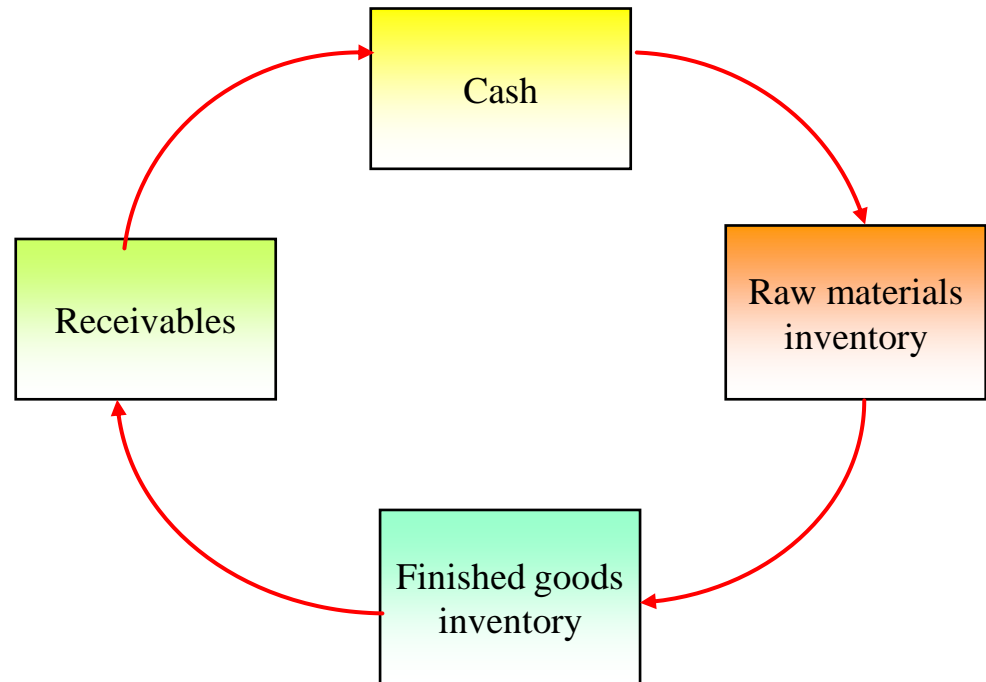


# Financial Management...

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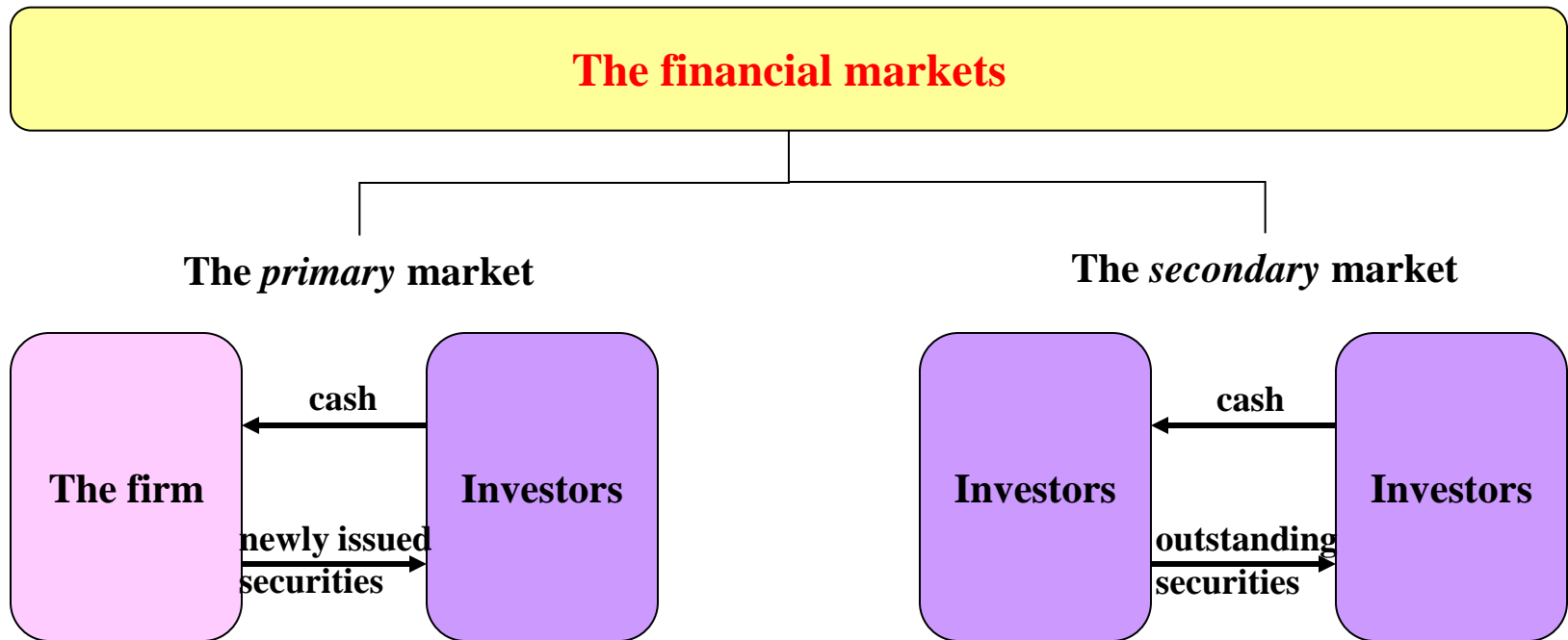
100 Slides



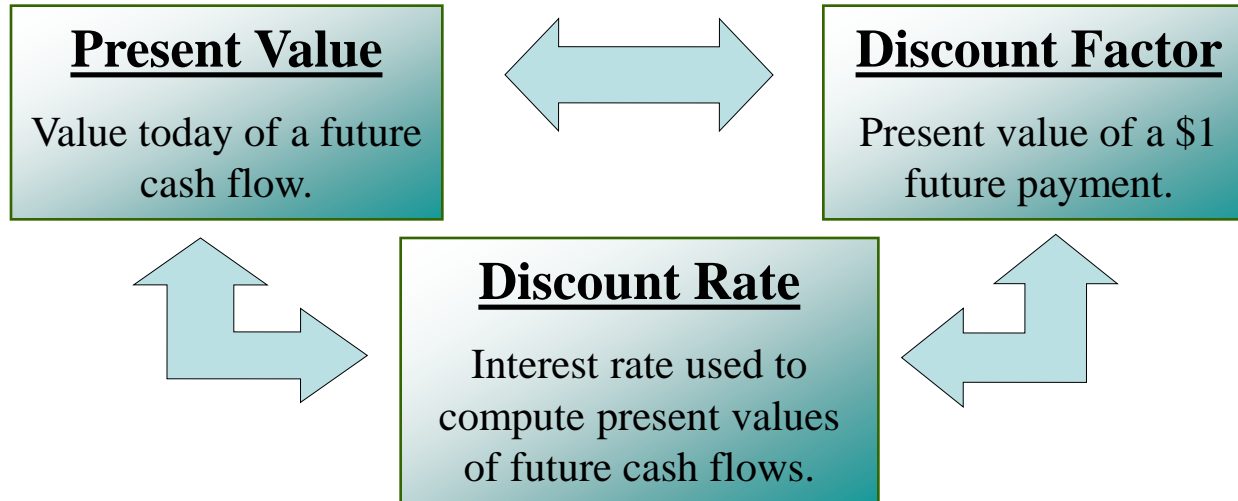
# Key Words...

Financial Market – Present Value – Perpetuity – Annuity – Compound Interest – Inflation – Bond Yield – Share Value – Free Cash Flow – IRR – Risk Valuation – Markowitz – SML – CAPM – Beta Risk – APT – Portfolio Theory – Economic Profit – Call Option – Straddle – Option Pricing Theory – Leverage Ratio – Liquidity – Du Pont – Private Equity – Volatility – Working Capital – Valuation – Value Drivers – Risk/Return – Diversification – Corporate Finance – Yield – NPV – Cash Transfer – Accounting

# The Dual Functions of Financial Markets



# Present Value



Present Value = PV

PV = discount factor  $\cdot C_1$

$$DF = \frac{1}{(1+r)^t}$$

$$PV = DF \cdot C_1 = \frac{C_1}{1+r_1}$$

# Net Present Value

$$\text{NPV} = \text{PV} - \text{required investment}$$

$$\text{NPV} = C_0 + \frac{C_1}{1+r}$$

# Perpetuity

*Perpetuity* - Financial concept in which a cash flow is theoretically received forever.

$$\text{Return} = \frac{\text{cash flow}}{\text{present value}}$$

$$r = \frac{C}{PV}$$

$$\text{PV of Cash Flow} = \frac{\text{cash flow}}{\text{discount rate}}$$

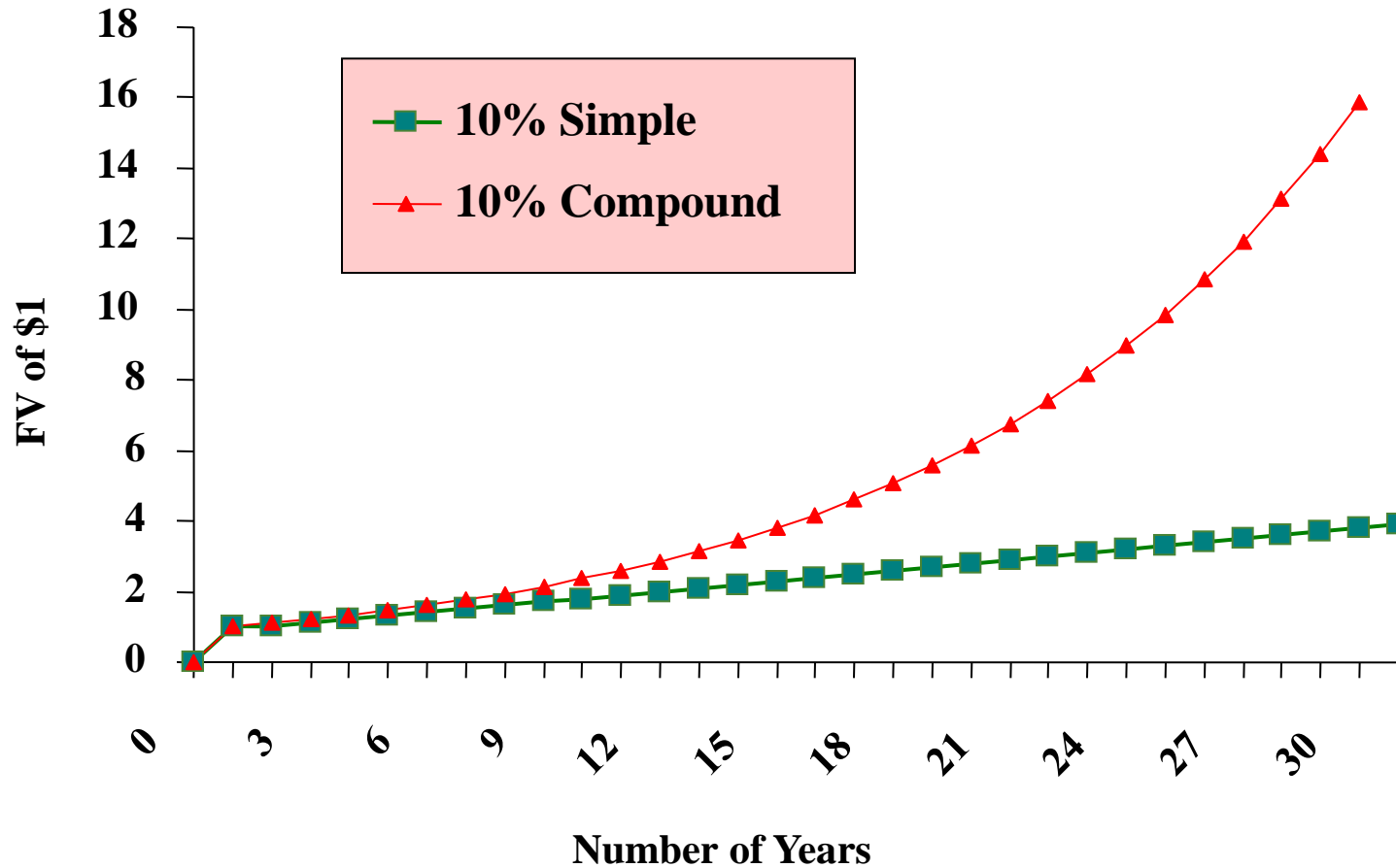
$$PV = \frac{C}{r}$$

# Annuity

**Annuity** - An asset that pays a fixed sum each year for a specified number of years.

$$\text{PV of annuity} = C \cdot \left[ \frac{1}{r} - \frac{1}{r(1+r)^t} \right]$$

# Compound Interest



# Inflation

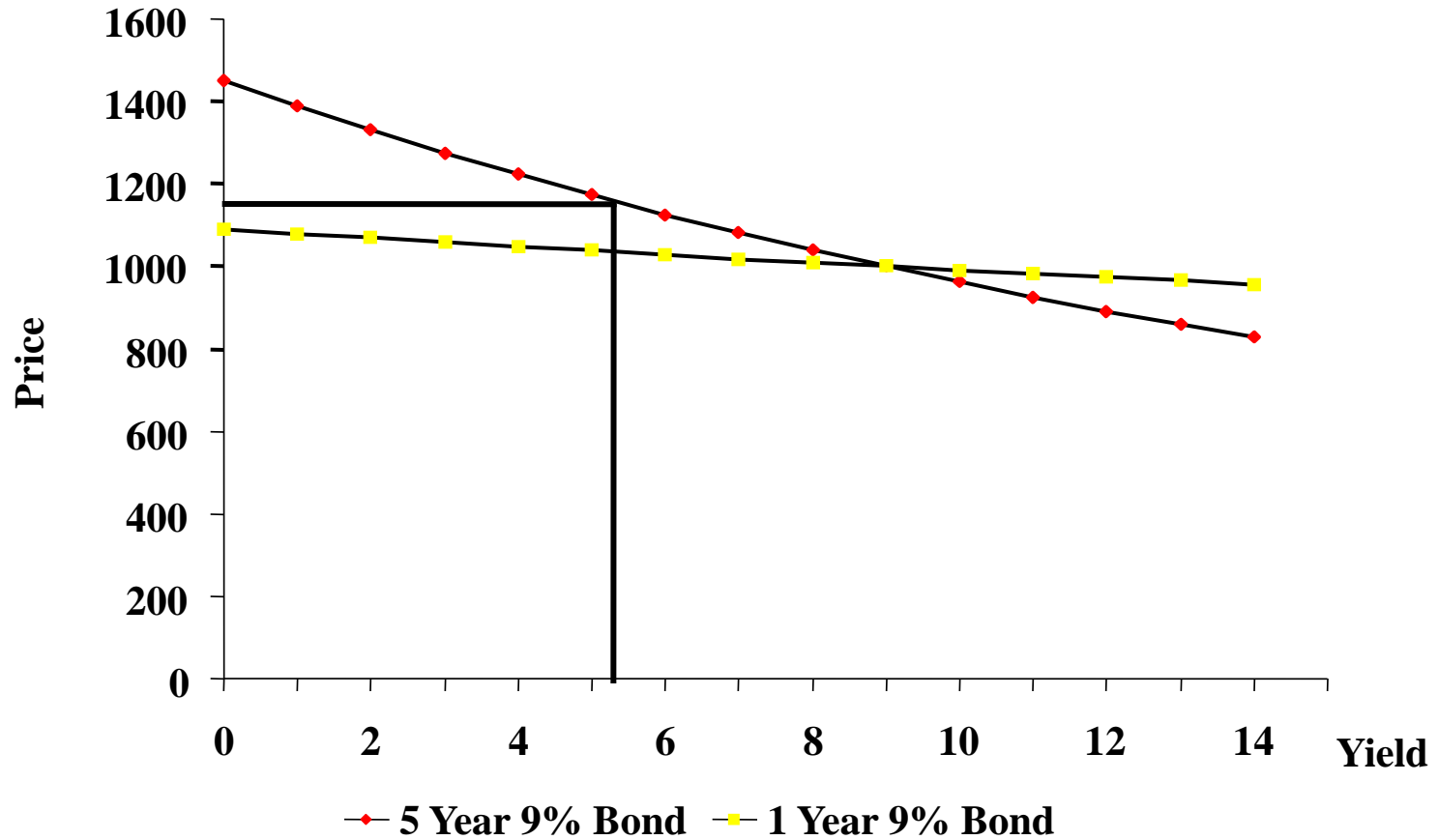
**Inflation** - Rate at which prices as a whole are increasing.

**Nominal Interest Rate** - Rate at which money invested grows.

**Real Interest Rate** - Rate at which the purchasing power of an investment increases.

$$1 + \text{real interest rate} = \frac{1 + \text{nominal interest rate}}{1 + \text{inflation rate}}$$

# Bond Prices and Yields



# Valuing Common Stocks I

$$\text{Expected Return} = r = \frac{Div_1}{P_0} + \frac{P_1 - P_0}{P_0}$$

$$\begin{aligned} \text{Capitalization Rate} &= P_0 = \frac{Div_1}{r - g} \\ &= r = \frac{Div_1}{P_0} + g \end{aligned}$$

# Valuing Common Stocks II

## Return Measurements

$$\text{Dividend Yield} = \frac{\text{Div}_1}{P_0}$$

Return on Equity = *ROE*

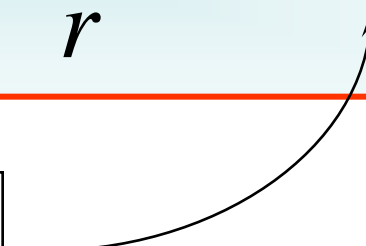
$$ROE = \frac{\text{EPS}}{\text{Book Equity Per Share}}$$

# Valuing Common Stocks III

If we forecast no growth, and plan to hold out stock indefinitely, we will then value the stock as a **PERPETUITY**.

$$\textit{Perpetuity} = P_0 = \frac{\textit{Div}_1}{r} \textit{ or } \frac{\textit{EPS}_1}{r}$$

Assumes all earnings are paid to shareholders.



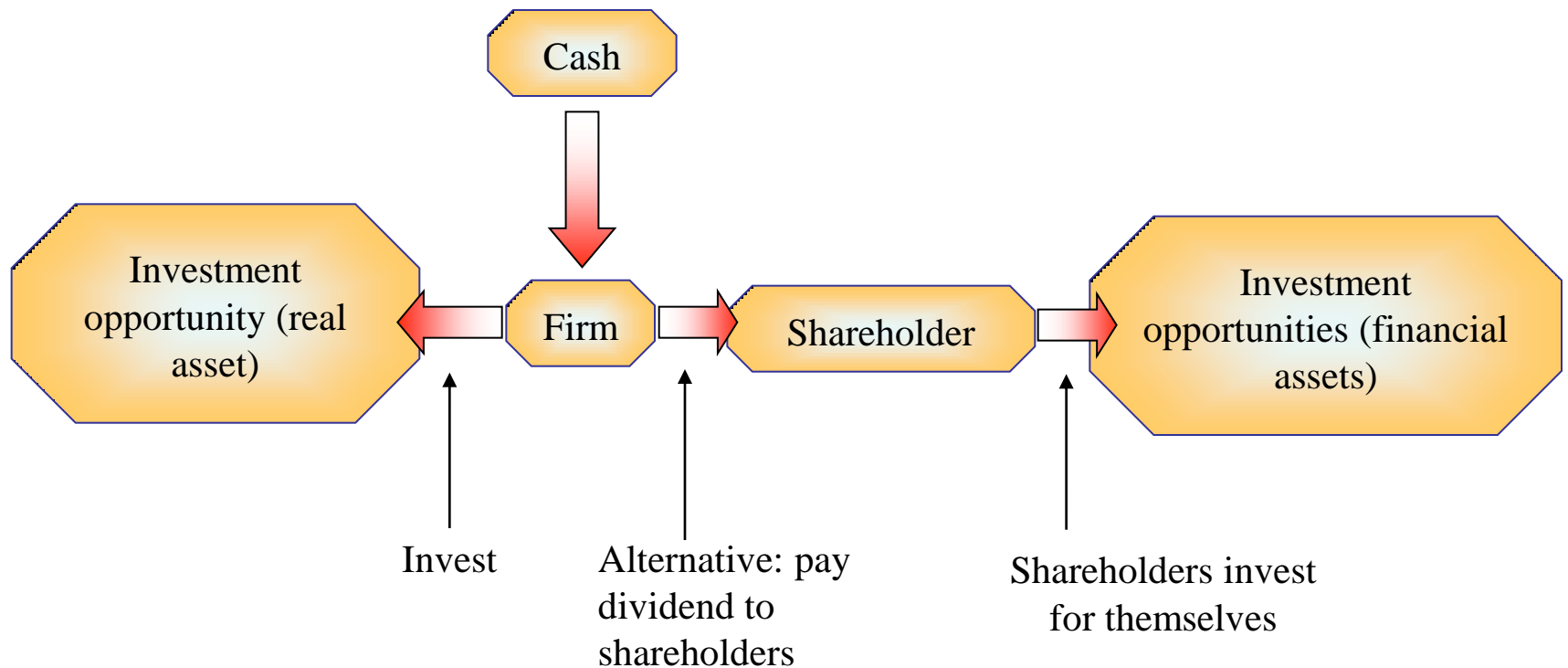
# FCF and PV

$$PV = \frac{FCF_1}{(1+r)^1} + \frac{FCF_2}{(1+r)^2} + \dots + \frac{FCF_H}{(1+r)^H} + \frac{PV_H}{(1+r)^H}$$

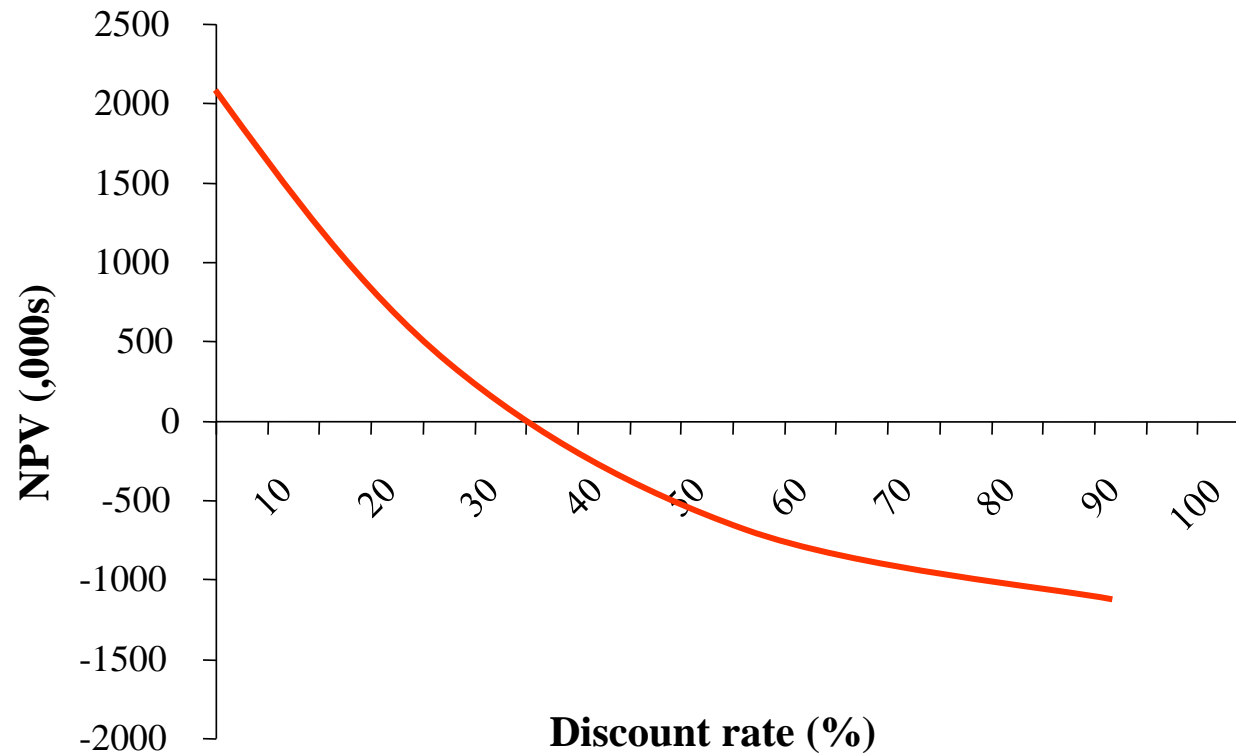
PV (free cash flows)

