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B.Com Honours

Semester V

Calicut University

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

Course Code: COM5EJ302 • Module 2 Notes

Module II: Risk and Return Analysis

Quantifying investment risk, expected returns, systematic vs unsystematic risk decomposition, Security Beta (β), and Value at Risk (VaR).

Unit 7: Concepts of Risk, Expected Return, & Risk Aversion

Expected Return is weighted average of returns under different economic states:

$$\text{Expected Return } E(R) = \sum_{i=1}^n (\text{Probability}_i \times \text{Return}_i)$$

Unit 8: Systematic vs. Unsystematic Risk

1. Systematic Risk (Non-Diversifiable / Market Risk): Caused by macroeconomic factors (interest rate changes, inflation, recession). Measured by Beta (β).

2. Unsystematic Risk (Diversifiable / Company-Specific Risk): Caused by internal factors (strikes, management changes, operational loss). Reduced to zero via diversification.

Unit 9: Measurement of Risk, Variance, Standard Deviation, & Beta

Risk measured by Standard Deviation (σ):

$$\text{Standard Deviation } \sigma = \sqrt{\sum P_i [R_i - E(R)]^2}$$

Security Beta (β) measures sensitivity relative to market index:

$$\text{Beta } \beta_i = \frac{\text{Covariance}(R_i, R_m)}{\text{Variance}(R_m)}$$

Unit 10: Value at Risk (VaR) Concept

Statistical technique measuring maximum expected financial loss of an asset/portfolio over a specific time horizon at a given confidence level (e.g. 95% 1-day VaR).

Practical Problem 1 (Solved Expected Return, Standard Deviation, & Beta Calculation): An equity stock has the following probability distribution of returns under 3 economic states:

State 1 (Boom): Probability = 0.30, Stock Return = 25%, Market Return = 20%.

State 2 (Normal): Probability = 0.50, Stock Return = 15%, Market Return = 12%.

State 3 (Recession): Probability = 0.20, Stock Return = -5%, Market Return = -4%. Calculate (a) Expected Return ($E(R_s)$), (b) Variance & Standard Deviation (σ_s), and (c) Security Beta (β_s).

Step-by-Step Solved Stock Risk-Return Computation Table:

Economic State	Prob ((P _i))	Stock Return ((R _s))	Market Return ((R _m))	(P _i imes R _s)	[(R _s - E(R _s)] ² imes P _i
Boom	0.30	25%	20%	7.5%	(0.30 imes (25 - 14) ² = 36.30)
Normal	0.50	15%	12%	7.5%	(0.50 imes (15 - 14) ² = 0.50)
Recession	0.20	-5%	-4%	-1.0%	(0.20 imes (-5 - 14) ² = 72.20)
TOTAL	1.00	-	-	14.0%	Variance = 109.00

Risk-Return Formula Results:

- **1. Expected Return E(R_s):** (7.5 + 7.5 - 1.0 = $\mathbf{14.0\%}$)
- **2. Stock Standard Deviation (sigma_s):** ($\sqrt{109.00}$ = $\mathbf{10.44\%}$)
- **3. Security Beta (eta_s):**

Expected Market Return E(R_m) = (0.3 imes 20) + (0.5 imes 12) + (0.2 imes -4) = 6.0 + 6.0 - 0.8 = $\mathbf{11.2\%}$

Covariance(R_s, R_m) = 87.20, Market Variance sigma_m² = 69.76 implies $\mathbf{\eta_s = \frac{87.20}{69.76} = 1.25}$

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