

# Risk Management [A Helicopter View]

- What is Risk? Risk Measurements
- Types of risk
- What is Risk Management?
- Risk Management Process
- What is risk management?

# What is Risk? Risk Measurement

For any activity, there are costs associated with any reward. Two costs are expected and unexpected costs (losses).

- Expected loss is something we expect or already taken into account.
- Unexpected loss is the large magnitude of loss well beyond the normal losses.

# What is Risk? Risk Measurement

Risk Measures are

1. Total Risk: Variance or SD
2. Covariance Risk
3. Market Risk (well-diversified) portfolio

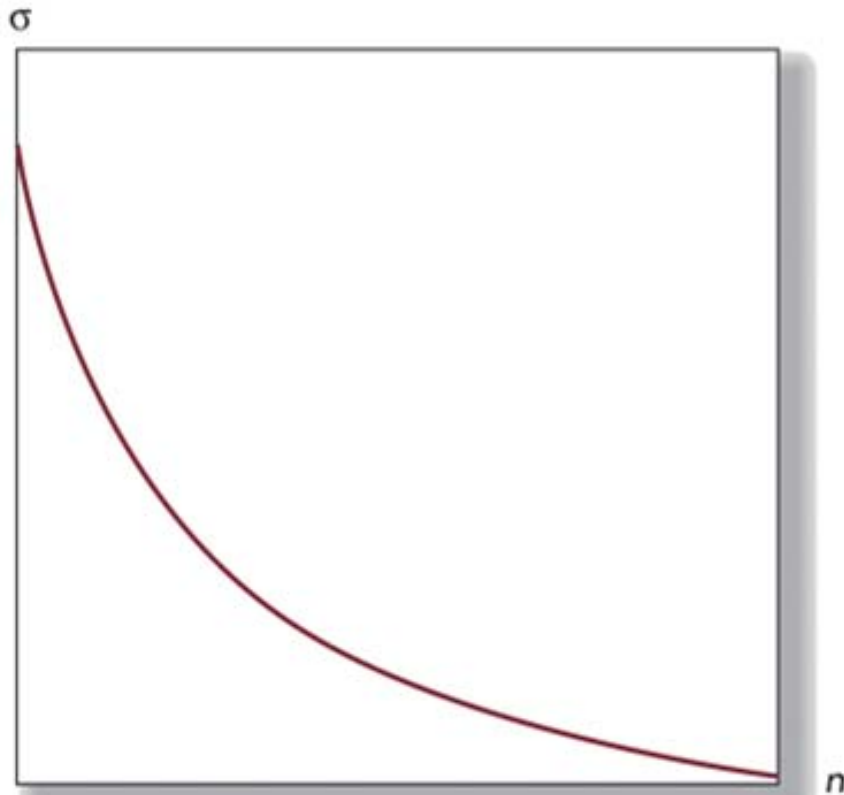
# What is Risk? Risk Measurement

## Diversification and Portfolio Risk

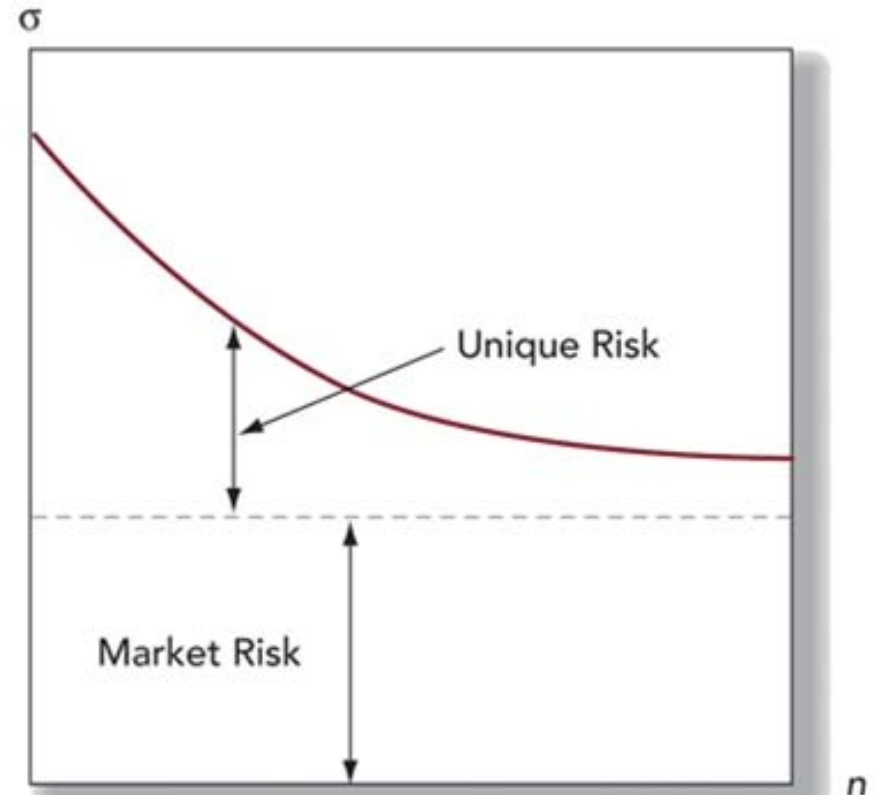
- Market risk
  - Systematic or nondiversifiable Risk
- Firm-specific risk
  - Diversifiable or nonsystematic Risk