PV (horizon value)

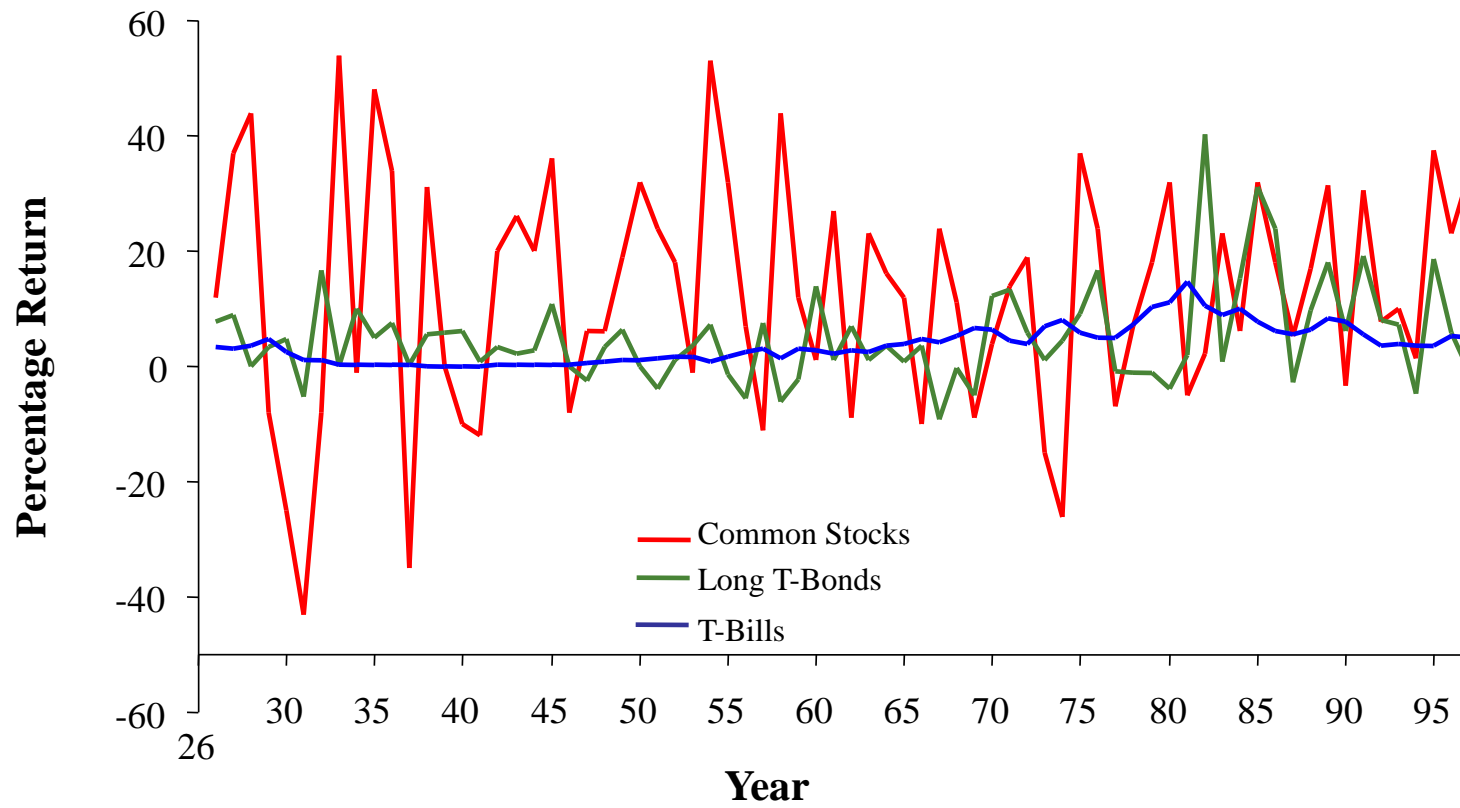
# NPV and Cash Transfers



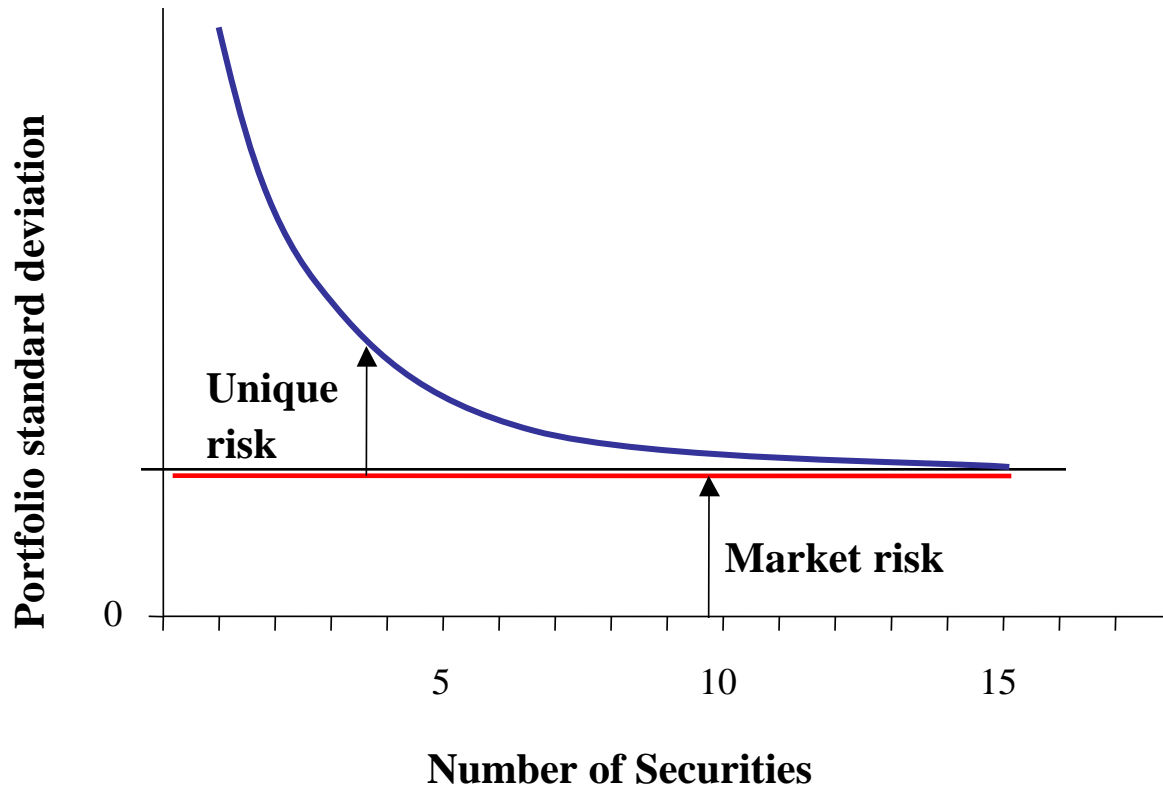
# Internal Rate of Return



# Rate of Return 1926 - 1997



# Measuring Risk



# Portfolio Risk I

The variance of a two stock portfolio is the sum of these four boxes:

	Stock 1	Stock 2
Stock 1	$x_1^2 \sigma_1^2$	$x_1 x_2 \sigma_{12} =$ $x_1 x_2 \rho_{12} \sigma_1 \sigma_2$
Stock 2	$x_1 x_2 \sigma_{12} =$ $x_1 x_2 \rho_{12} \sigma_1 \sigma_2$	$x_2^2 \sigma_2^2$

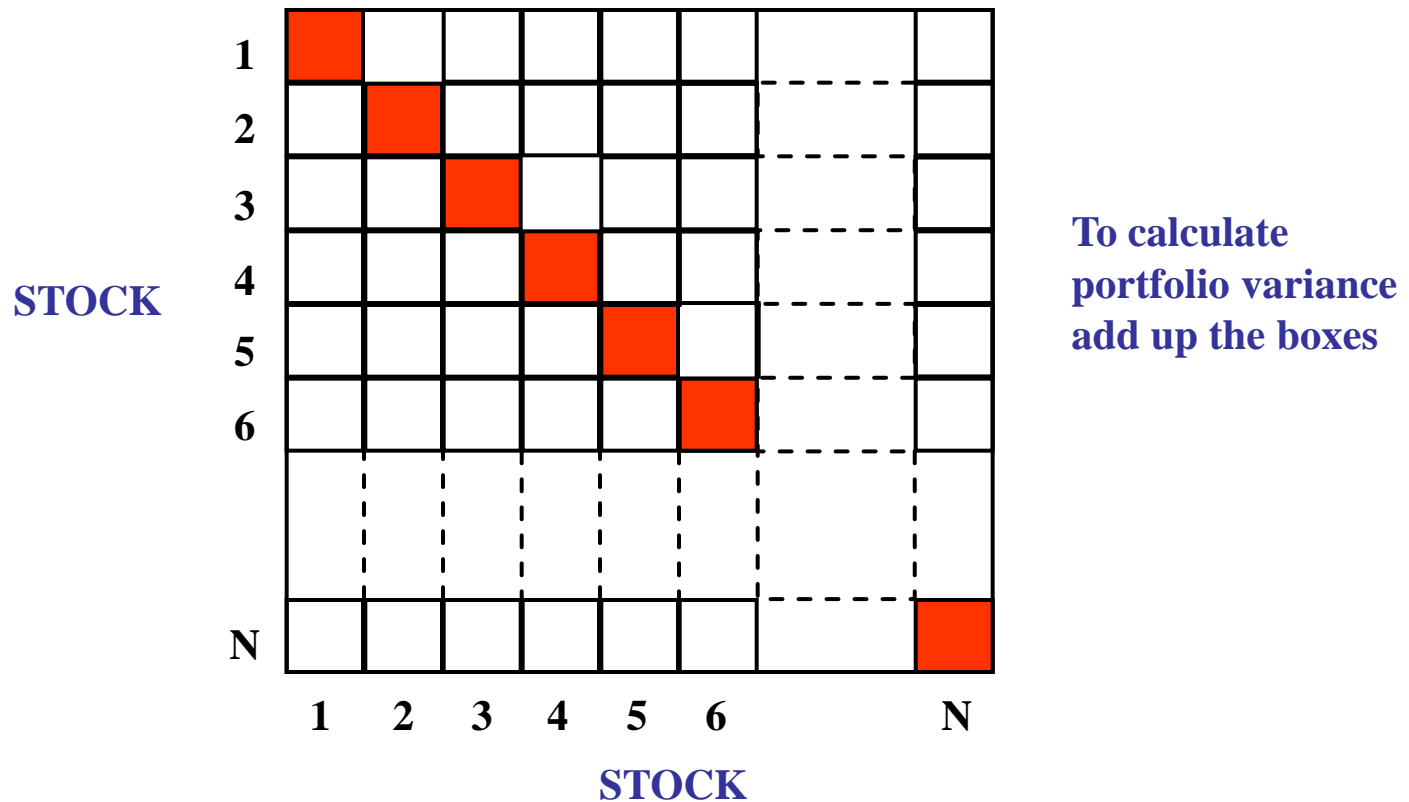
# Portfolio Risk II

$$\text{Expected Portfolio Return} = (x_1 r_1) + (x_2 r_2)$$

$$\text{Portfolio Variance} = x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2(x_1 x_2 \rho_{12} \sigma_1 \sigma_2)$$

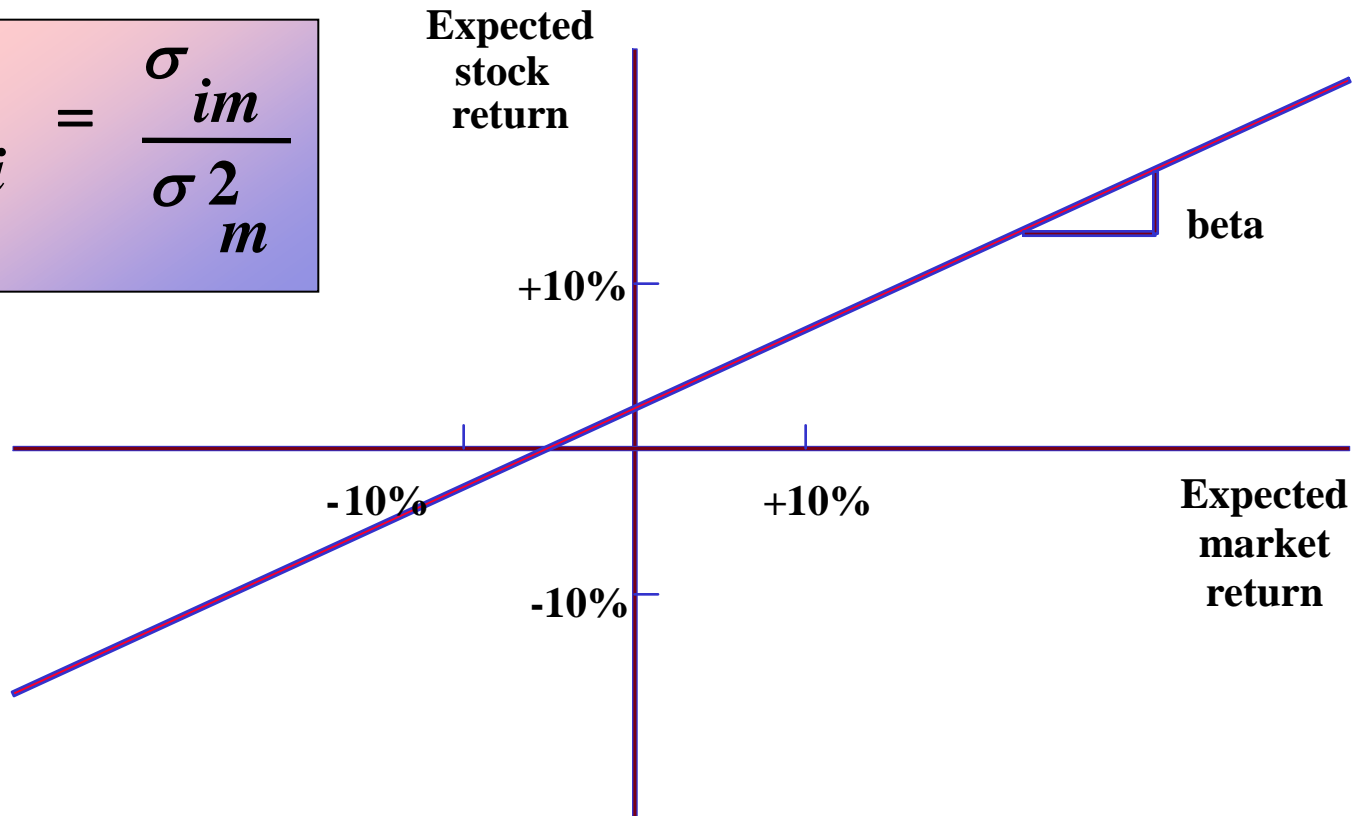
# Portfolio Risk III

The shaded boxes contain variance terms; the remainder contain covariance terms.



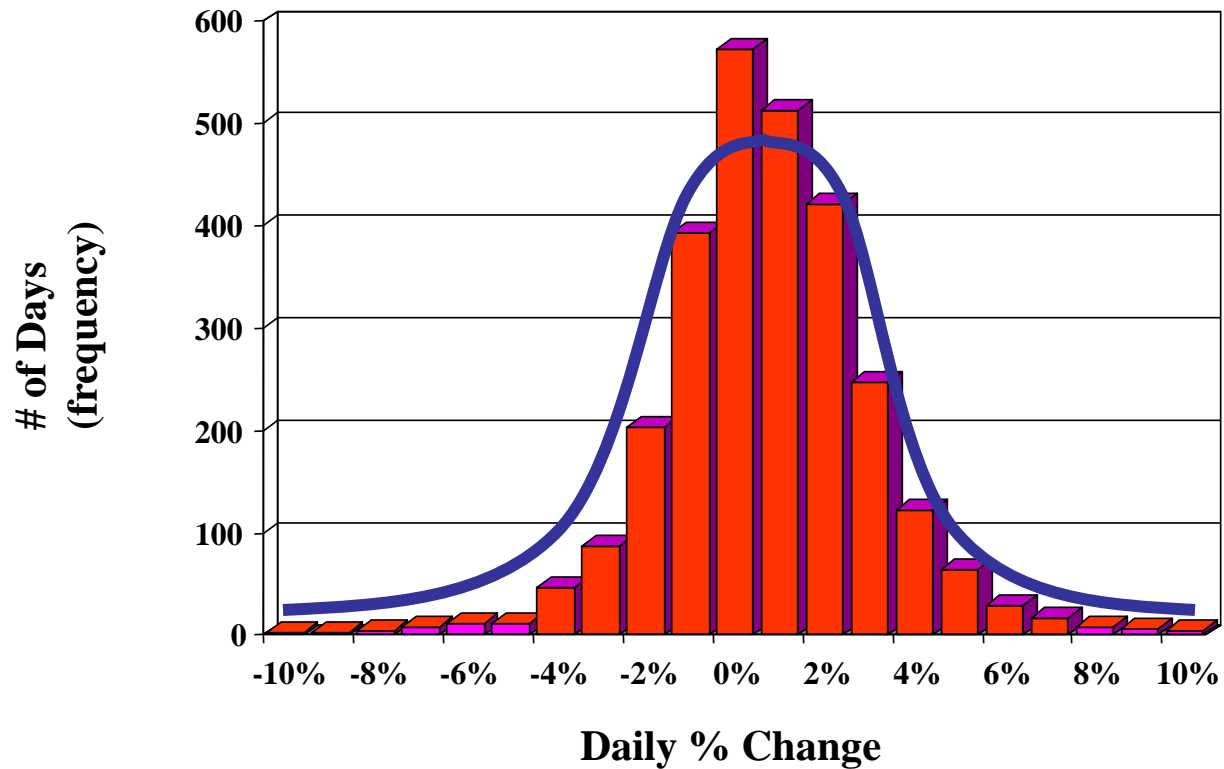
# Beta and Unique Risk

$$B_i = \frac{\sigma_{im}}{\sigma_m^2}$$

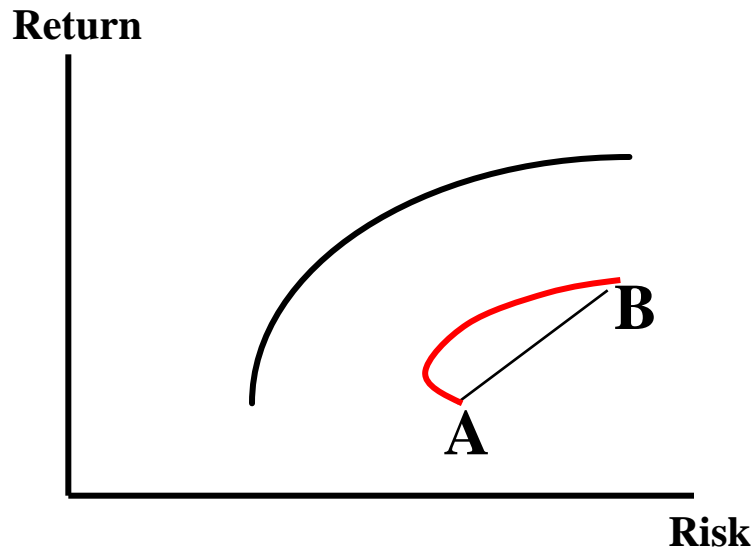


# Markowitz Portfolio Theory

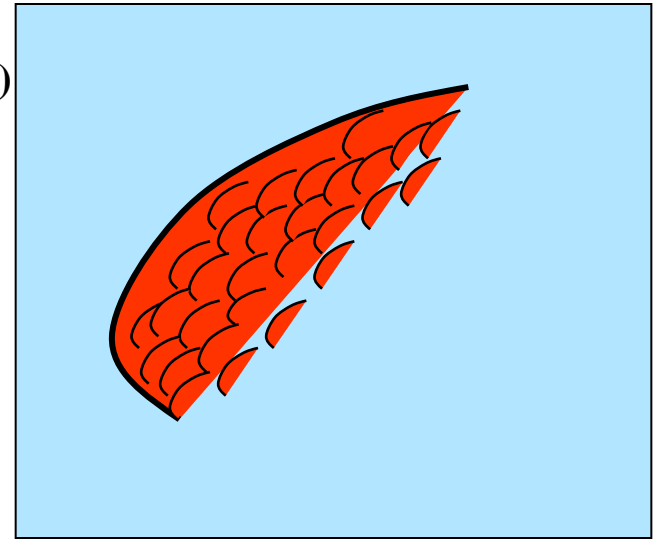
## Price changes vs. Normal distribution



