



DARBHANGA COLLEGE OF ENGINEERING  
DARBHANGA

# PRINCIPLES OF MANAGEMENT AND INDUSTRIAL RELATIONS (SEM–VIII:EE)

## Lecture 6

# RETURN RELATIONSHIPS

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# Chapter Objectives

At the end of the topic, students should be able to understand the following:

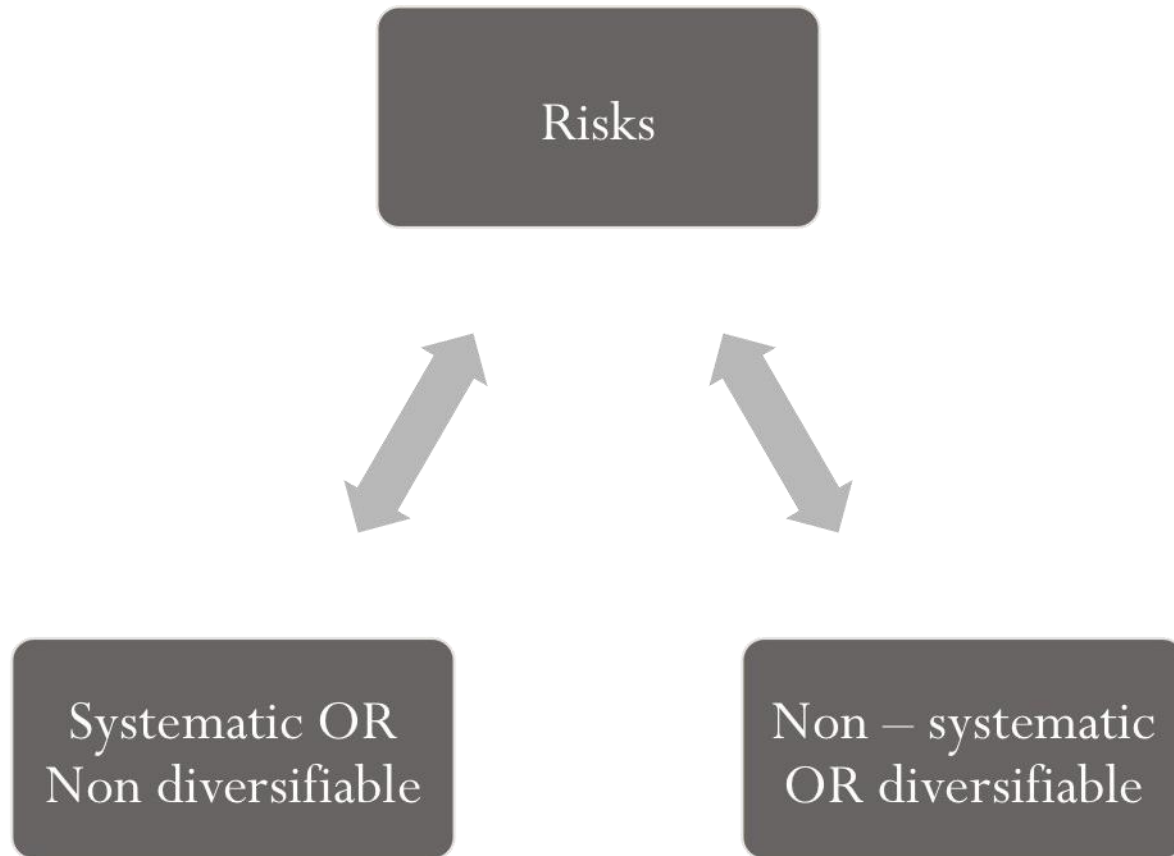
- ☐ Total Risk
- ☐ Risks Associated with Investments
- ☐ Risk Relationship Between Different Stocks
- ☐ Portfolio
- ☐ Diversification of Risk

# TOTAL RISK

- The total variability in returns of a security represents the total risk of that security. Systematic risk and unsystematic risk are the two components of total risk. Thus

$$\text{Total risk} = \text{Systematic risk} + \text{Unsystematic risk}$$

# Risks Associated with Investments



## SYSTEMATIC RISK

- The portion of the variability of return of a security that is caused by external factors, is called systematic risk.
- It is also known as market risk or non-diversifiable risk.
- Economic and political instability, economic recession, macro policy of the government, etc. affect the price of all shares systematically. Thus the variation of return in shares, which is caused by these factors, is called systematic risk.