# What is Risk? Risk Measurement

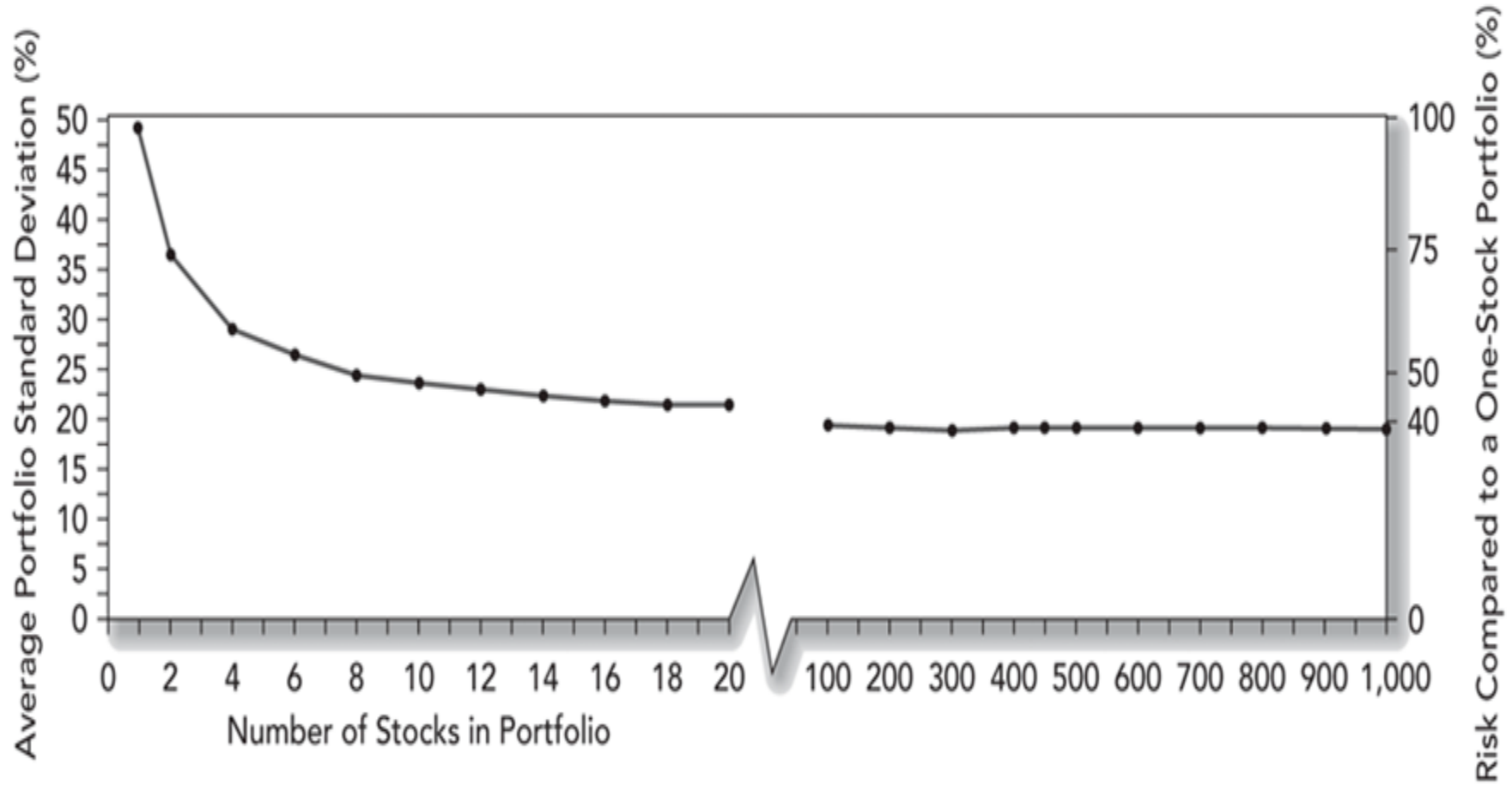
Panel A



Panel B



# What is Risk? Risk Measurement



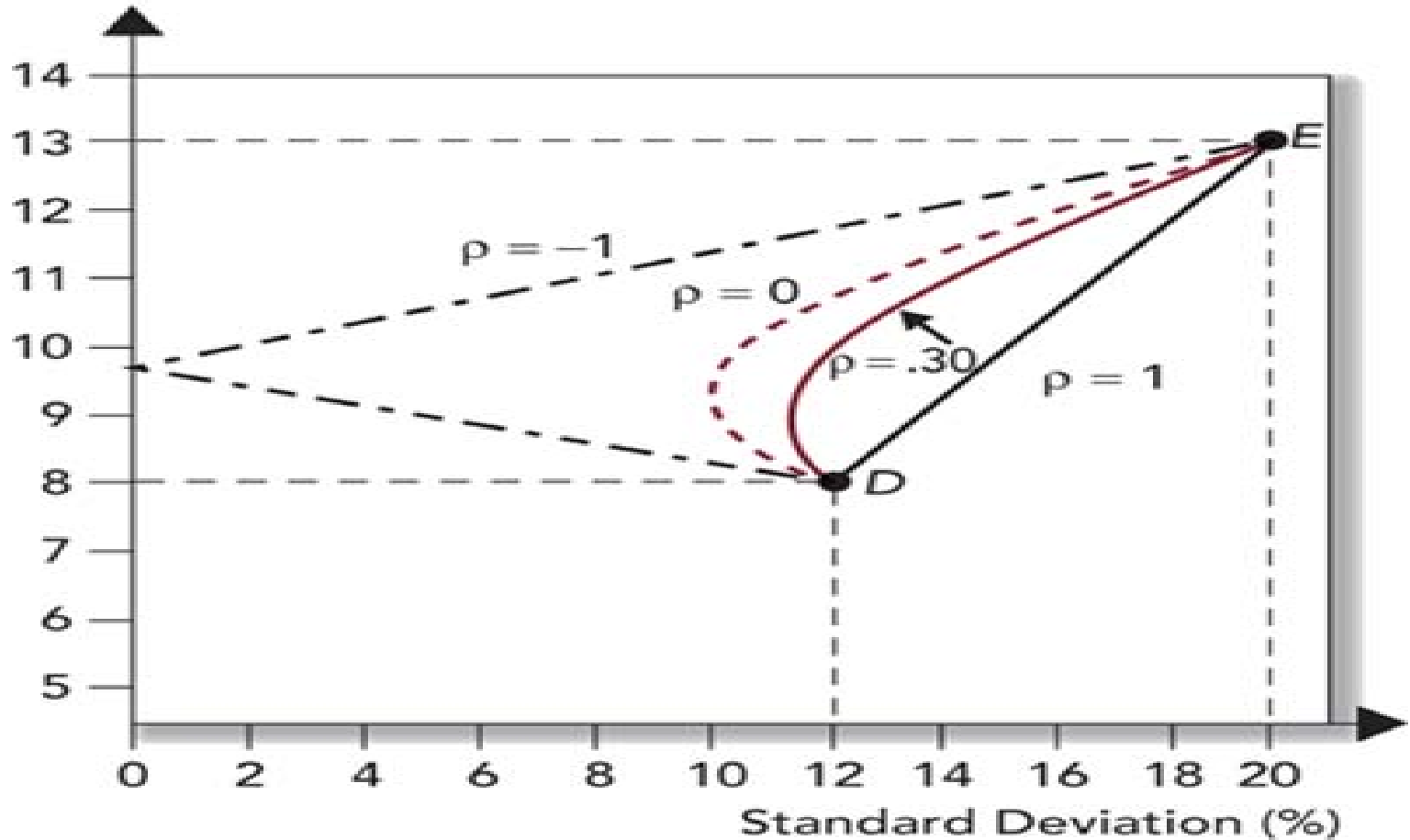
# What is Risk? Risk Measurement

## Covariance and Correlation

- Portfolio risk depends on the correlation between the returns of the assets in the portfolio
- Covariance and the correlation coefficient provide a measure of the way returns two assets vary

# What is Risk? Risk Measurement

Expected Return (%)



# What is Risk? Risk Measurement

How to calculate unexpected loss?

- Identify risk factors that seem to drive the volatility of any outcome.
- Estimate probabilities of various outcomes.

Ex: VaR (Value at Risk) is the area of the distribution that would cause financial difficulties given probability of this loss occurring.

# What is Risk? Risk Measurement

Risk defined as volatility of returns leading to “unexpected loss.”