# Efficient Frontier I

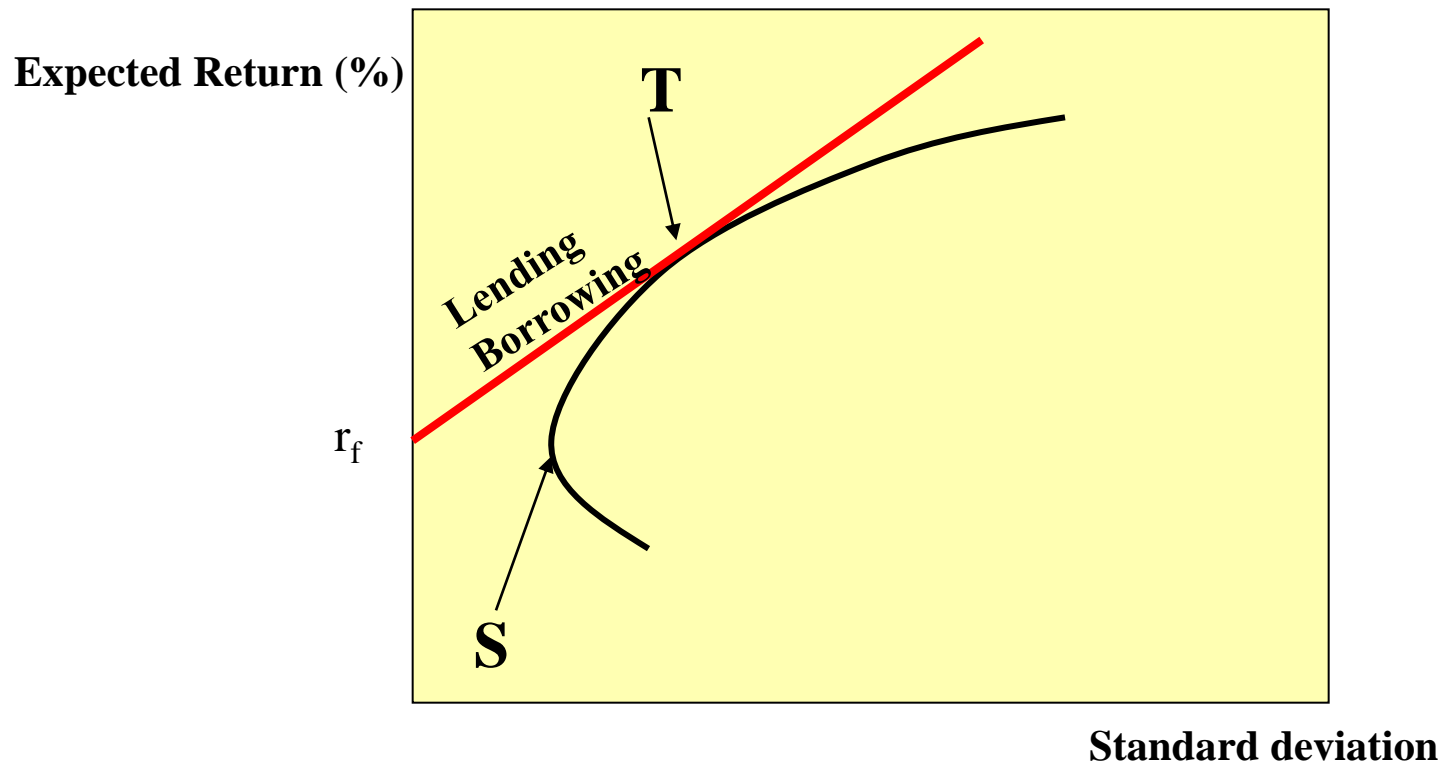


Expected  
Return (%)

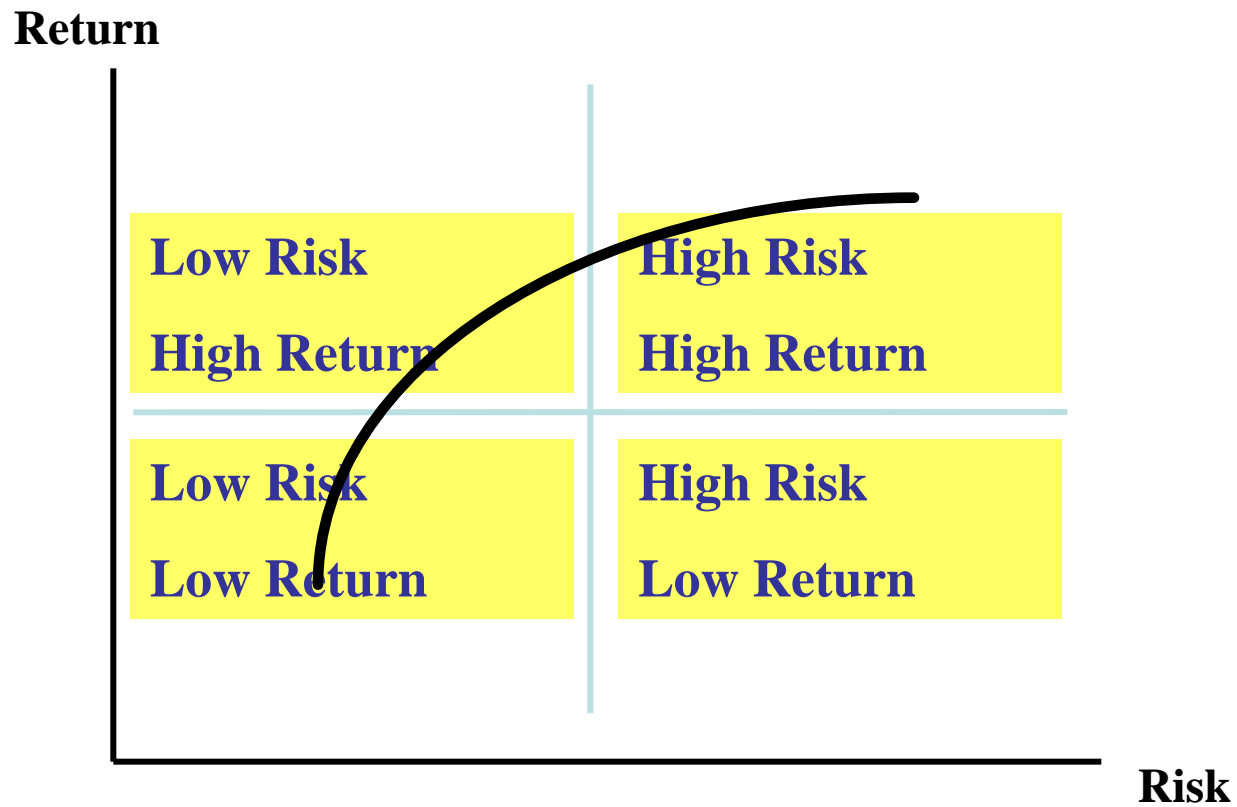


Standard  
deviation

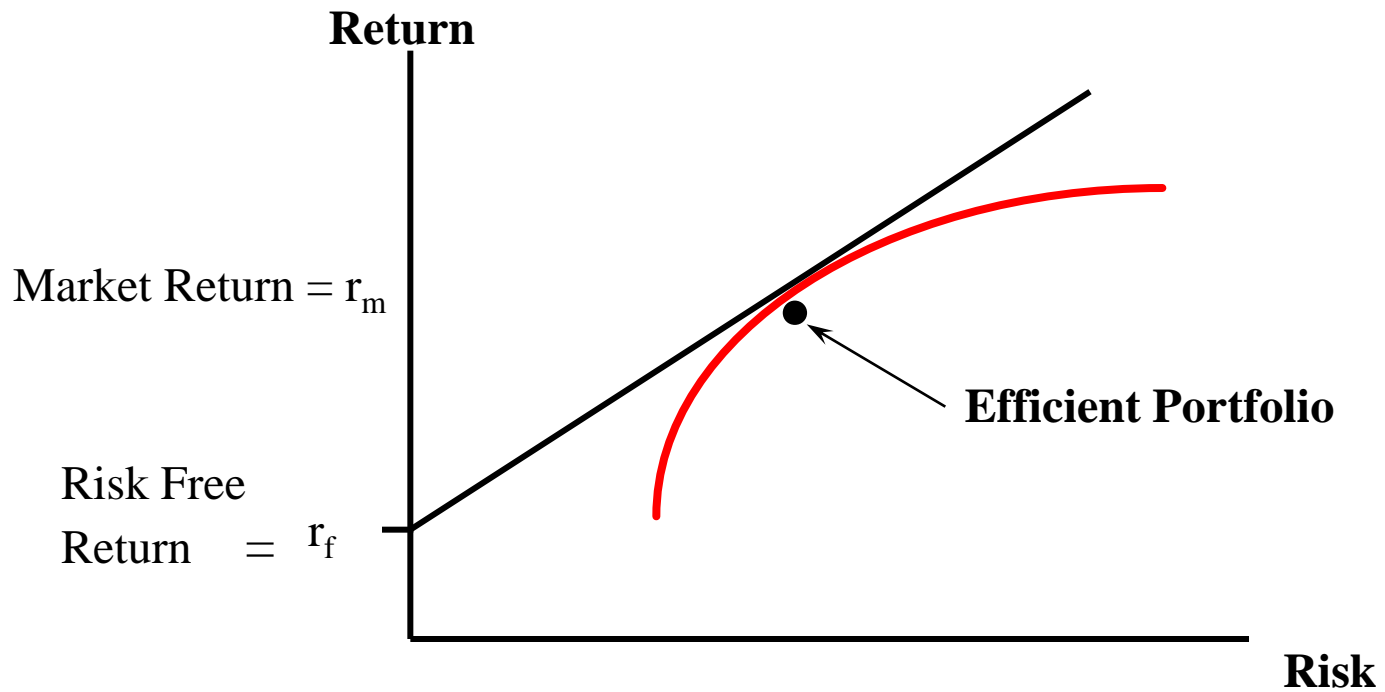
# Efficient Frontier II



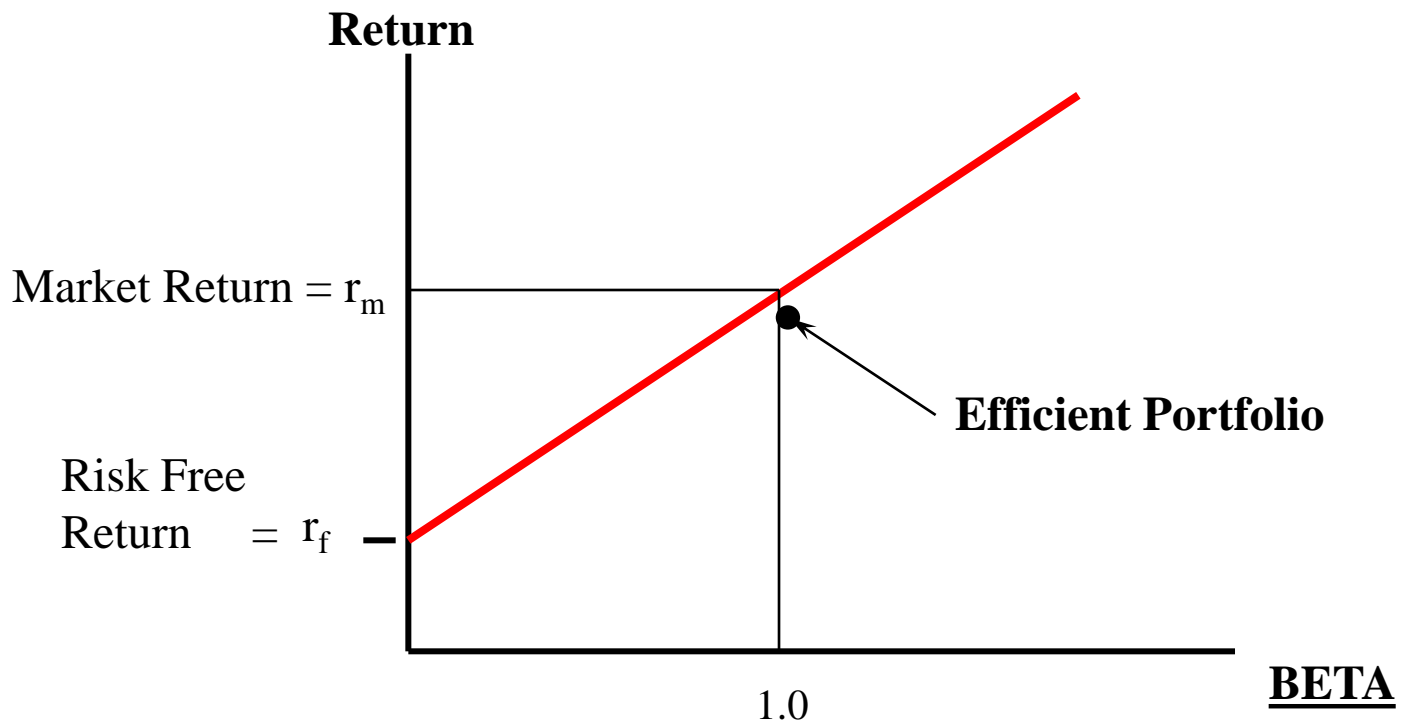
# Efficient Frontier III



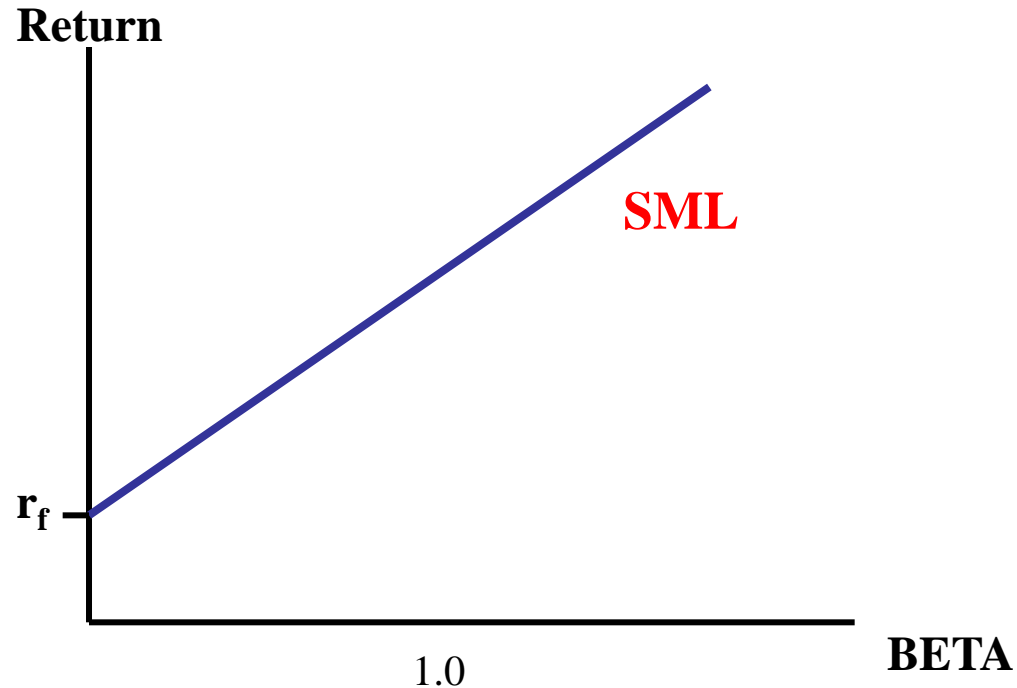
# Security Market Line I



# Security Market Line II

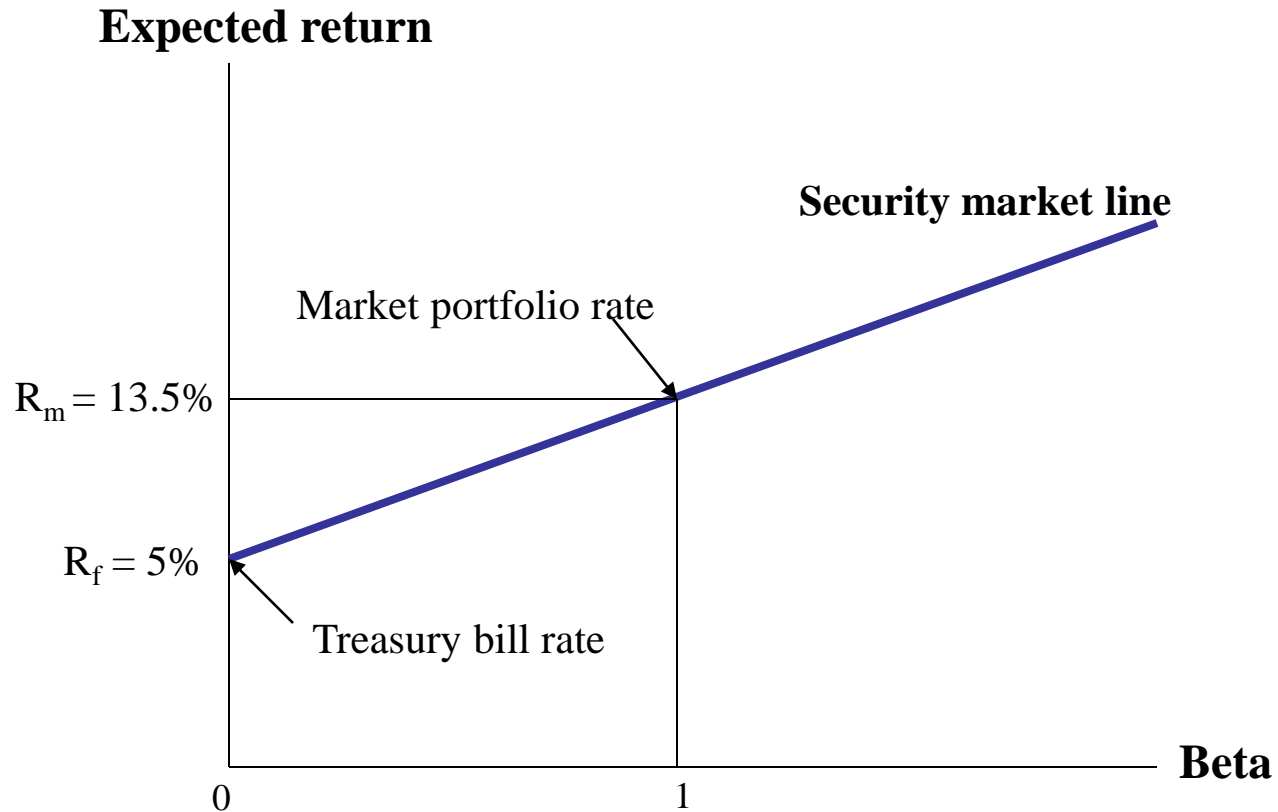


# Security Market Line III



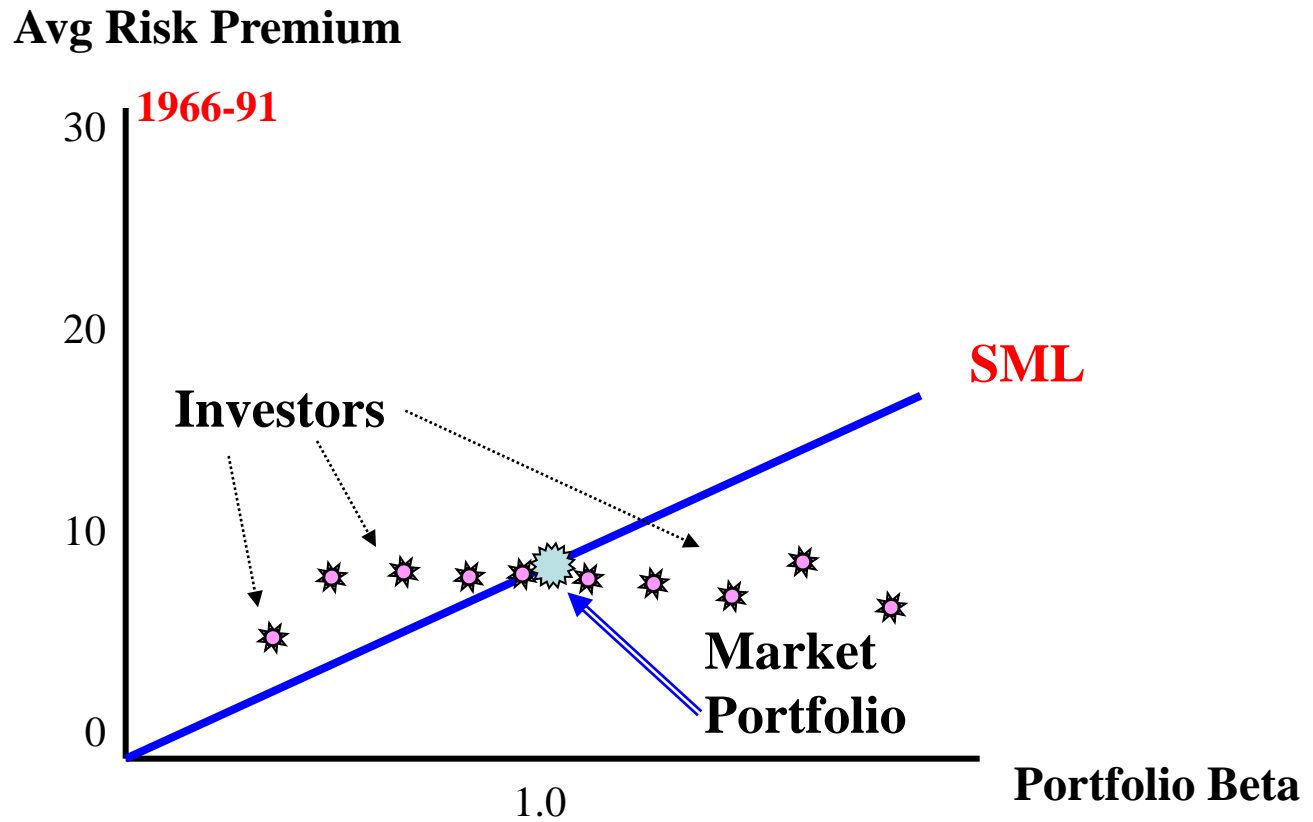
$$\text{SML Equation} = r_f + B ( r_m - r_f )$$

