return (R_t^e) in the stock market over the risk free rate (R_t^f). Since the expected rate of return on any stock represents the cost of equity capital for the company, it is also considered as an important factor in corporate finance decision.

The ERP is defined as the return on equity minus the risk-free rate of return:

$$ERP_t = R_t^e - R_t^f$$

The slope of the security market line (SML) also the measures market risk premium.

Determinants of Risk Premium:
- Variance in the Underlying Economy
- Political Risk
- Market Structure

2. What is the relationship between Systematic Risk and Return?

Ans:

- Effect of Skewness on Relationship: investors prefer stocks with high positive skewness that provide an opportunity for very large returns
- Effect of Size, P/E, and Leverage: size, and P/E have an inverse impact on returns after considering the CAPM. Financial Leverage also helps explain cross-section of returns
- Effect of Book-to-Market Value: Fama and French questioned the relationship between returns and beta in their seminal 1992 study. They found the BV/MV ratio to be a key determinant of returns
- Summary of CAPM Risk-Return Empirical Results: the relationship between beta and rates of return is a moot point

3. How to estimate the Characteristic Line?

Ans:

Calculating Systematic Risk: The Characteristic Line

The systematic risk input of an individual asset is derived from a regression model, referred to as the asset's characteristic line with the model portfolio:

$$R_{i,t} = \alpha_i + \beta_i R_{M,t} + \varepsilon$$

where:

$R_{i,t}$ = the rate of return for asset i during period t

$R_{M,t}$ = the rate of return for the market portfolio M during t

$$\alpha_i = R_i - \beta_i R_m$$
$$\beta i = Cov_{i,M} / \sigma_M^2$$

ε = the random error term

4. Explain the concept of Beta.

   Systematic risk of a portfolio is measured by beta of a security. It represents the tendency of a stock to move with the market or sensitivity of an asset's price to the changes in the market. Beta of a risk free security is zero while Beta of a market portfolio is one. A beta of less than 1 means that the security will be less volatile than the market.

The formula for the beta of an asset within a portfolio is

$$\beta_a = \frac{Cov(r_a, r_p)}{Var(r_p)},$$

   Where,

   ra measures the rate of return of the asset, rp measures the rate of return of the portfolio, and cov(ra,rp) is the covariance between the rates of return.

5. What is the critical evidence towards the empirical findings of Capital Asset Pricing Model?

Ans:

The Market Portfolio: Theory versus Practice

- There is a controversy over the market portfolio. Hence, proxies are used
- There is no unanimity about which proxy to use
- An incorrect market proxy will affect both the beta risk measures and the position and slope of the SML that is used to evaluate portfolio performance
- CAPM is criticized because of the difficulties in selecting a proxy for the market portfolio as a benchmark
- An alternative pricing theory i.e. Arbitrage Pricing Theory with fewer assumptions and multifactor models.
- Zero Beta Model : does not require a risk-free asset
- Differential Borrowing and Lending Rates : Heterogeneous Expectations and Planning Periods

- Heterogeneous Expectations and Planning Periods: will have an impact on the CML and SML
- Taxes: could cause major differences in the CML and SML among investors
- Stability of Beta: betas for individual stocks are not stable
- Factors other than beta seem important in pricing assets