$$\sigma = f(\text{risk\_factors})$$

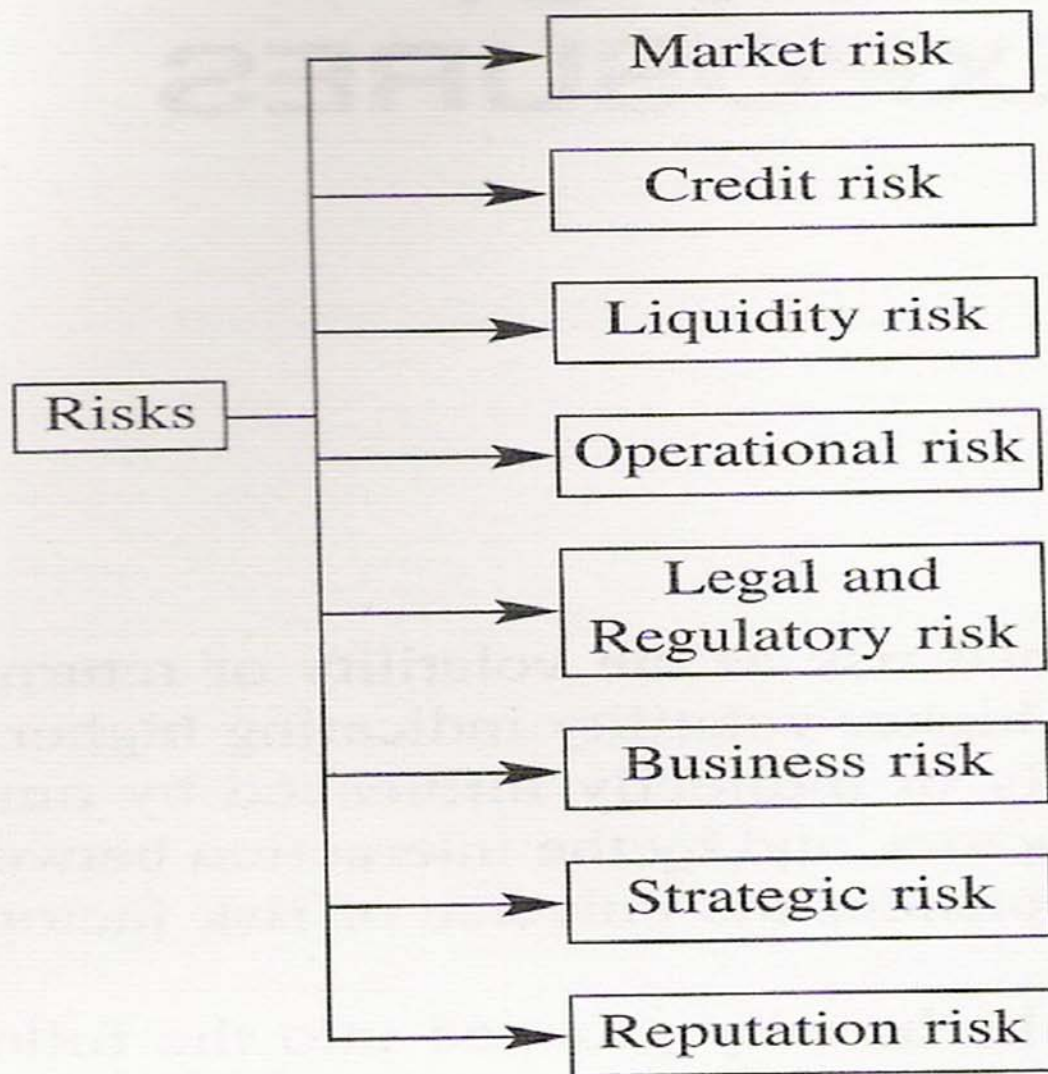
# Types of Risk

Risk factors are as follows:

- Market risk
- Credit risk
- Liquidity risk
- Operational risk: Derivative trading, Human factor risks, technology risk
- Legal and regulatory risk
- Business risk: Palm m500 line
- Strategic Risk: Nokia
- Reputation risk: Enron