# Capital Asset Pricing Model (CAPM)

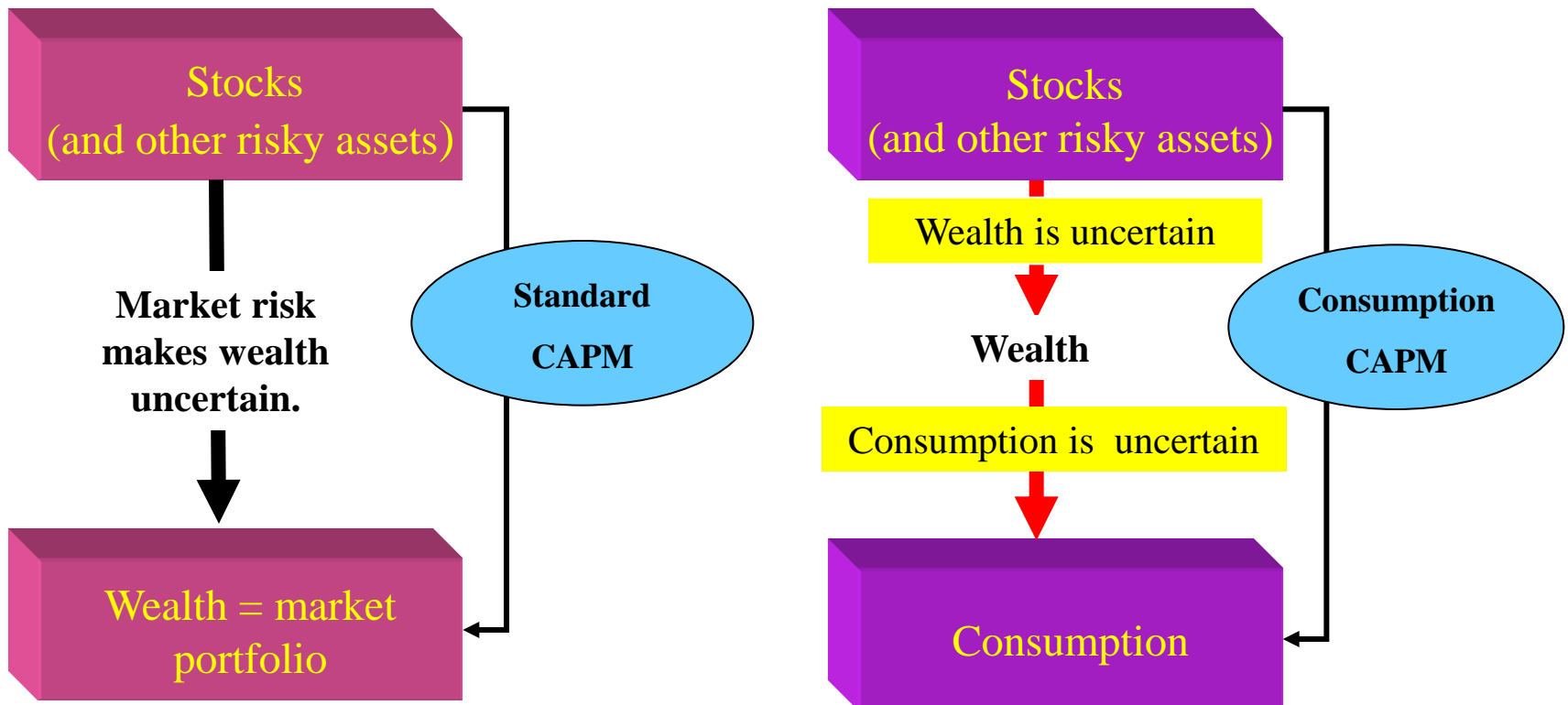


$$R = r_f + B ( r_m - r_f )$$

# Beta vs. Average Risk Premium



# Consumption Betas vs. Market Betas



# Arbitrage Pricing Theory

## *Alternative to CAPM*

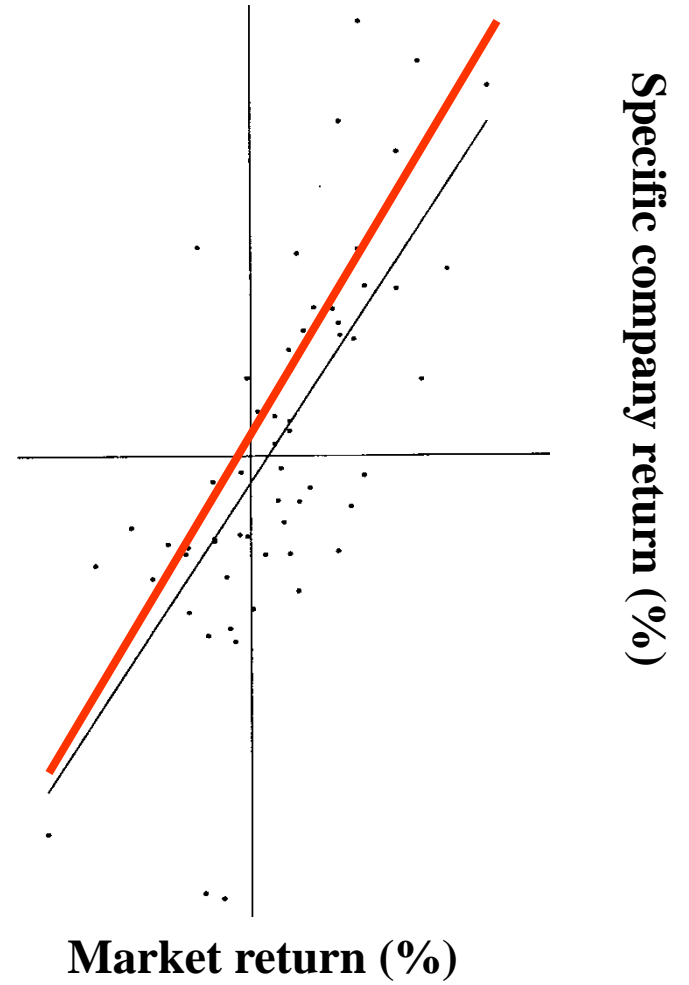
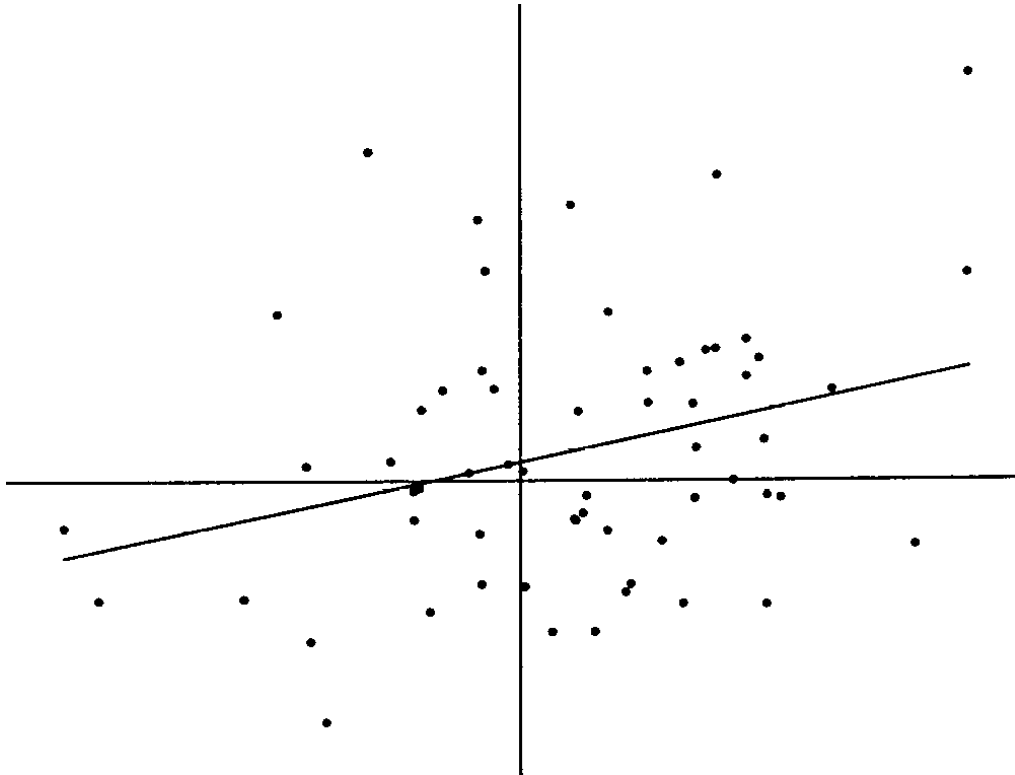
Expected Risk

$$\text{Premium} = r - r_f$$

$$= B_{\text{factor1}}(r_{\text{factor1}} - r_f) + B_{f2}(r_{f2} - r_f) + \dots$$

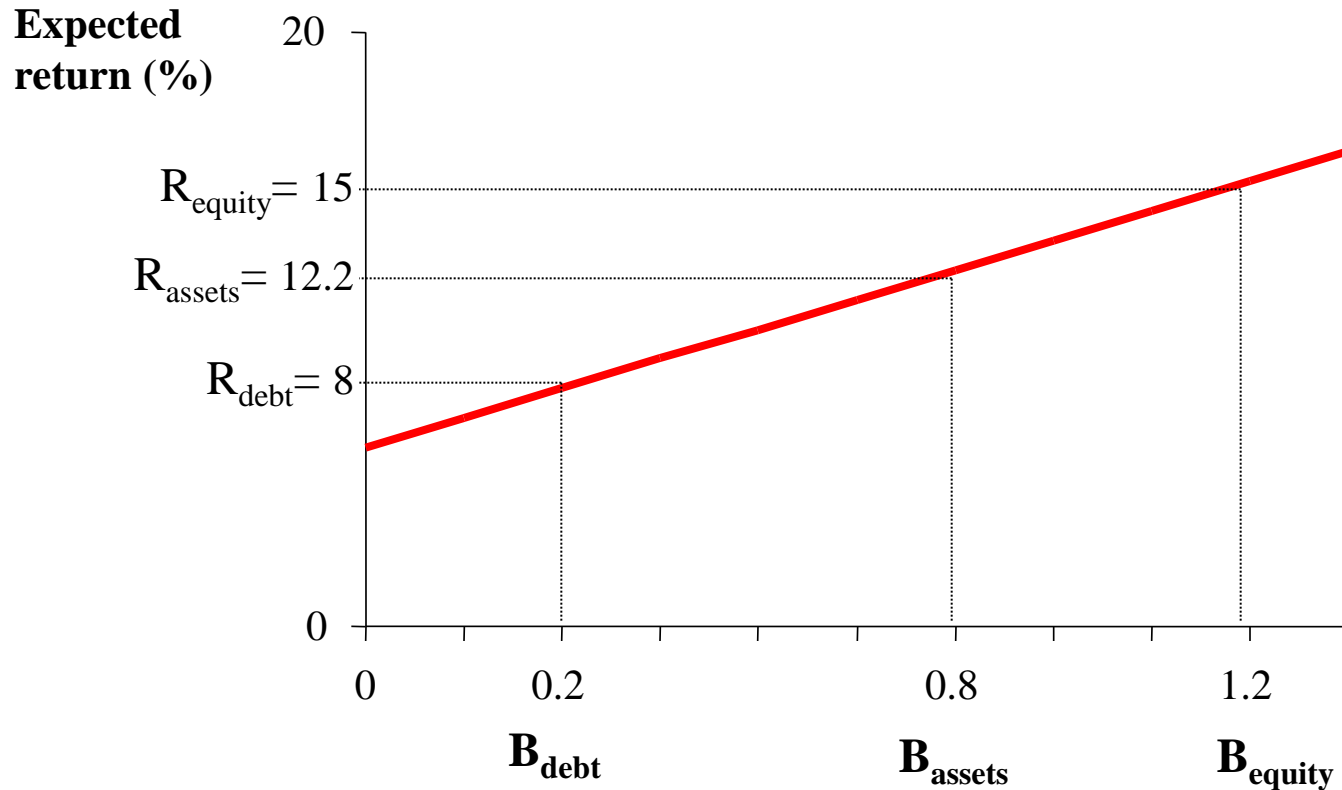
$$\text{Return} = a + b_{\text{factor1}}(r_{\text{factor1}}) + b_{f2}(r_{f2}) + \dots$$

# Portfolio Risk



# Capital Structure & COC

## Expected Returns and Betas prior to refinancing



# Residual Income & EVA

*Residual Income or EVA* = Net Dollar return after deducting the cost of capital.

*EVA* = Residual Income

= Income earned - Income required

= Income earned - [Cost of Capital × Investment]

# Economic Profit

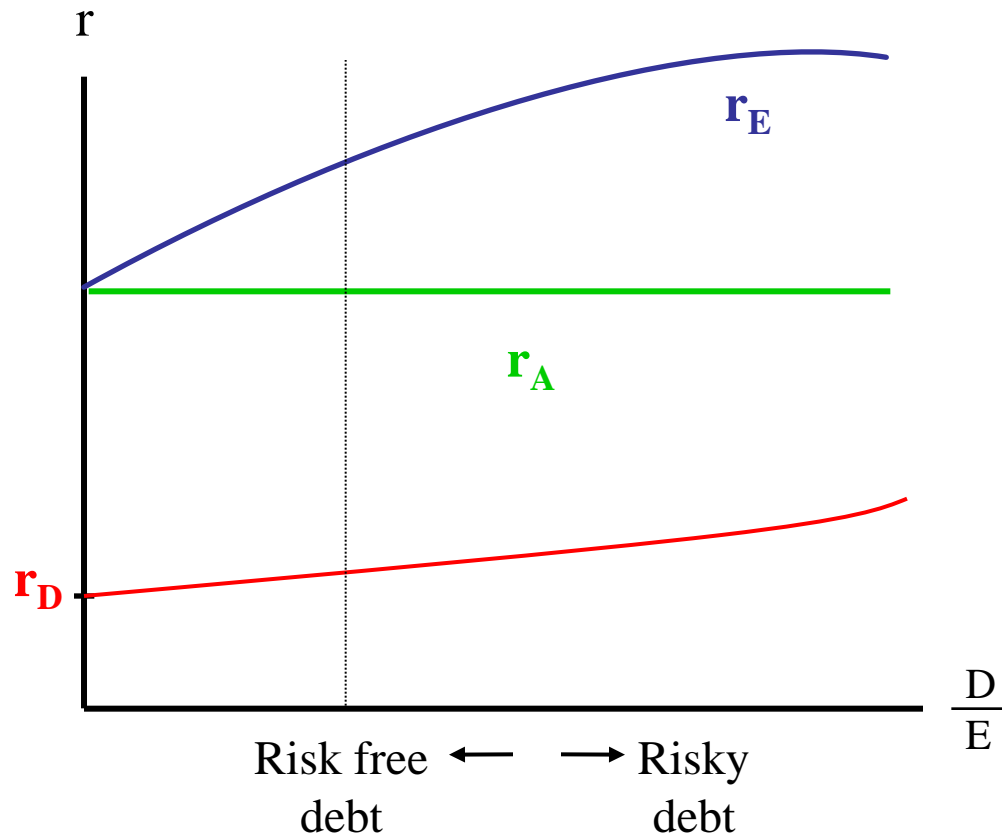
*Economic Profit* = capital invested multiplied by the spread between return on investment and the cost of capital.

$$\begin{aligned} EP &= \text{Economic Profit} \\ &= (ROI - r) \times \text{Capital Invested} \end{aligned}$$

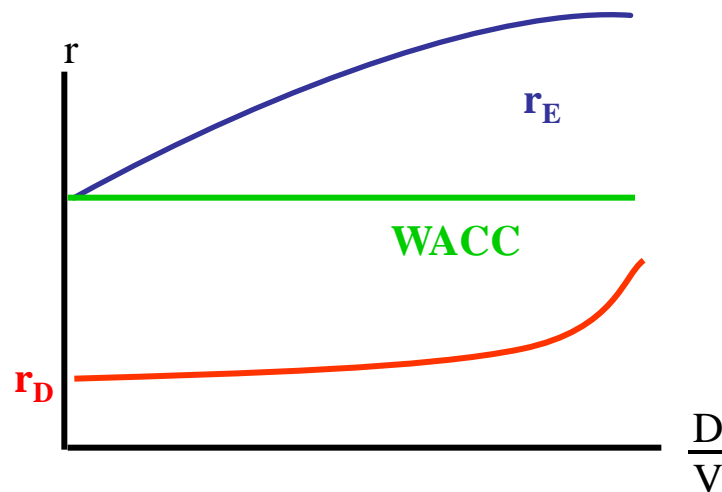
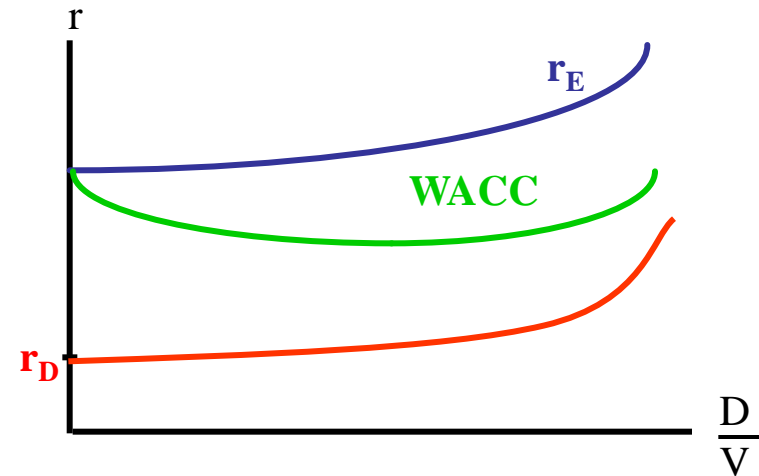
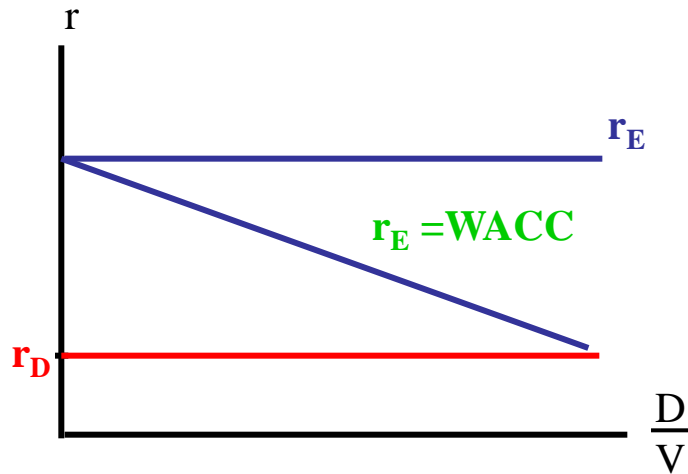
# Accounting Measurement

	<u><b>ECONOMIC</b></u>	<u><b>ACCOUNTING</b></u>
<u><b>INCOME</b></u>	Cash flow + change in PV =	Cash flow + change in book value =
	Cash flow - economic depreciation	Cash flow - accounting depreciation
<u><b>RETURN</b></u>	<u>Economic income</u> PV at start of year	<u>Accounting income</u> BV at start of year

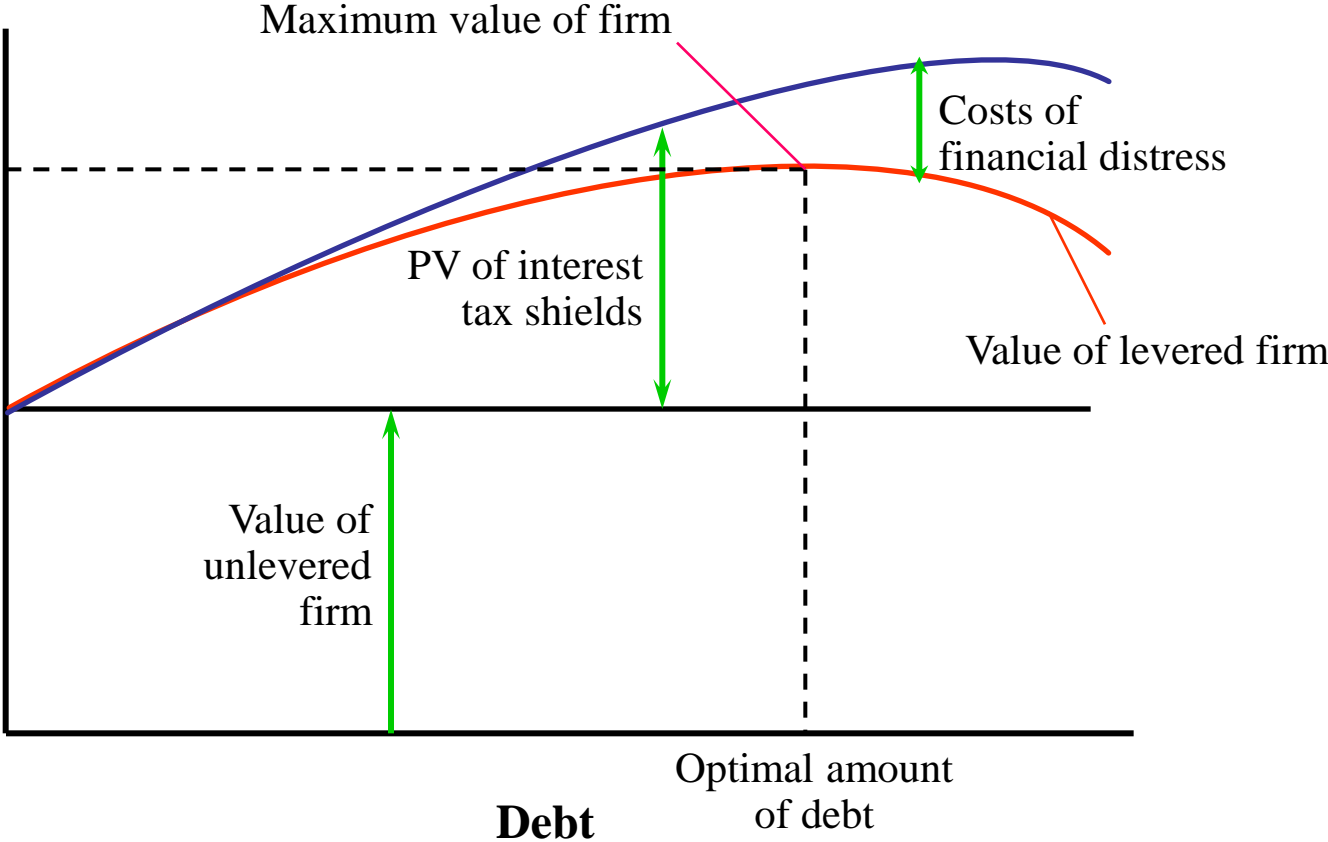
# M&M Proposition



# WACC (traditional and M&M view)

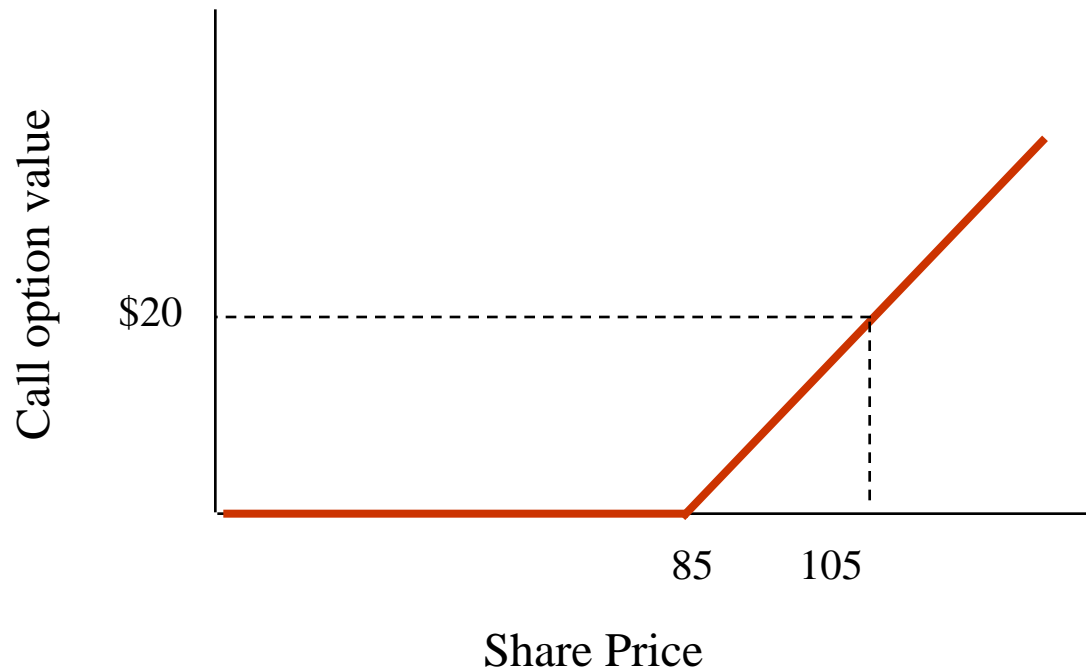


# Financial Distress



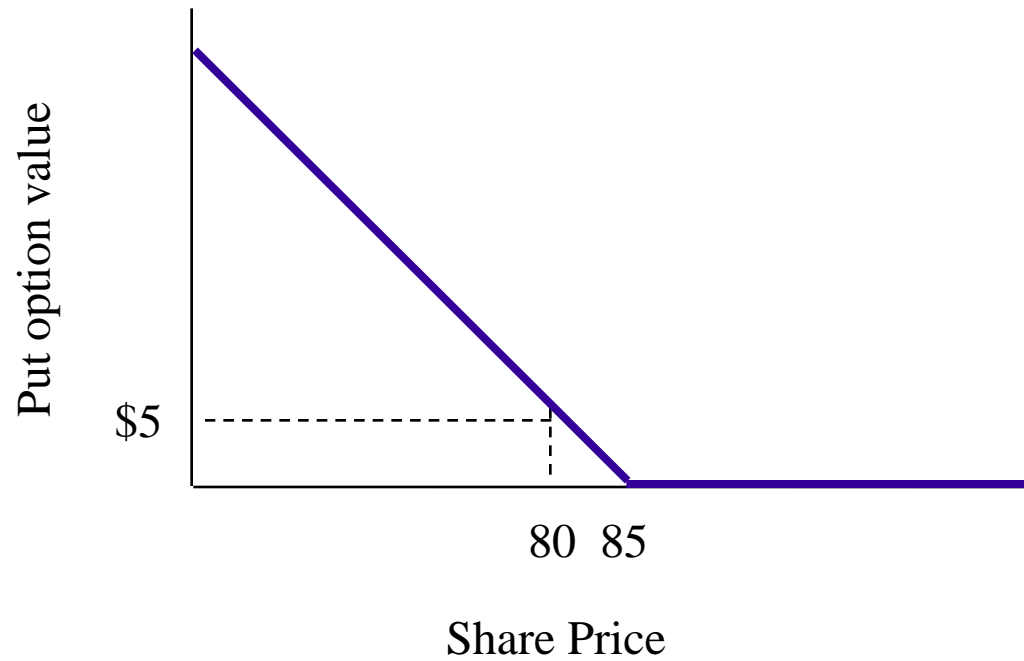
# Call Option (long)

Call option value given a \$85 exercise price.