# Systematic Risks



## NON - SYSTEMATIC RISK

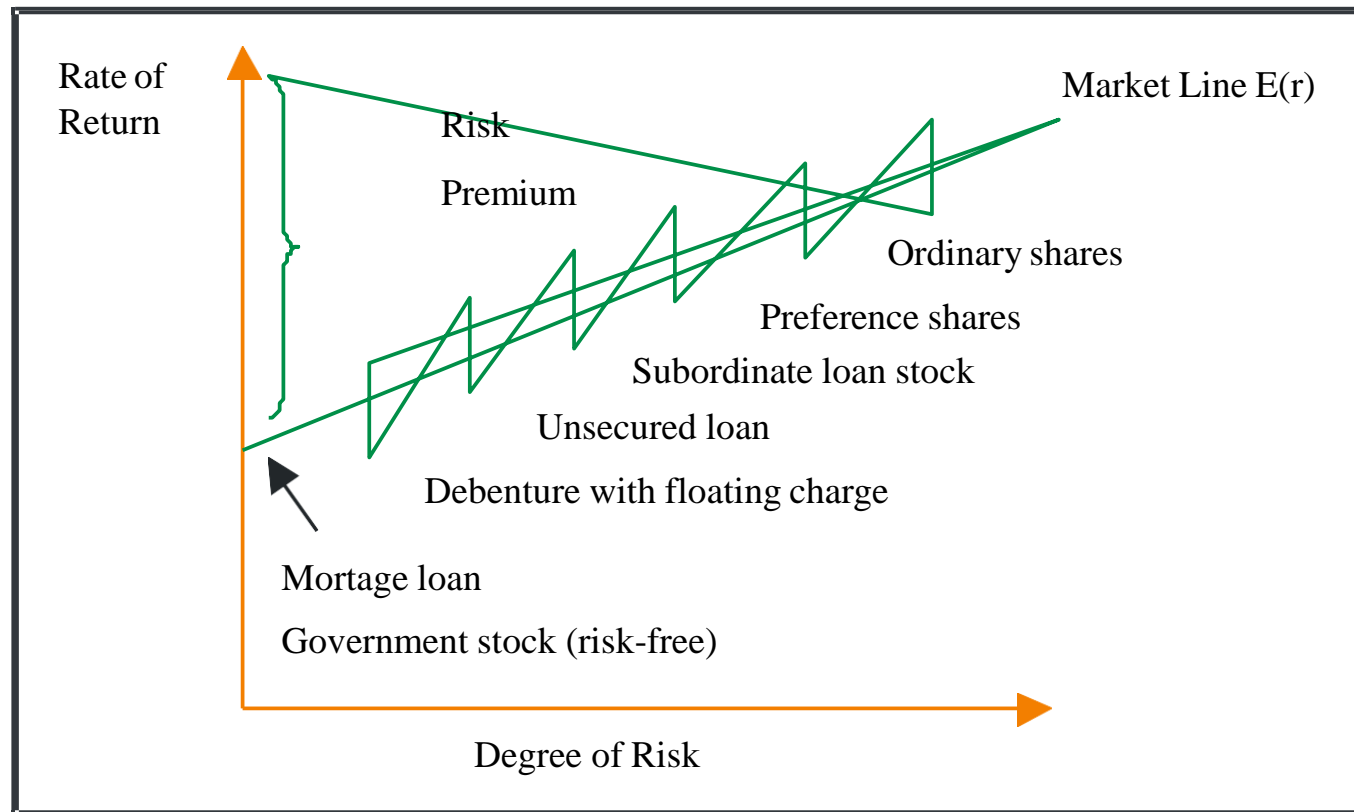
- The return from a security sometimes varies because of certain factors affecting only the company issuing such security. Examples are raw material scarcity, Labour strike, management efficiency etc.
- When variability of returns occurs because of such firm-specific factors, it is known as unsystematic risk.

# Non – Systematic Risks





# RISK RETURN RELATIONSHIP OF DIFFERENT STOCKS



Risk return relationship of different stocks

# Risk

- Risk refers to dispersion of a variable.
- It is measured by variance or SD.
- Variance is the sum of squares of the deviations of actual returns from average returns .

- **Variance** =  $\sum (R_i - \bar{R})^2$

- **S D** =  $(\text{variance}^2)^{1/2}$

# Expected Rate of Return

□ It is the weighted average of all possible returns multiplied by their respective probabilities.

□  $E(R) = R_1P_1 + R_2P_2 + \dots + R_nP_n$

□  $E(R) = \sum_{i=1}^n R_i P_i$

$R_i$

Where  $R_i$  is the outcome  $i$ ,  $P_i$  is the probability of occurrence of  $i$ .

# Portfolio

- A portfolio is a bundle of individual assets or securities.
- All investors hold well diversified portfolio of assets instead of investing in a single asset.
- If the investor holds well diversified portfolio of assets, the concern should be expected rate of return & risk of portfolio rather than individual assets.

# Portfolio Return – Two Asset Case

- The expected return from a portfolio of two or more securities is equal to the weighted average of the expected returns from the individual securities.