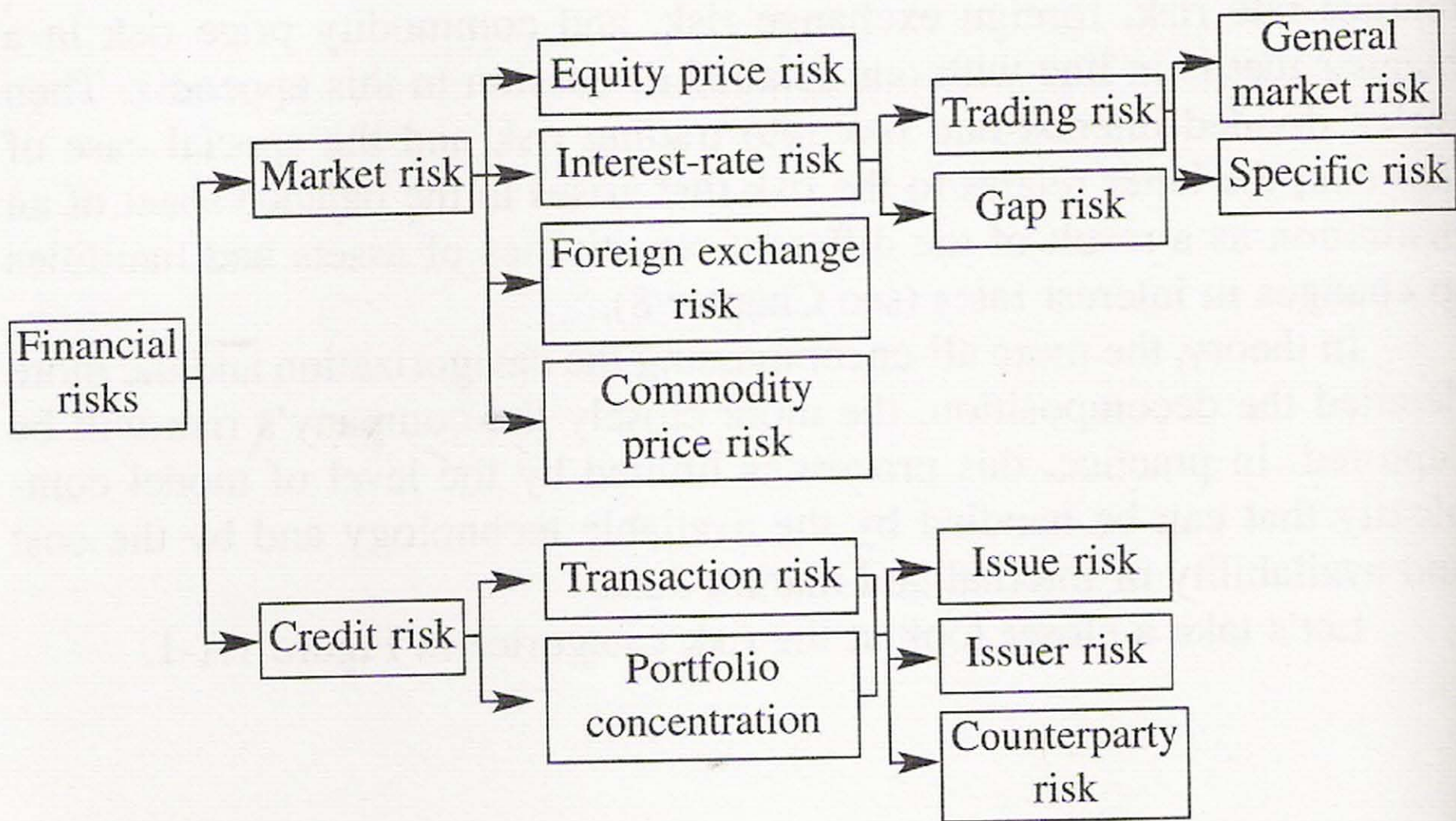
**FIGURE 1A-1**

**Typology of risks**



**FIGURE 1A-2**

Schematic presentation, by categories, of financial risks



## Note:

1. Reputation risk has no clear industry view on whether these risks (business and reputation) can be meaningfully measured.
2. The main difference between the intuitive conception of risk and a more formal treatment of it is the use of statistics to define the extent and potential cost of any exposure.
3. Expected loss refers to how much the banks expect to lose subject to its “risk appetite”

- Expected loss, by definition, is predictable and is priced into the products and services offered to the customers.

Thoughts:

Compare level of loss between credit card portfolio and corporate loan portfolio, which portfolio is subjected to higher chance of facing the unexpected loss? Why?

# What is Risk?

- In theory, the more the factors are included and the more detailed the decomposition, the more closely the company's risk will be captured.
- In practice, this process is limited by the level of model complexity that can be handled by the available technology and by the cost and availability of internal and market data.

# What is Risk?

- Risk management process becomes not the process of controlling and reducing expected loss, but is the process of understanding, costing, and efficiently managing “unexpected loss.”

# What is Risk Management?

- It is the process of selecting both type and magnitude (level) of risk that the firm can take or that appropriate for the firm or decision maker.
- Risk management and risk taking aren't opposite but two sides of the same coin.

Ex: Credit derivatives are used to protect financial institutions from credit default.

# What is Risk Management?

- We go to great measures to make our lives orderly and predictable according to our tolerance for ambiguity.