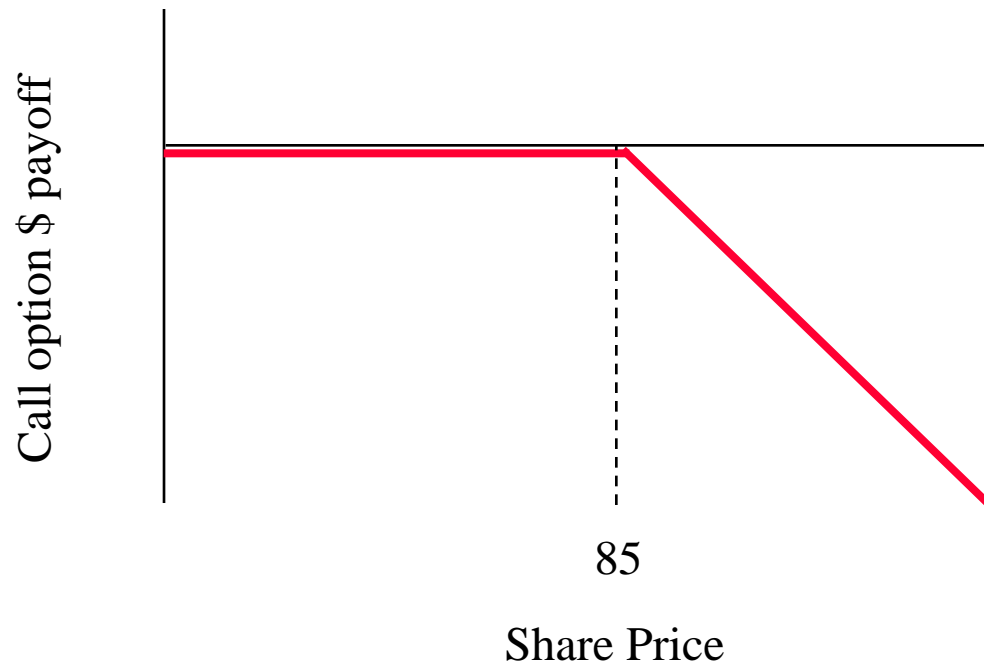
# Put Option (long)

Put option value given a \$85 exercise price.



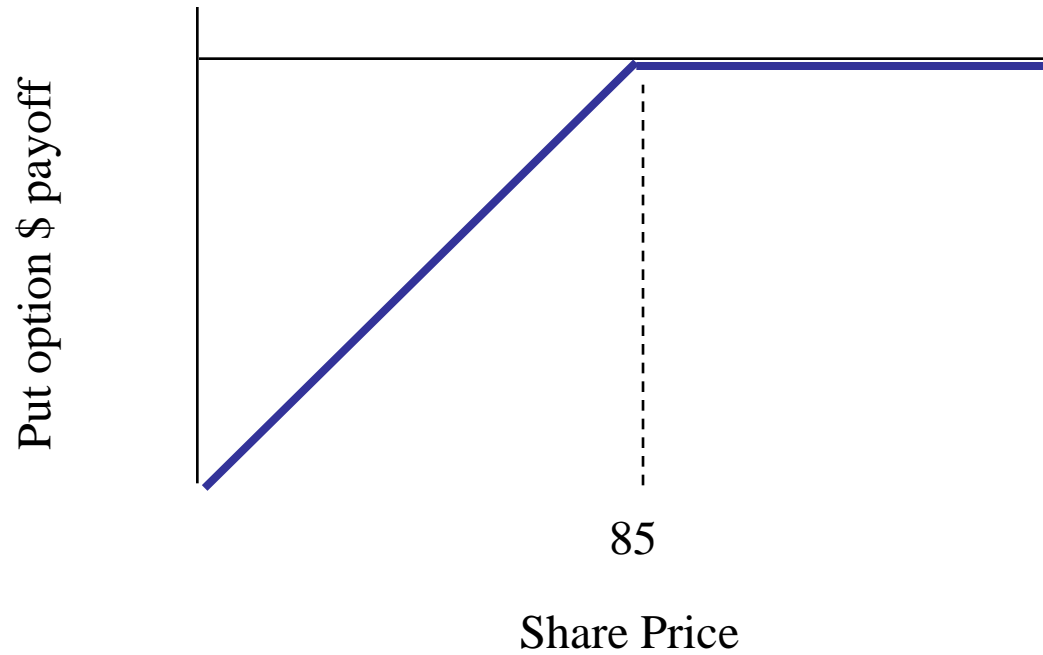
# Call Option (short)

Call option payoff (to seller) given a \$85 exercise price.



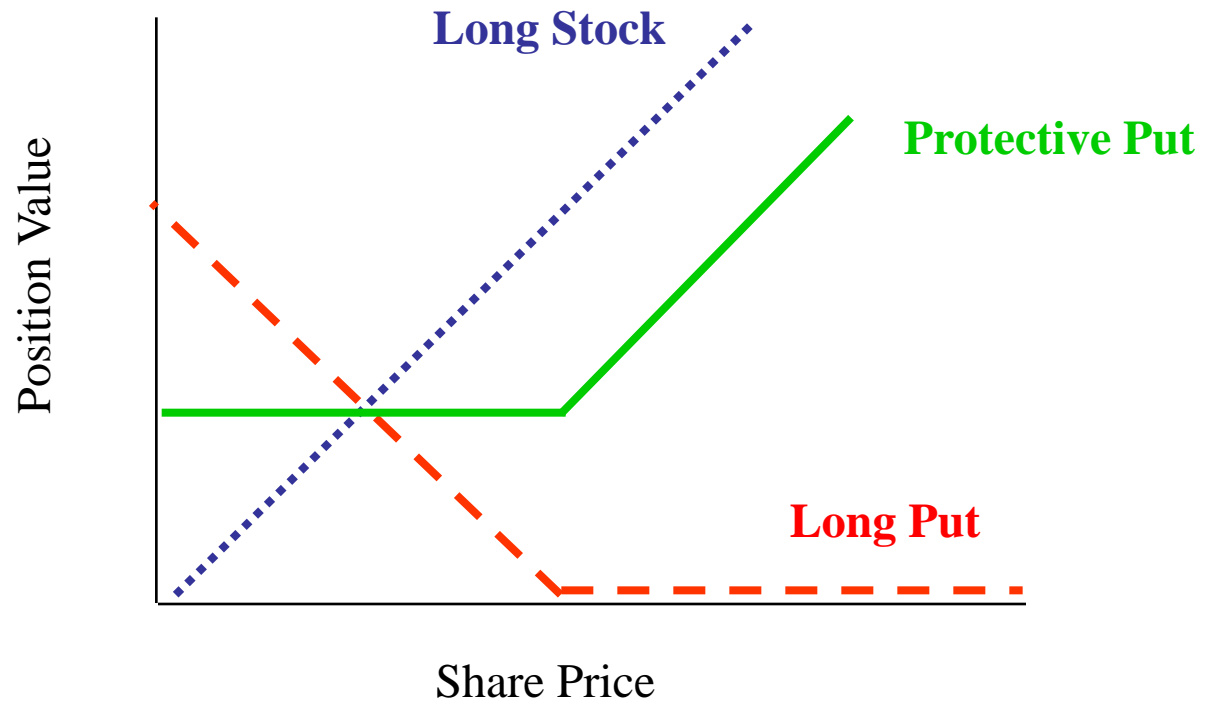
# Put Option (short)

Put option payoff (to seller) given a \$85 exercise price.



# Protective Put

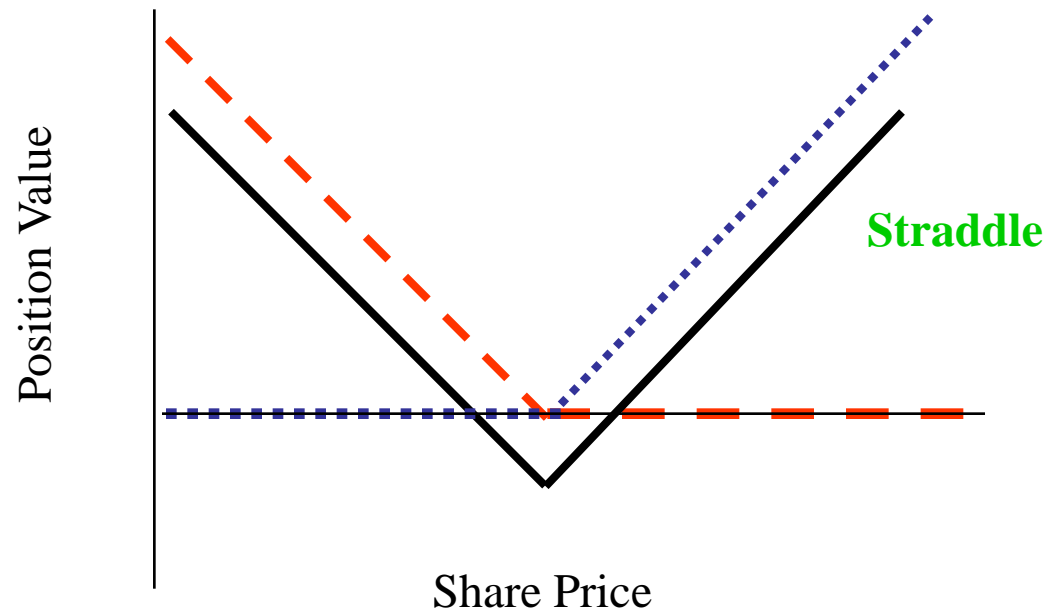
Long stock and long put



# Straddle

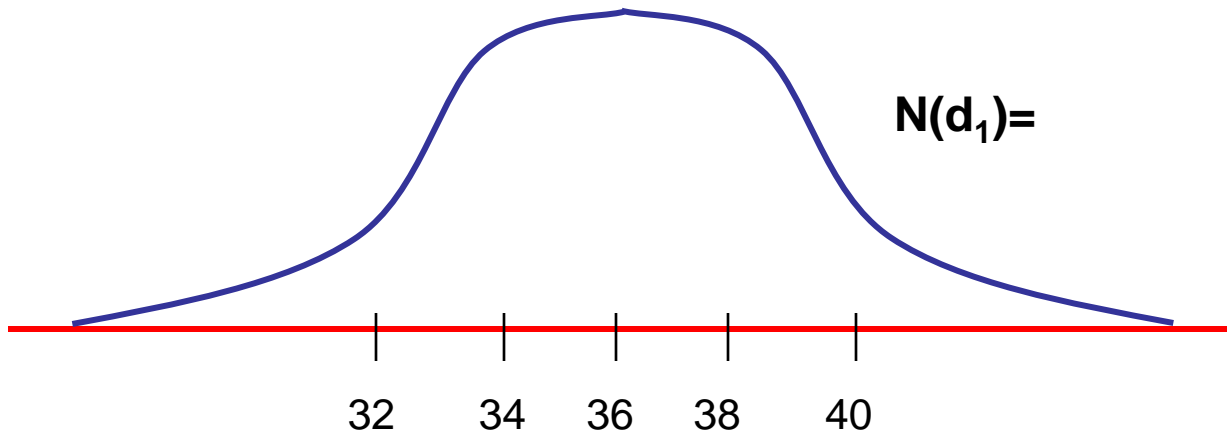
**Long call and long put**

**- Strategy for profiting from high volatility**



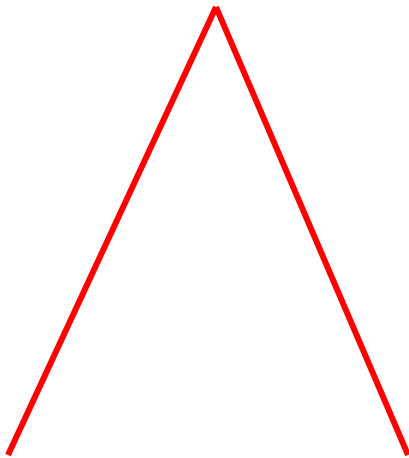
# Black-Scholes Option Pricing Model

$$d_1 = \frac{\ln \frac{P_s}{S} + \left( r + \frac{v^2}{2} \right) t}{v \sqrt{t}}$$



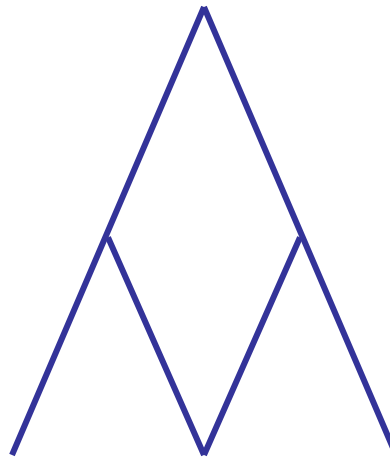
# Binomial vs. Black Scholes

Expanding the binomial model to allow more possible price changes



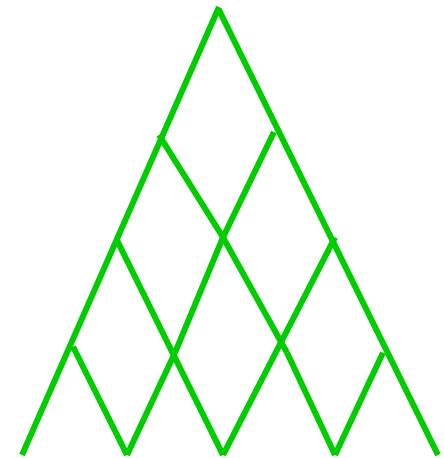
**1 step**

**(2 outcomes)**



**2 steps**

**(3 outcomes)**

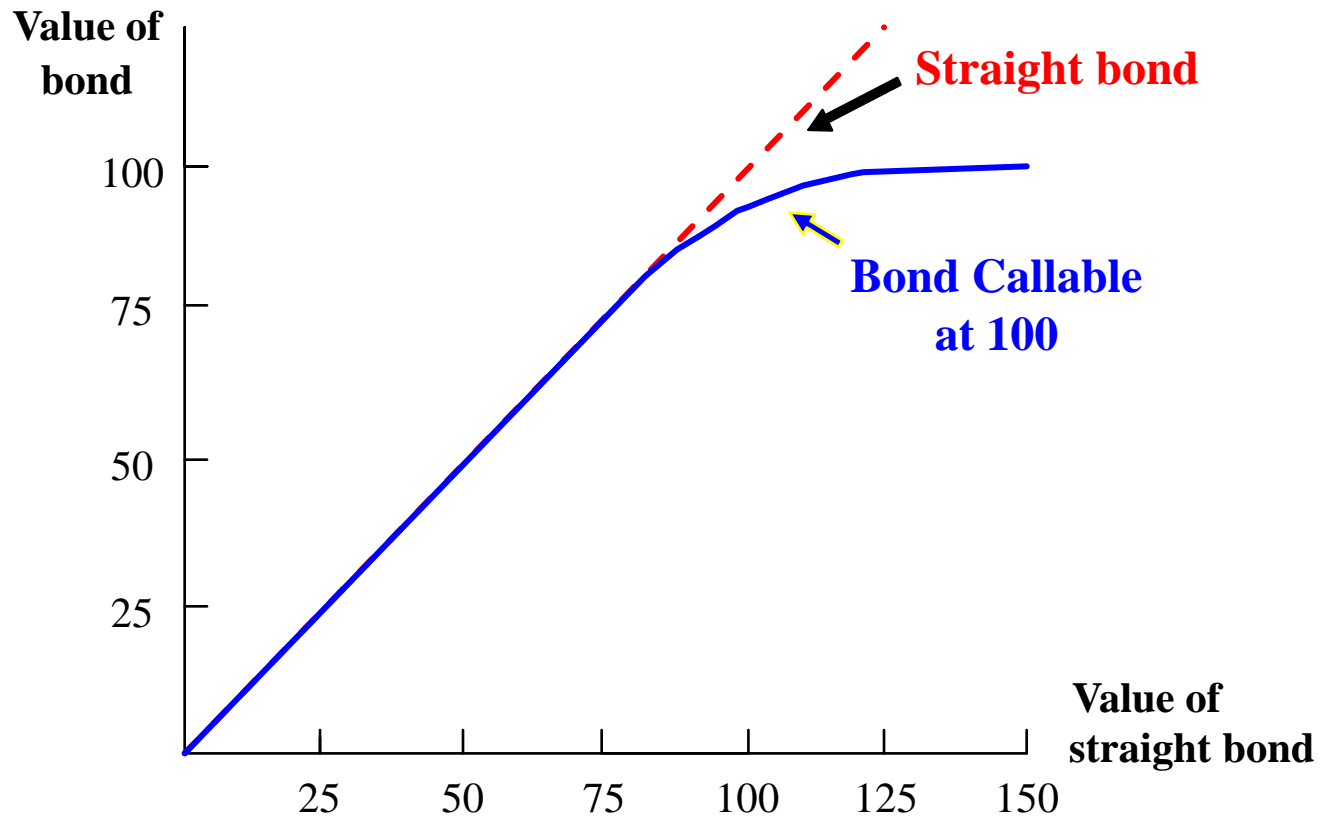


**4 steps**

**(5 outcomes)**

**etc. etc.**

# Straight Bond vs. Callable Bond



# Exchange Rate Relationship

$$\frac{1 + r_{\text{foreign}}}{1 + r_{\$}}$$

equals

$$\frac{f_{\text{foreign} / \$}}{S_{\text{foreign} / \$}}$$

equals



$$\frac{1 + i_{\text{foreign}}}{1 + i_{\$}}$$

equals

$$\frac{E(s_{\text{foreign} / \$})}{S_{\text{foreign} / \$}}$$

# Leverage Ratios I

$$\text{Long term debt ratio} = \frac{\text{long term debt}}{\text{long term debt} + \text{equity}}$$

$$\text{Debt equity ratio} = \frac{\text{long term debt} + \text{value of leases}}{\text{equity}}$$

# Leverage Ratios II

$$\text{Total debt ratio} = \frac{\text{total liabilities}}{\text{total assets}}$$

$$\text{Times interest earned} = \frac{\text{EBIT}}{\text{interest payments}}$$

$$\text{Cash coverage ratio} = \frac{\text{EBIT} + \text{depreciation}}{\text{interest payments}}$$

# Liquidity Ratios I

$$\text{Net working capital to total assets ratio} = \frac{\text{net working capital}}{\text{total assets}}$$

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$

# Liquidity Ratios II

$$\text{Quick ratio} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{current liabilities}}$$

$$\text{Cash ratio} = \frac{\text{cash} + \text{marketable securities}}{\text{current liabilities}}$$

$$\text{Interval measure} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{average daily expenditures from operations}}$$

# Efficiency Ratios I

$$\text{Asset turnover ratio} = \frac{\text{sales}}{\text{average total assets}}$$

$$\text{NWC turnover} = \frac{\text{sales}}{\text{average net working capital}}$$

# Efficiency Ratios II

$$\text{Inventory turnover ratio} = \frac{\text{cost of goods sold}}{\text{average inventory}}$$

$$\text{Days' sales in inventory} = \frac{\text{average inventory}}{\text{cost of goods sold} / 365}$$

$$\text{Average collection period} = \frac{\text{average receivables}}{\text{average daily sales}}$$

# Profitability Ratios I

$$\text{Net profit margin} = \frac{\text{EBIT} - \text{tax}}{\text{sales}}$$

$$\text{Return on assets} = \frac{\text{EBIT} - \text{tax}}{\text{average total assets}}$$

$$\text{Return on equity} = \frac{\text{earnings available for common stock}}{\text{average equity}}$$

# Profitability Ratios II

$$\text{Payout ratio} = \frac{\text{dividends}}{\text{earnings}}$$

$$\begin{aligned}\text{Plowback ratio} &= \frac{\text{earnings} - \text{dividends}}{\text{earnings}} \\ &= 1 - \text{payout ratio}\end{aligned}$$

$$\text{Growth in equity from plowback} = \frac{\text{earnings} - \text{dividends}}{\text{earnings}}$$

# Market Value Ratios I

$$\text{PE Ratio} = \frac{\text{stock price}}{\text{earnings per share}}$$

$$\text{Forecasted PE ratio} = \frac{P_0}{\text{aveEPS}_1} = \frac{\text{Div}_1}{\text{EPS}_1} \times \frac{1}{r - g}$$

$$\text{Dividend yield} = \frac{\text{dividend per share}}{\text{stock price}}$$

# Market Value Ratios II

$$\text{Price per share} = P_0 = \frac{\text{Div}_1}{r - g}$$

$$\text{Market to book ratio} = \frac{\text{stock price}}{\text{book value per share}}$$

$$\text{Tobins Q} = \frac{\text{market value of assets}}{\text{estimated replcement cost}}$$



# Du Pont System II

$$\text{ROE} = \frac{\text{assets}}{\text{equity}} \times \frac{\text{sales}}{\text{assets}} \times \frac{\text{EBIT} - \text{taxes}}{\text{sales}} \times \frac{\text{EBIT} - \text{taxes} - \text{interest}}{\text{EBIT} - \text{taxes}}$$