- $$\Sigma(R_P) = W_A (R_A) + W_B (R_B)$$

- Where

- $\Sigma(R_P)$  Expected return from a portfolio of two securities

- $W_A$  = Proportion of funds invested in Security A

- $W_B$  = Proportion of funds invested in Security B

- $R_A$  = Expected return of Security A

- $R_B$  = Expected return of Security B

- $W_A + W_B = 1$

# Portfolio Risk – Two Asset

- Since the securities associated in a portfolio are associated with each other, portfolio risk is associated with covariance between returns of securities.

- $$\text{Covariance}_{xy} = \sum_{i=1}^n (R_{xi} - E(R_x)) (R_{yi} - E(R_y)) * P_i$$

# Correlation

- To measure the relationship between returns of securities.
- $\text{Cor}_{xy} = \frac{\text{Cov}_{xy}}{\text{SD}_X \text{SD}_Y}$
- the correlation coefficient ranges between  $-1$  to  $+1$ .
- The diversification has benefits when correlation between return of assets is less than 1.

## DIVERSIFICATION OF RISK

- We have seen that total risk of an individual security is measured by the standard deviation ( $\sigma$ ), which can be divided into two parts i.e., systematic risk and unsystematic risk
- Total Risk ( $\sigma$ ) = Systematic Risk + Unsystematic risk

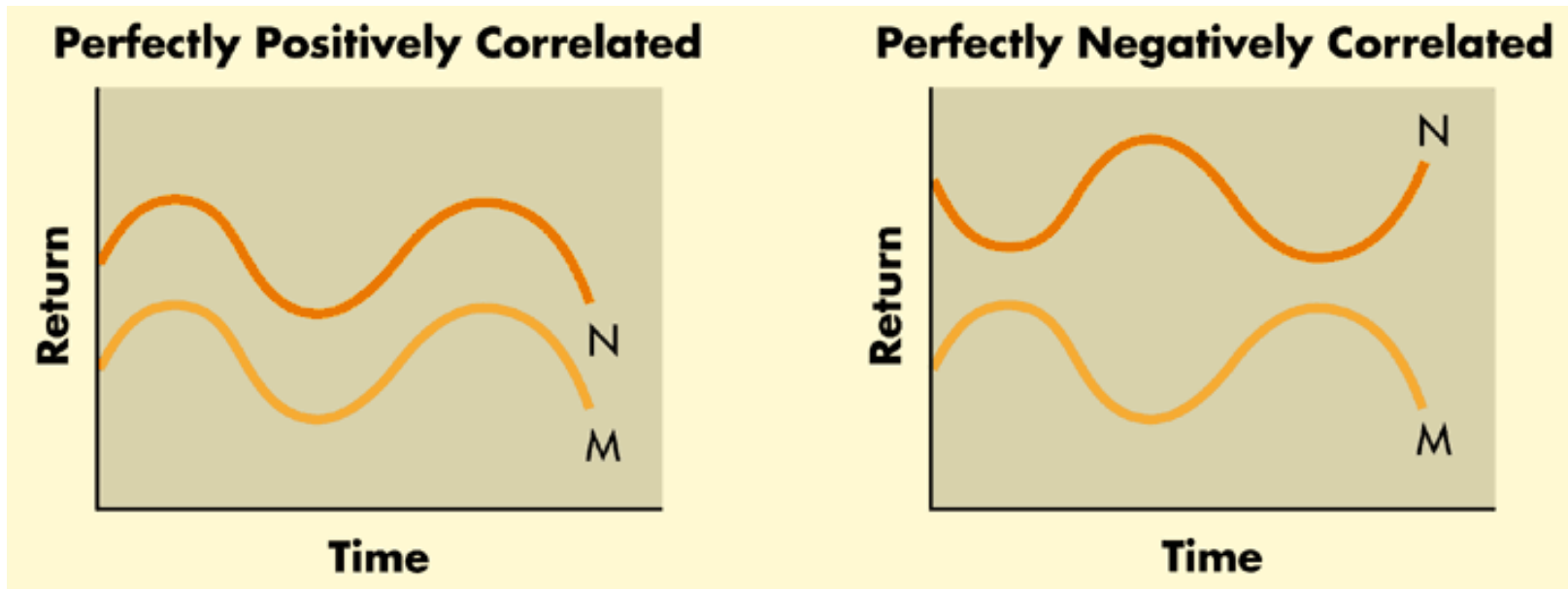


# TWO IMPORTANT FINDINGS:

- More number of securities will reduce portfolio risk
- Securities should not be perfectly correlated.

# Diversification....does it always work?

- Diversification is enhanced depending upon the extent to which the returns on assets “move” together.
- This movement is typically measured by a statistic known as “correlation” as shown in the figure below.



- Even if two assets are not perfectly negatively correlated, an investor can still realize *diversification* benefits from combining them in a portfolio as shown in the figure below.