- A crisis is the point at which it becomes apparent that what we had planned is no longer feasible and our expectations are disrupted.
- Not until predicting the weather became a discipline could modern farming develop. Today's farmers cannot control the climate, but they can anticipate weather-related events with a high level of accuracy and manage their resources accordingly.

# What is Risk Management?

- Learning to understand asset price movement behavior does not make you immune to its consequences. Life and its inevitable changes will still surprise you. The advantage is that you will not be *surprised that you are surprised*, and will be able therefore be able to recover more quickly and effectively.
- Credit Derivatives can be used to redistribute part or all of an institution's credit exposure to banks, hedge funds, or other institutional investors.

# What is Risk Management?

“ The development of our paradigms for containing risk has emphasized dispersion of risk to those willing, are presumably able, to bear it. If risk is properly dispersed, shocks to overall economic system will be better absorbed or less likely to create cascading failures that could threaten financial stability”

[Alan Greenspan]

# What is Risk Management?

- Practically, risk management fails to protect the users or prevent the market from breaking down. Why?

“Herd Behavior” of risk manager such as buy risky assets when risk measures are low and sell when risk measures reach a certain level  
This causes higher market volatility.

# What is Risk Management?

Caution:

Risk Management mechanism that allows risk manager to change the shape of cash flows, such as deferring a negative outcome into the future, may work for S/T benefit not for the long-run. This could destroy shareholders' value.

# Risk Management Process

- Identify risk
- Measure risk
- Assess impact of risk [evaluate the consequences]
- Take action
  - Risk transfer
  - Risk mitigation