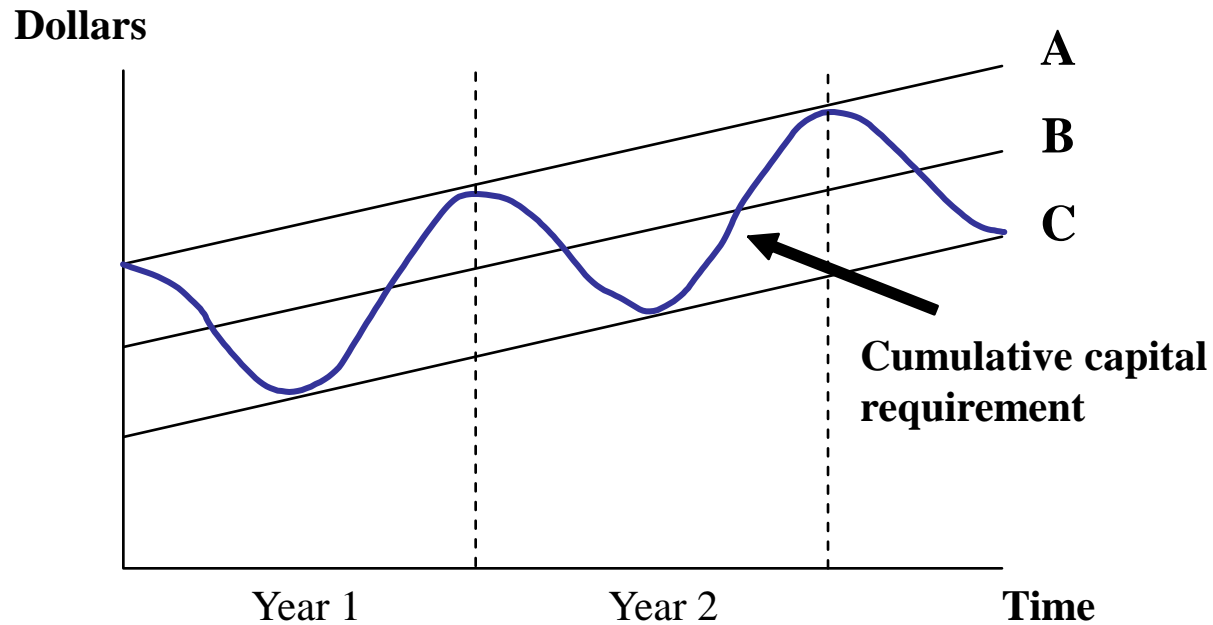
leverage  
ratio

asset  
turnover

profit  
margin

debt  
burden

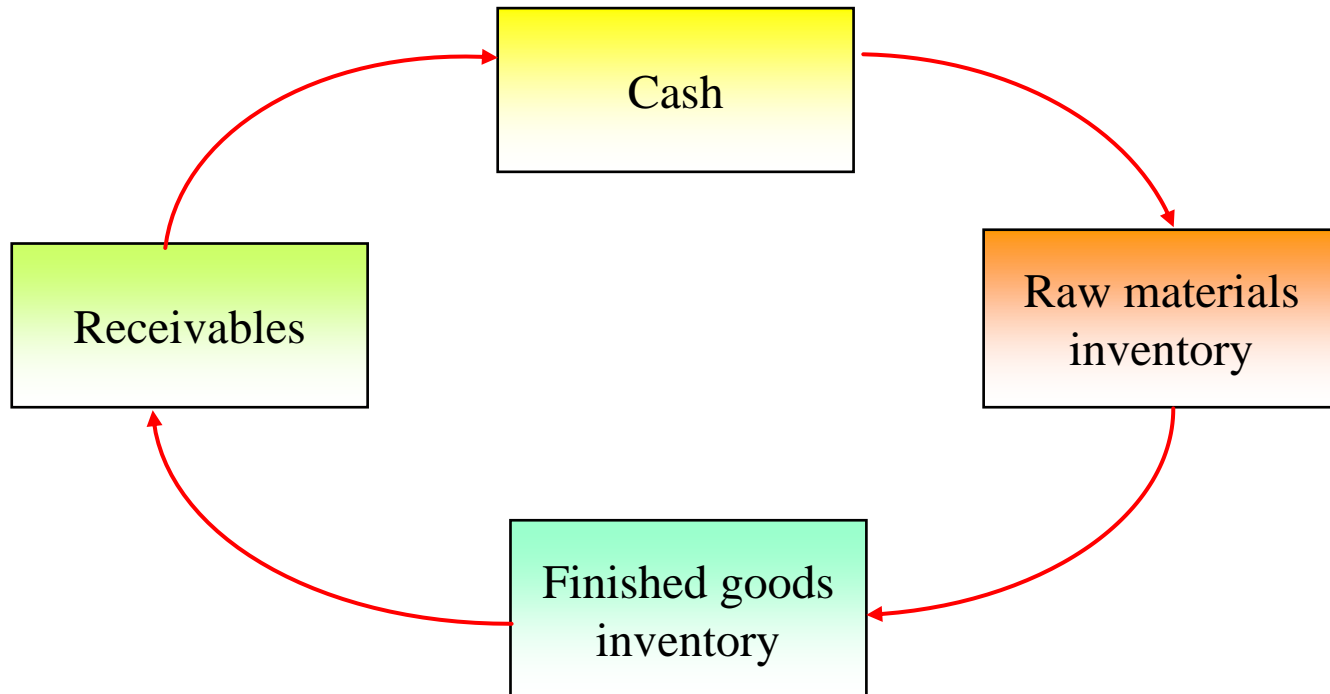
# Firm's Cumulative Capital Requirement



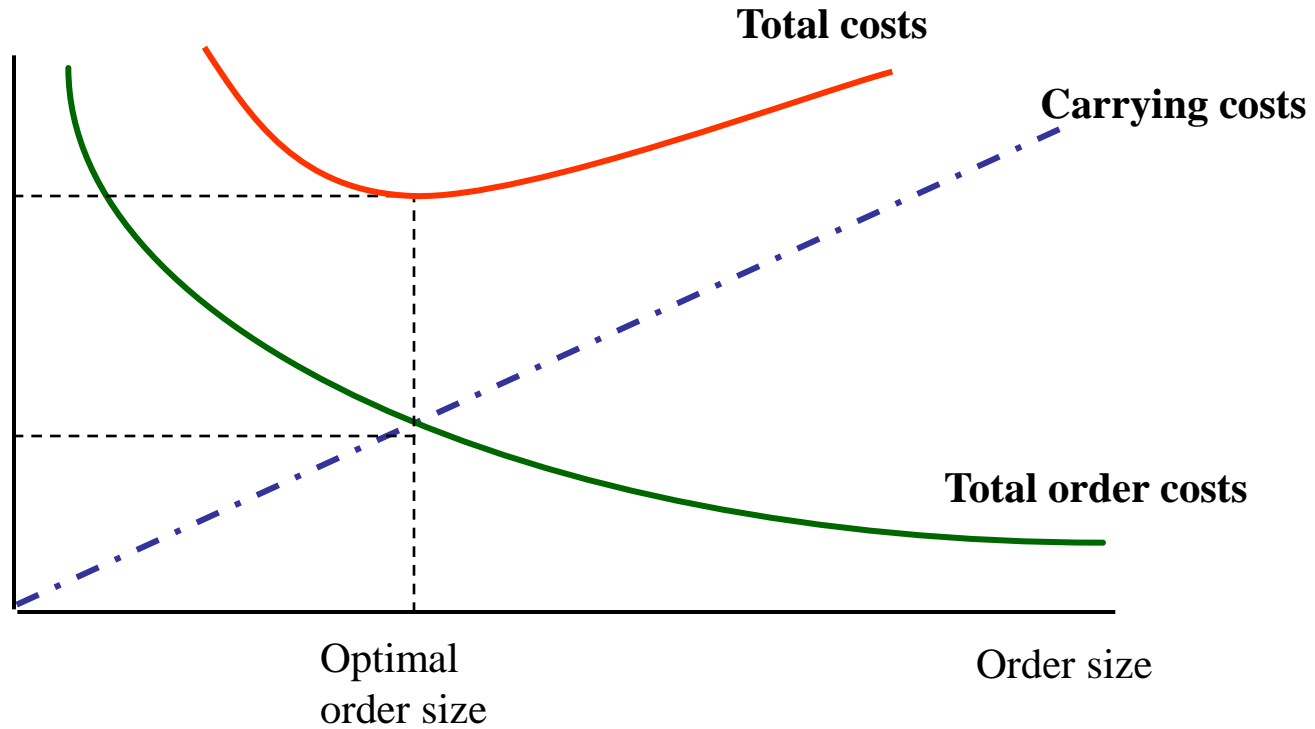
- Strategy A:** A permanent cash surplus
- Strategy B:** Short-term lender for part of year and borrower for remainder
- Strategy C:** A permanent short-term borrower

# Working Capital

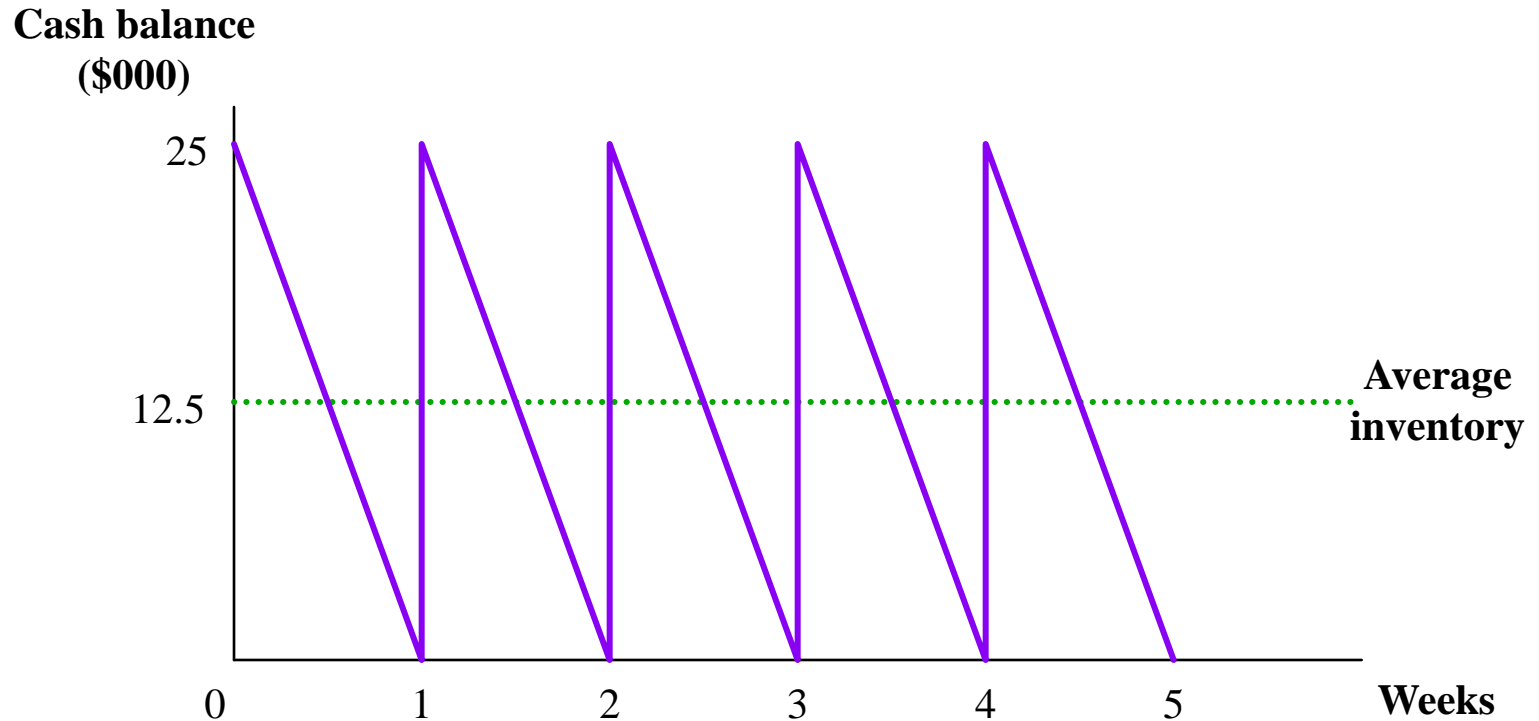
Simple Cycle of operations



# Inventories & Cash Balances I



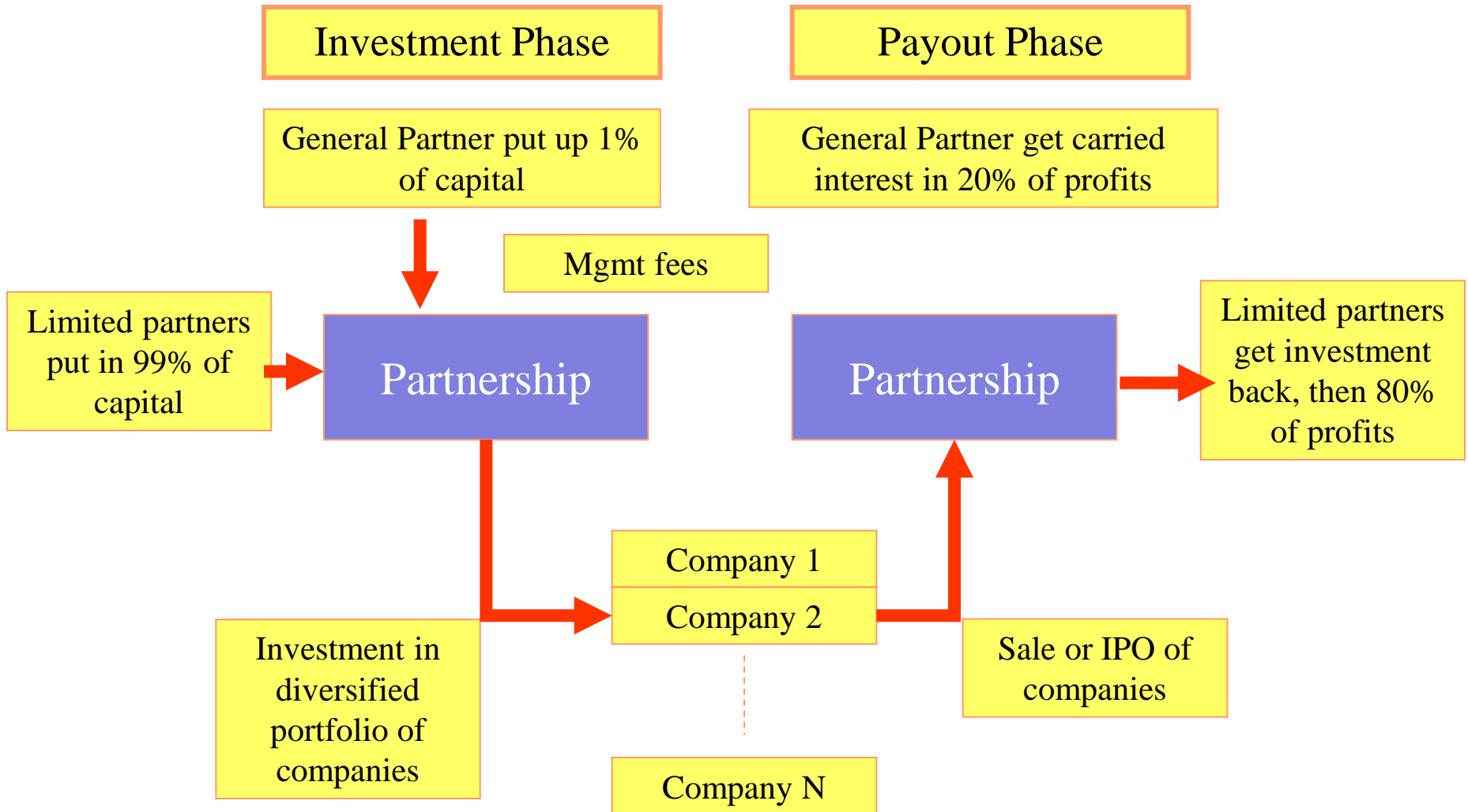
# Inventories & Cash Balances II



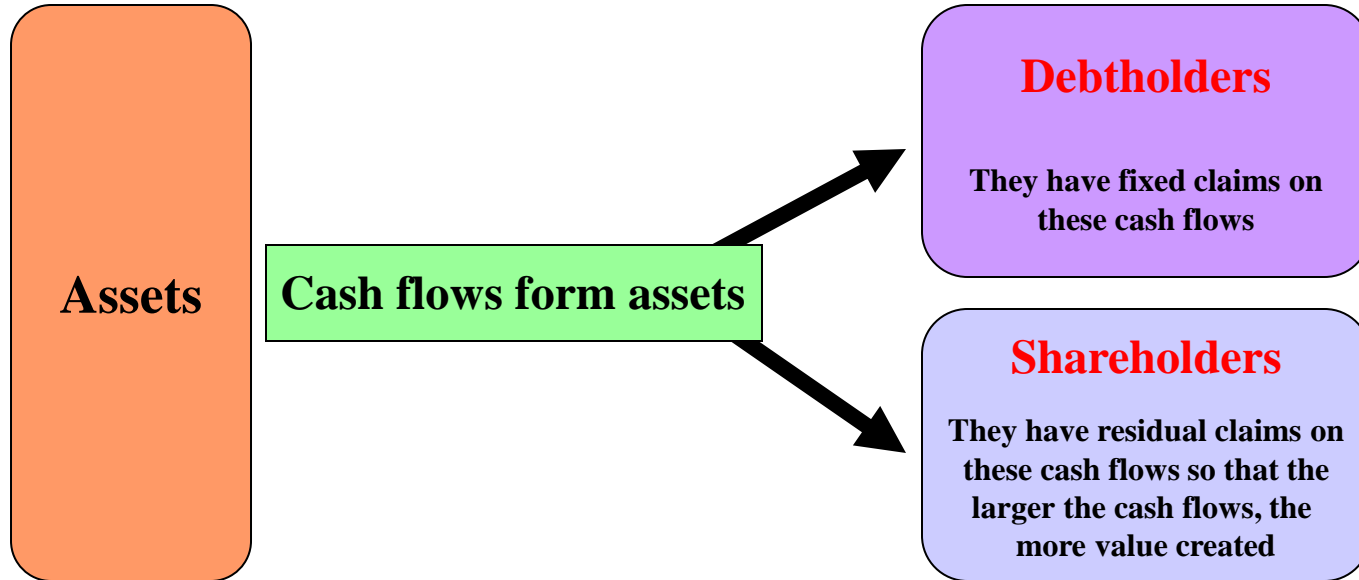
**Value of bills sold = Q =**

$$\sqrt{\frac{2 \times \text{annual cash disbursement} \times \text{cost per sale}}{\text{interest rate}}}$$

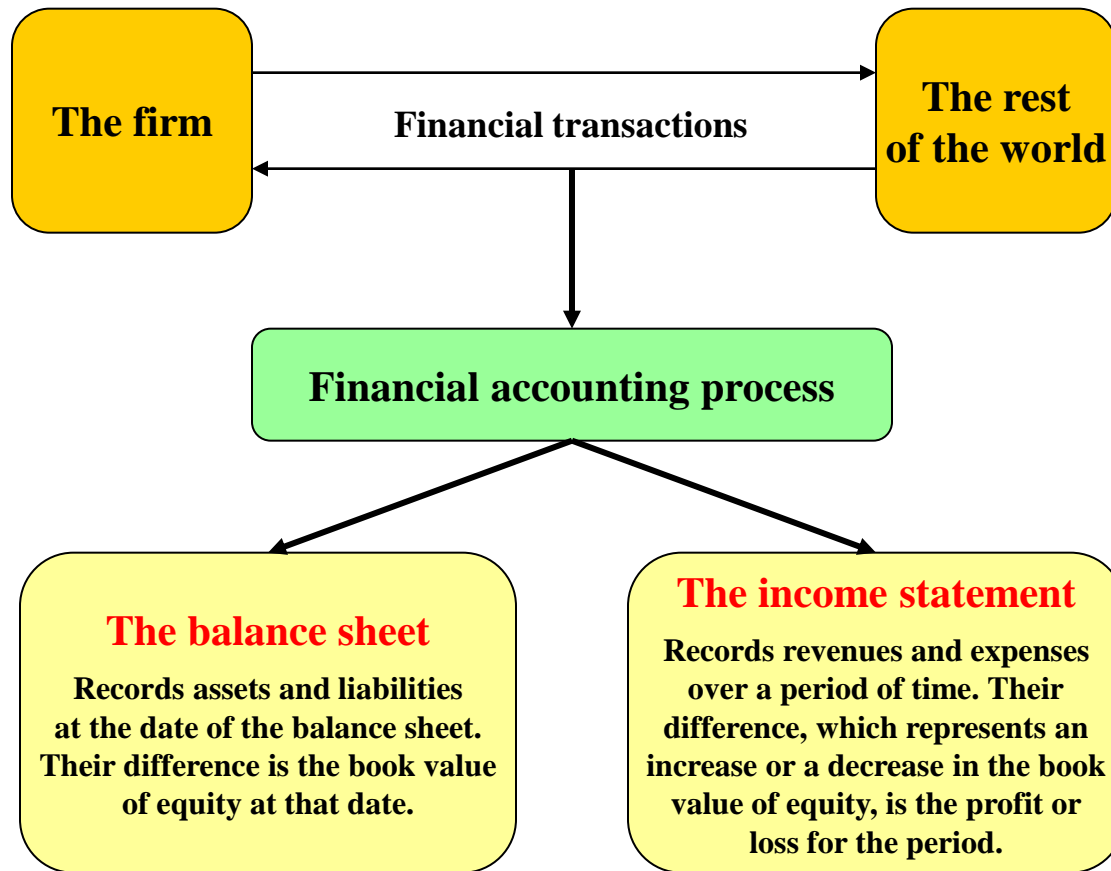
# Private Equity Partnership



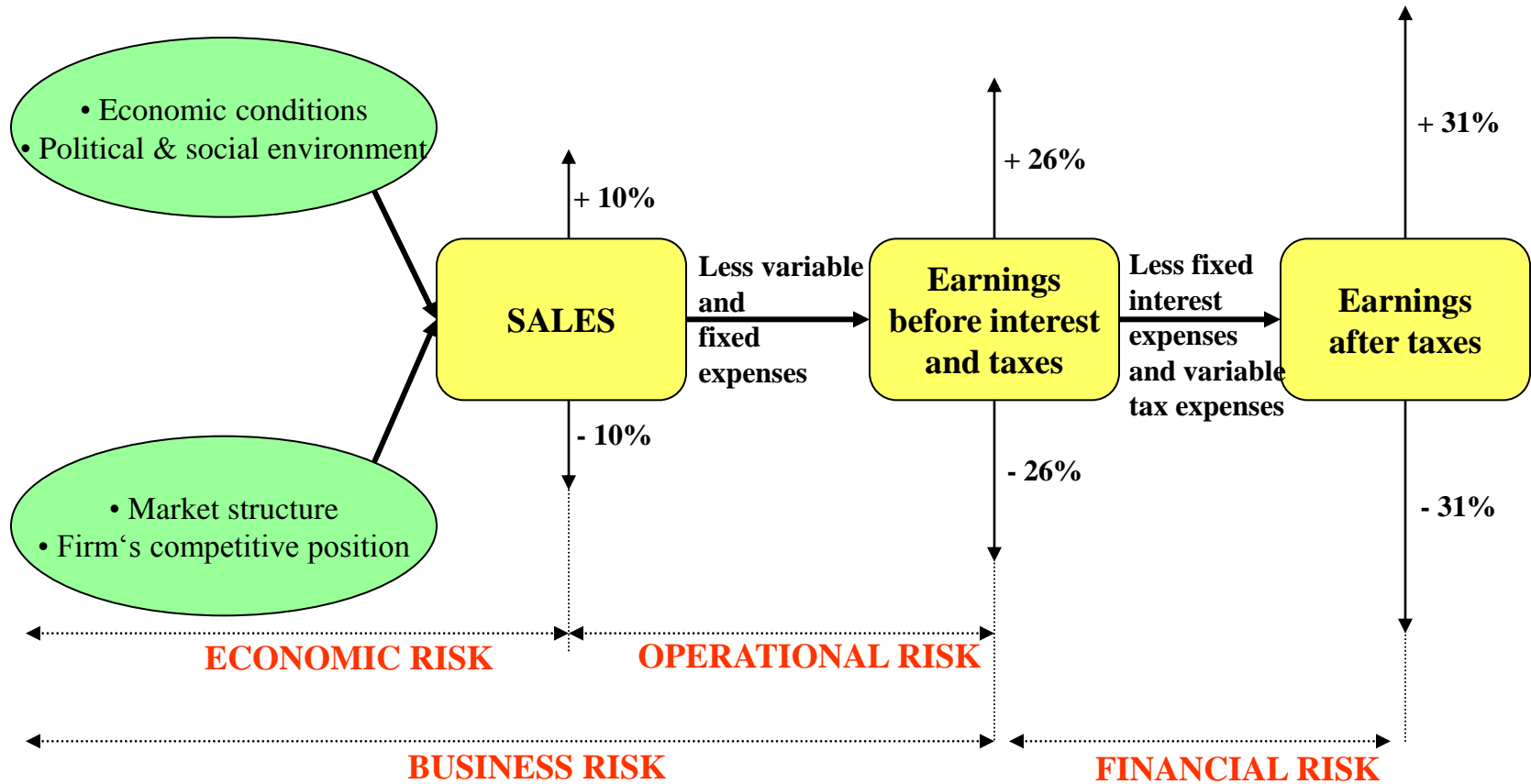
# Increase in the Cash Flows from Assets



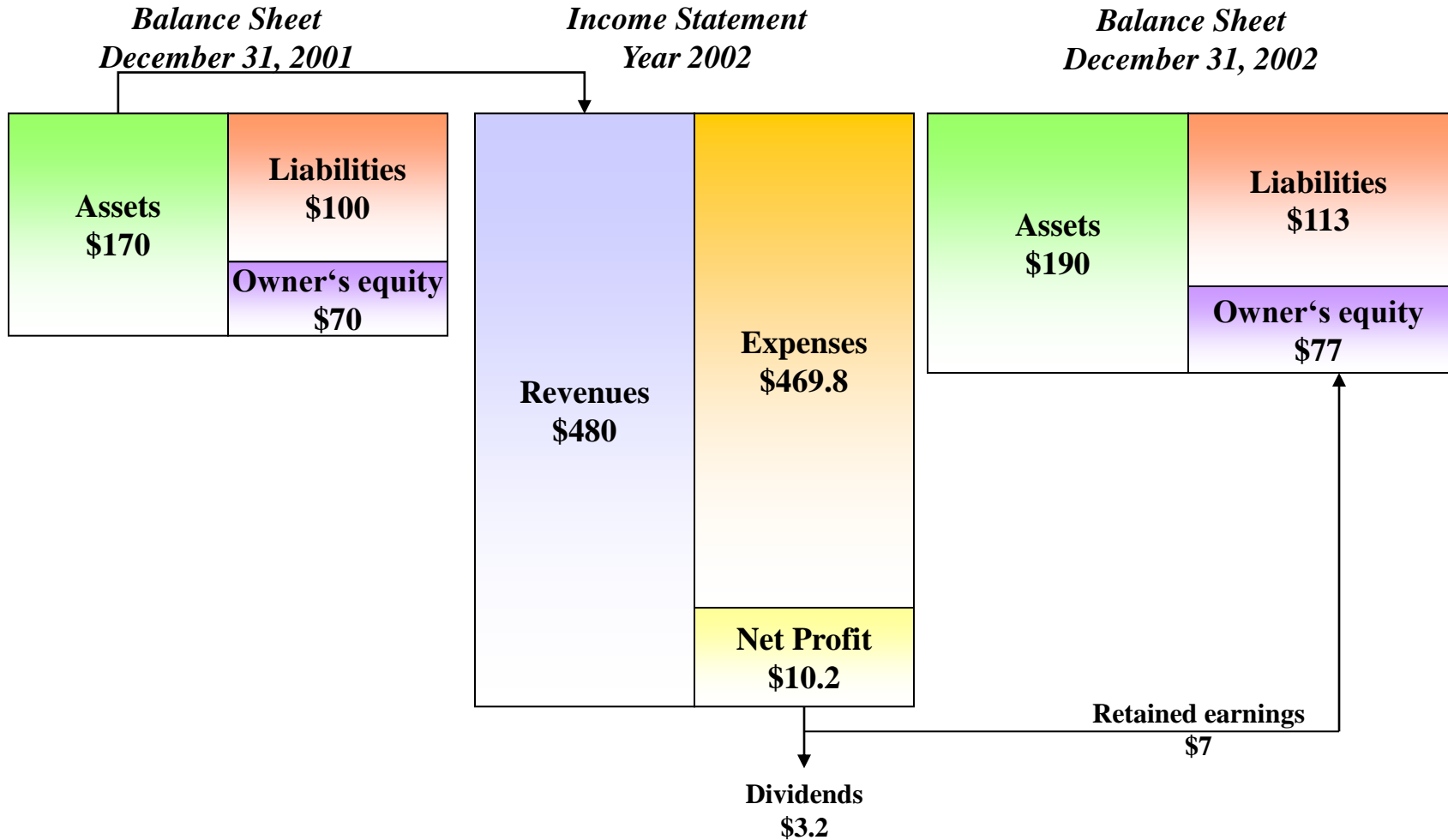
# A Simplified View of the Financial Accounting Process



# Sources of Risk That Increase Profit Volatility



# The Link Between the Balance Sheets and the Income Statement



# The Managerial Balance Sheet Versus the Standard Balance Sheet

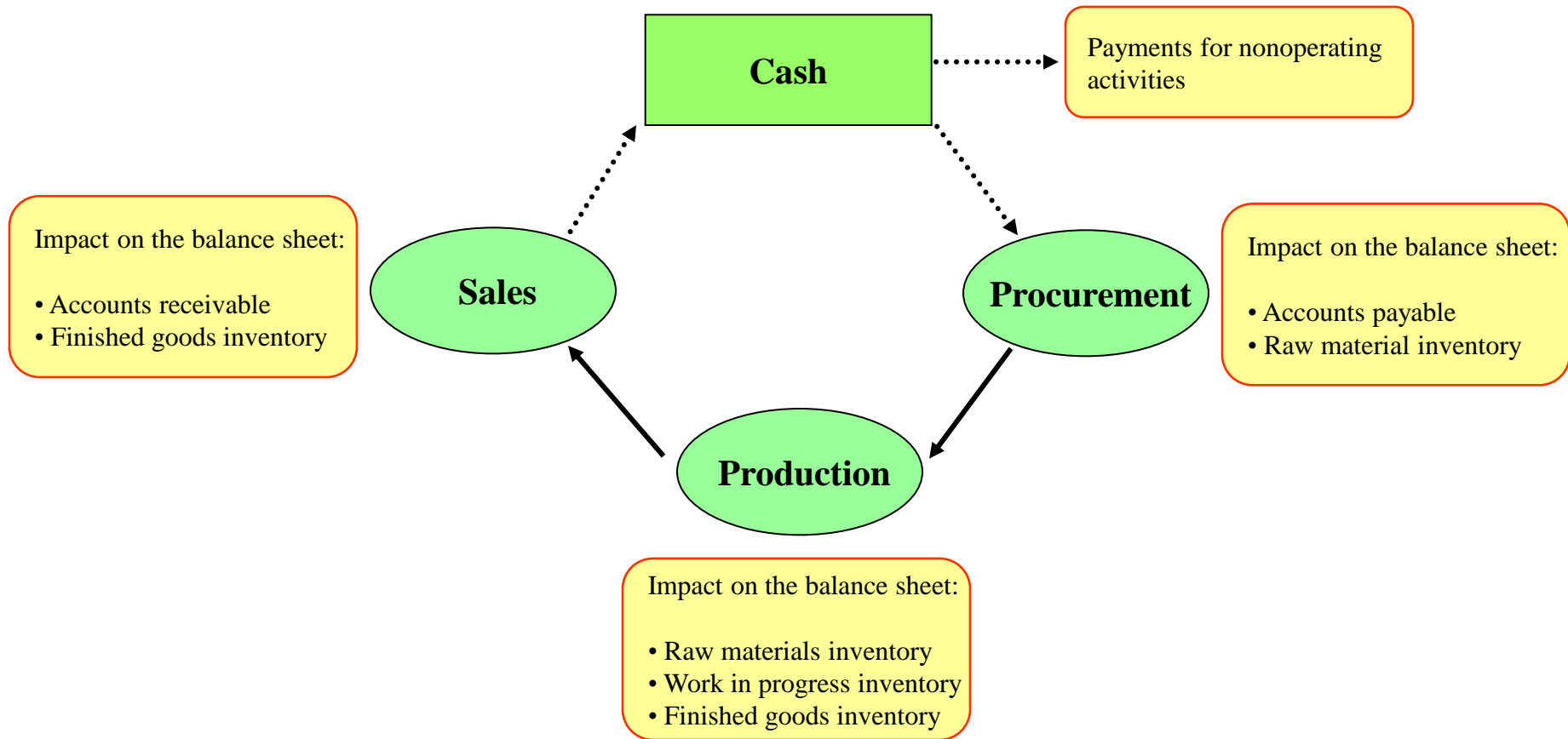
*The Managerial Balance Sheet*

<b>Invested capital or net assets</b>	<b>Capital employed</b>
<b>Cash</b>	<b>Short-term debt</b>
<b>Working capital requirement (WCR)</b> Operating assets less Operating liabilities	<b>Long-term financing</b> Long-term debt plus Owner's equity
<b>Net fixed assets</b>	

*The Standard Balance Sheet*

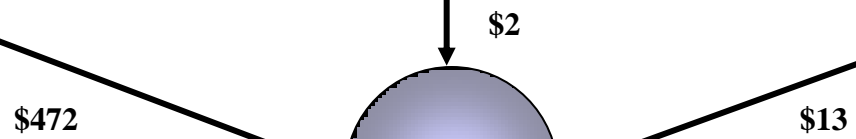
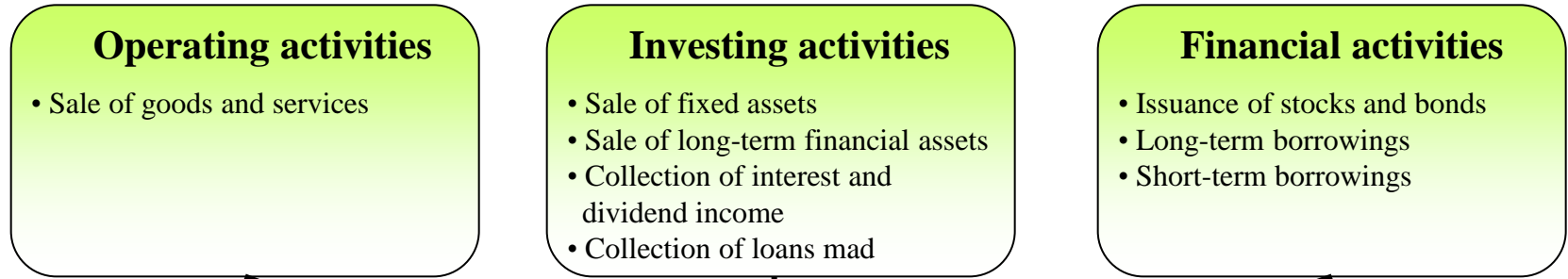
<b>Total assets</b>	<b>Liabilities and owner's equity</b>
<b>Cash</b>	<b>Short-term debt</b>
<b>Operating assets</b> Accounts receivable plus Inventories plus Prepaid expenses	<b>Operating liabilities</b> Accounts payable plus Accrued expenses
<b>Net fixed assets</b>	<b>Long-term financing</b> Long-term debt plus Owner's equity

# The Firm's Operating Cycle and Its Impact on the Firm's Balance Sheet

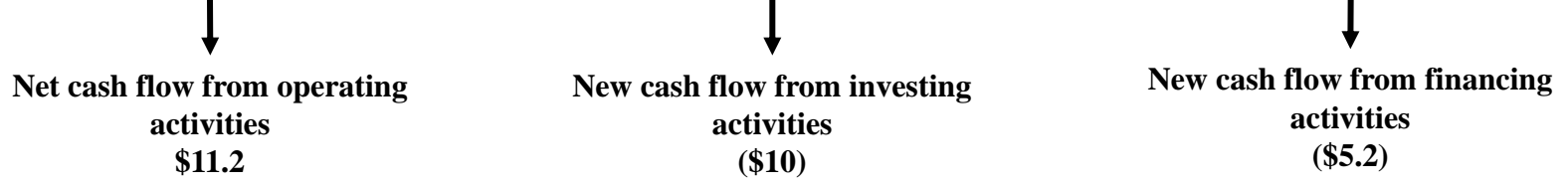
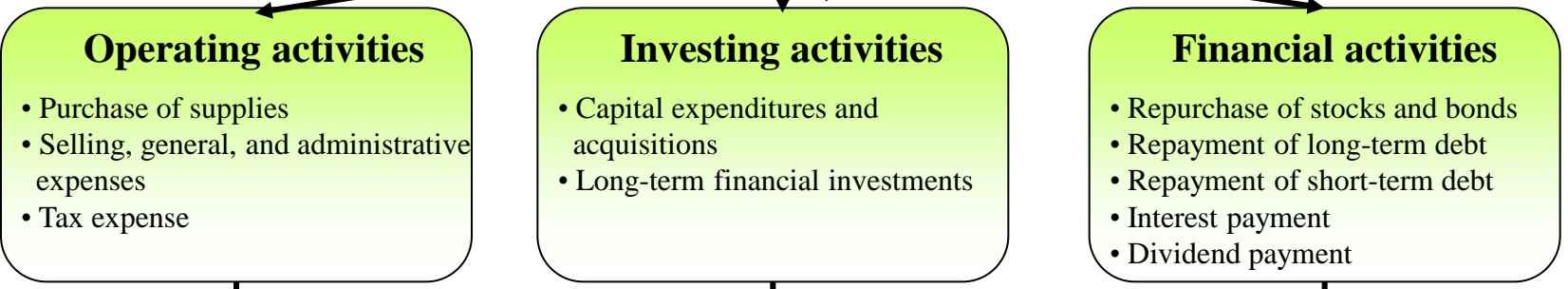


# Sources of Cash Inflow and Cash Outflow

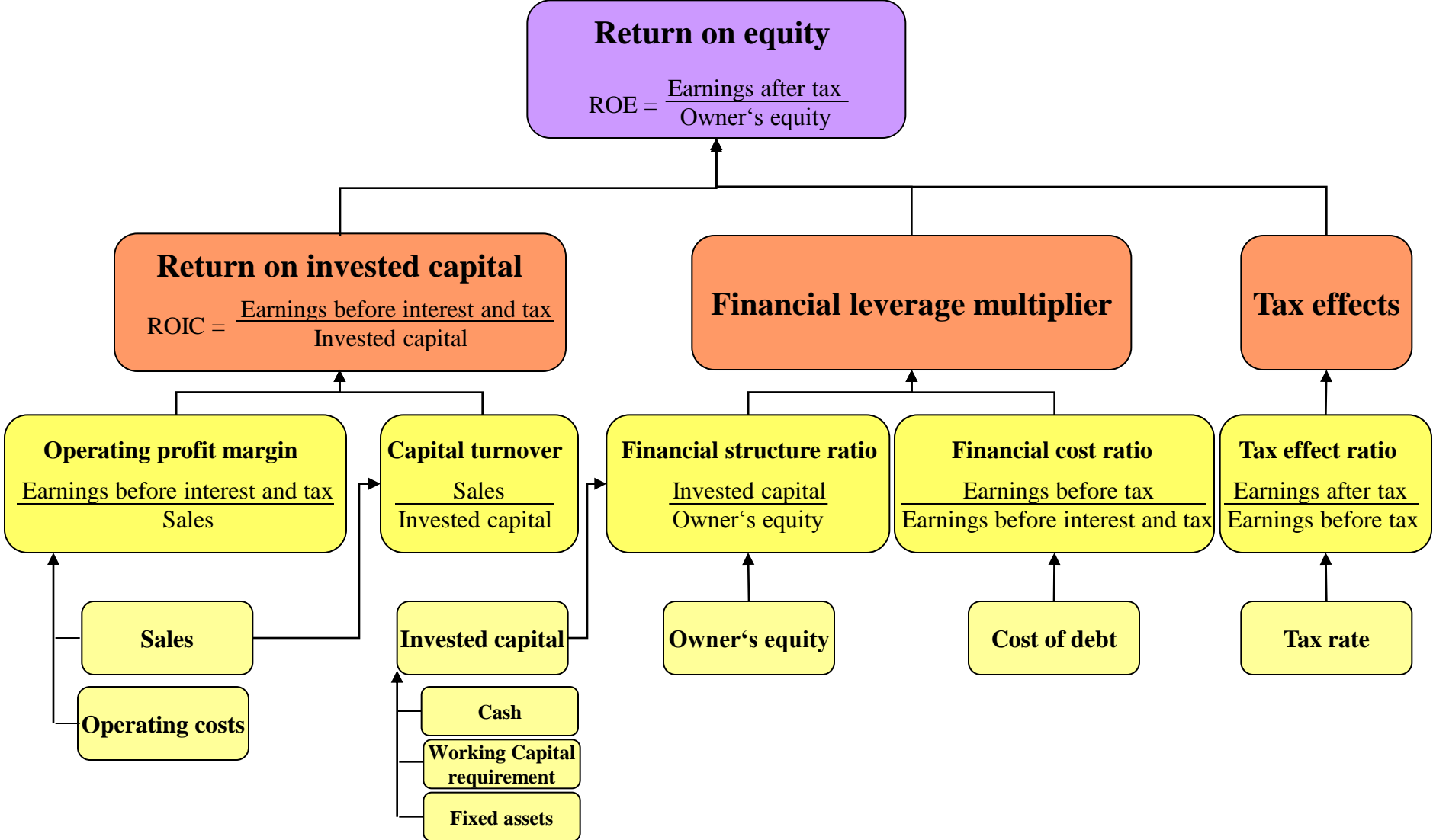
Sources of cash inflow



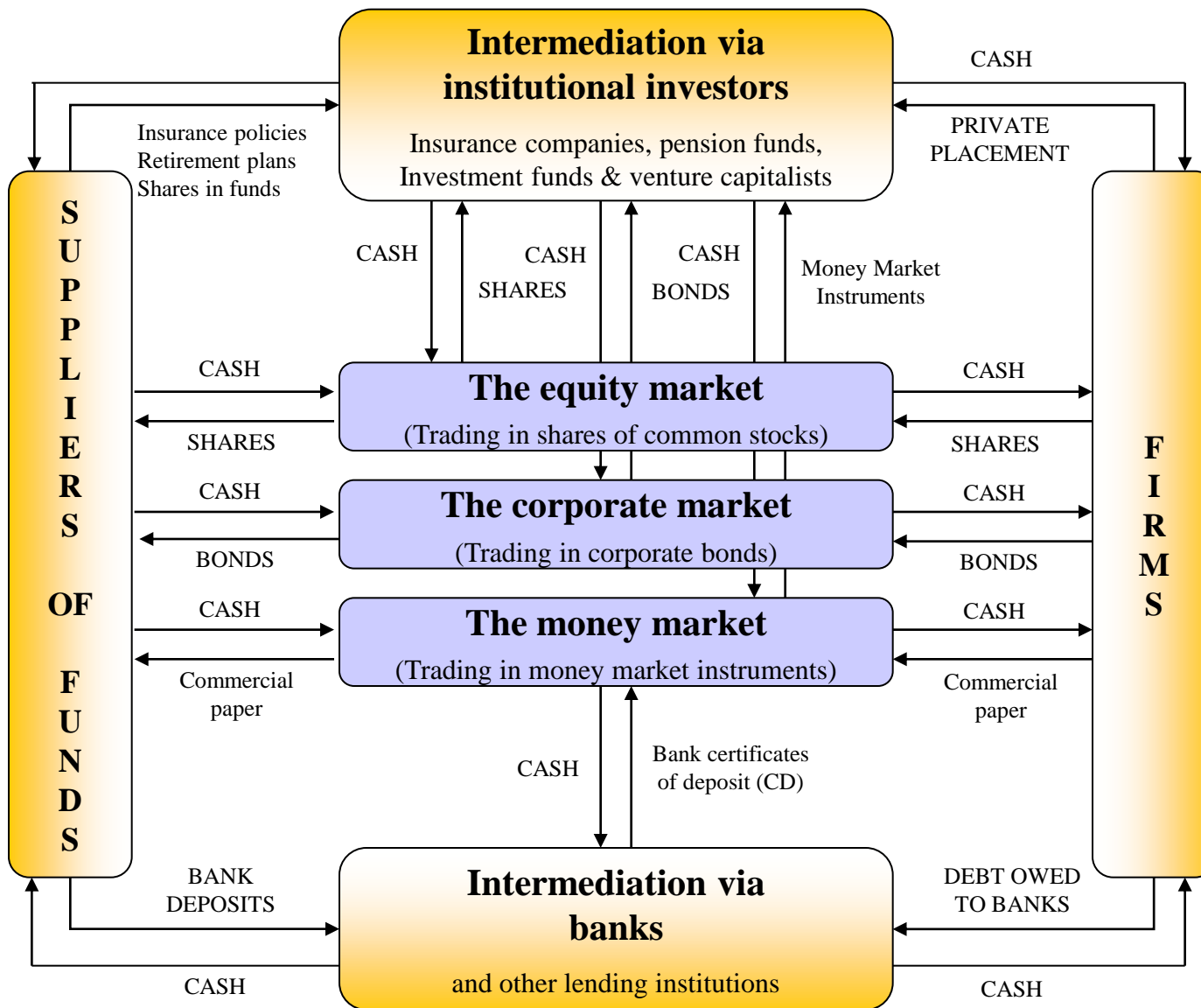
Sources of cash outflow



# The Drivers of Return on Equity

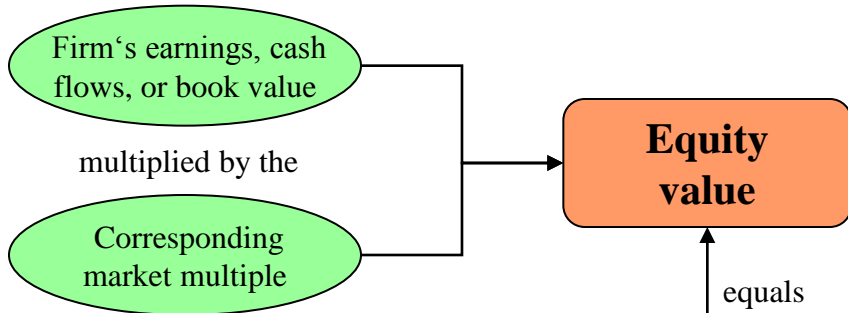


# The Financial System

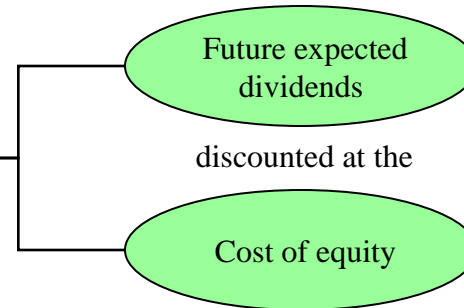


# Alternative Equity Valuation Models

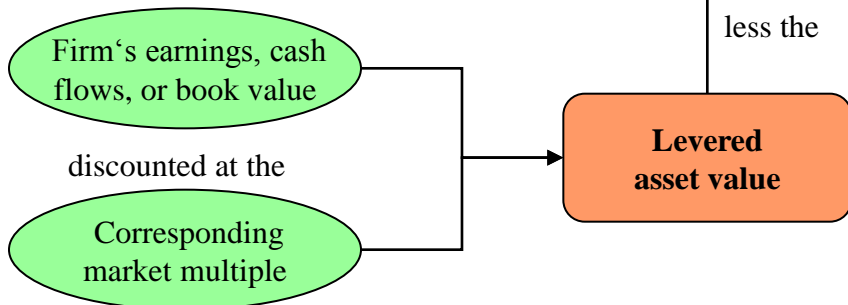
## *Market multiples model*



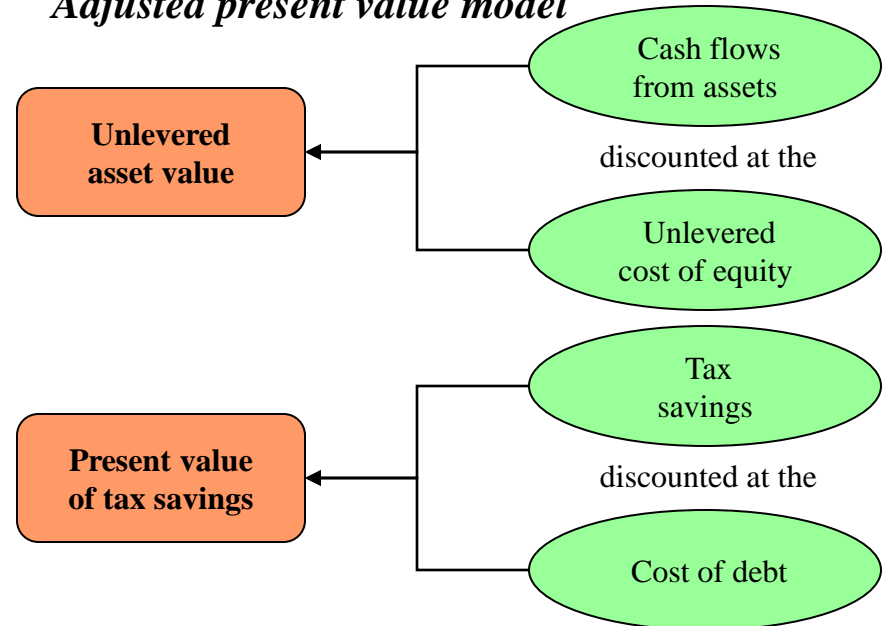
## *Dividend valuation model*



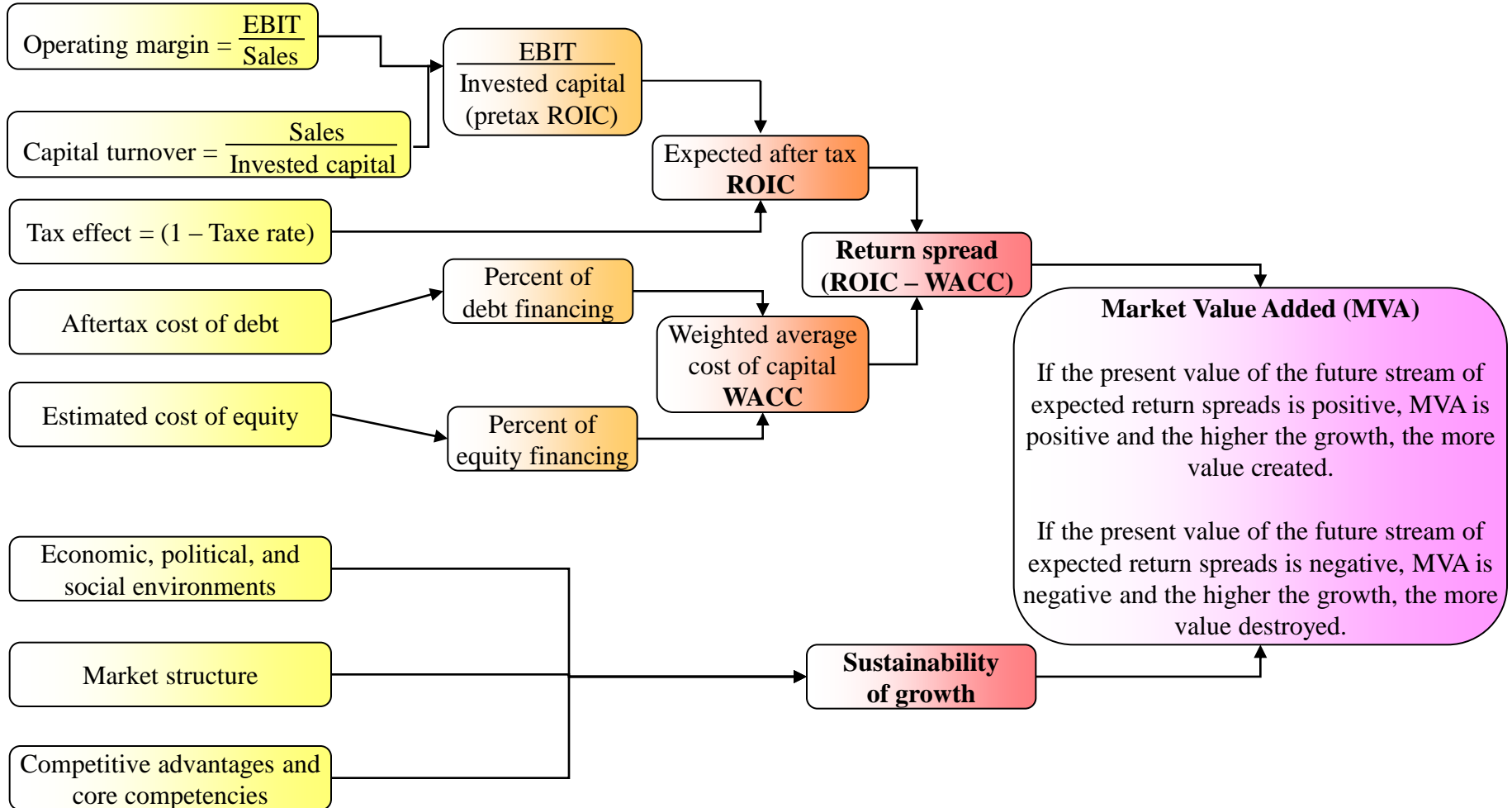
## *Discounted cash flow model*



## *Adjusted present value model*

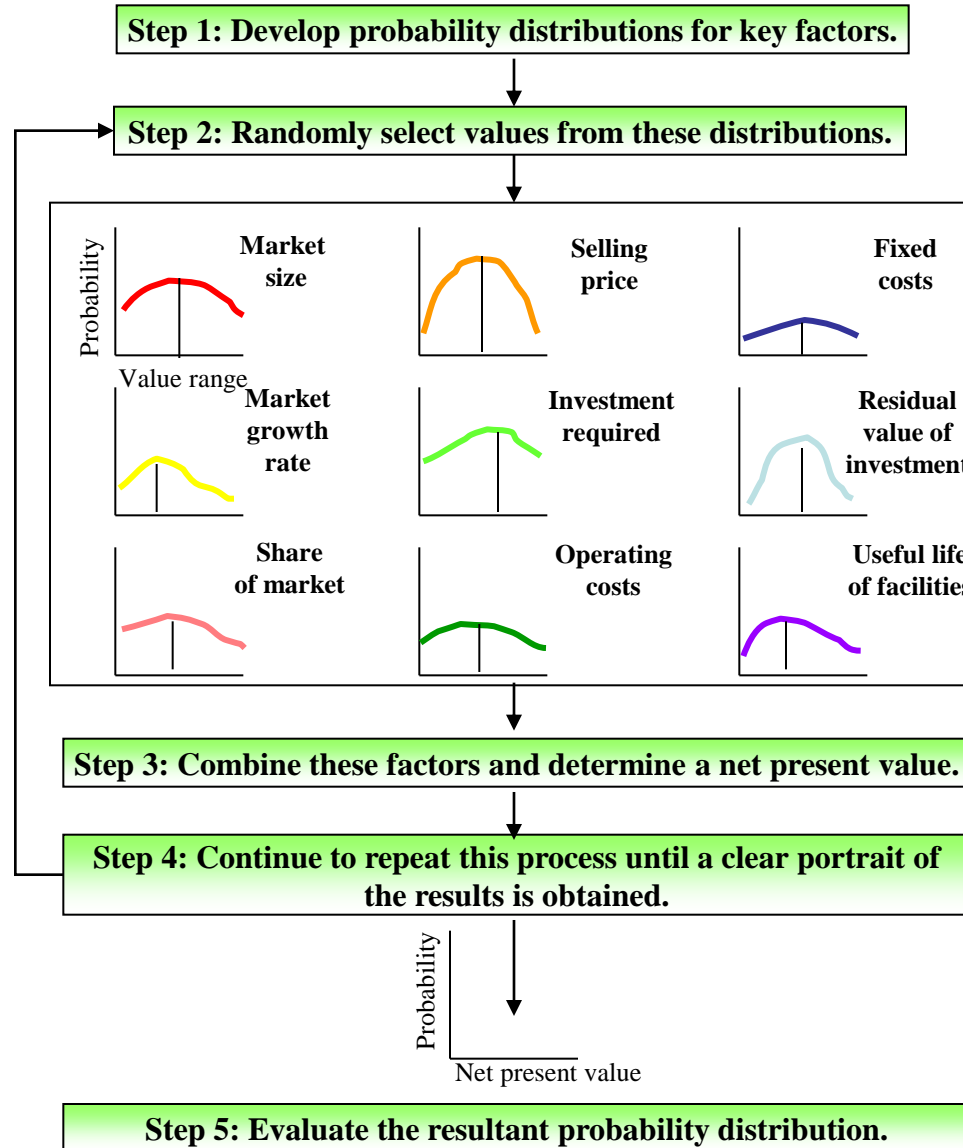


# The Drivers of Value Creation

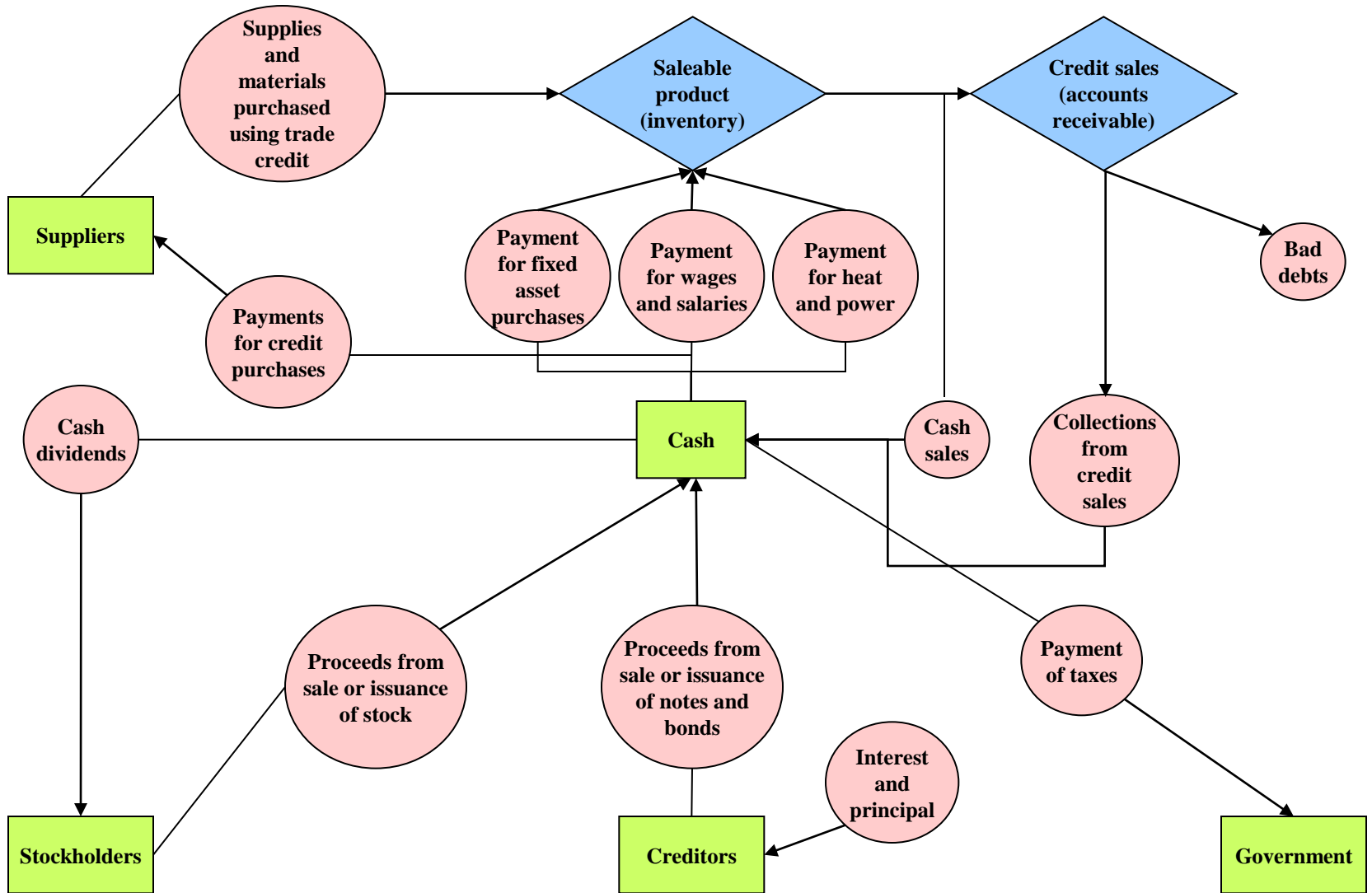


EBIT = Earnings before interest and taxes (operating profit before tax);  
 Invested capital = Cash + Working capital requirement + net fixed assets;  
 WACC = (%Debt)(After tax cost of debt) + (%Equity)(Cost of equity).

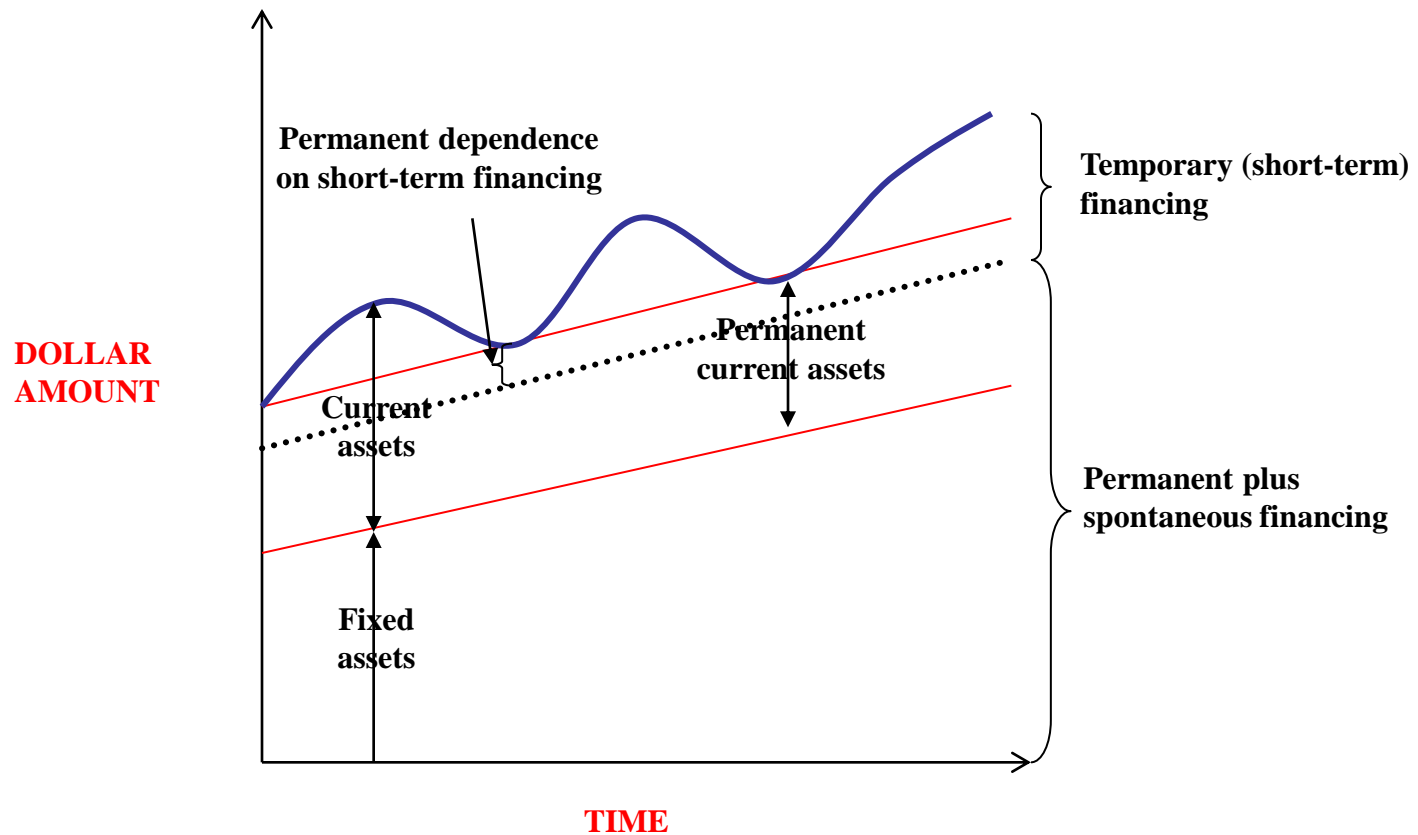
# Capital-Budgeting Simulation



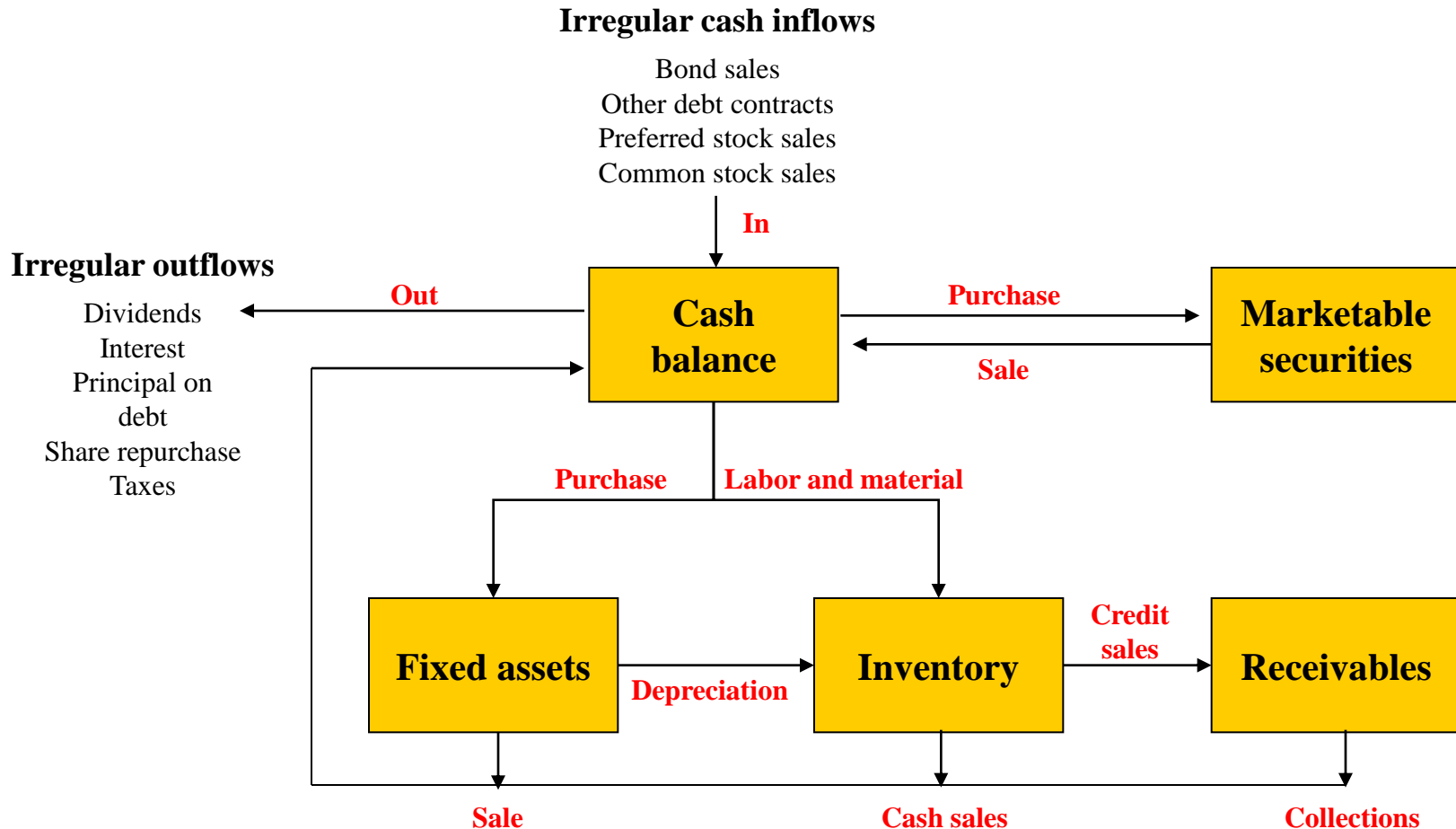
# Cash Flow Diagram



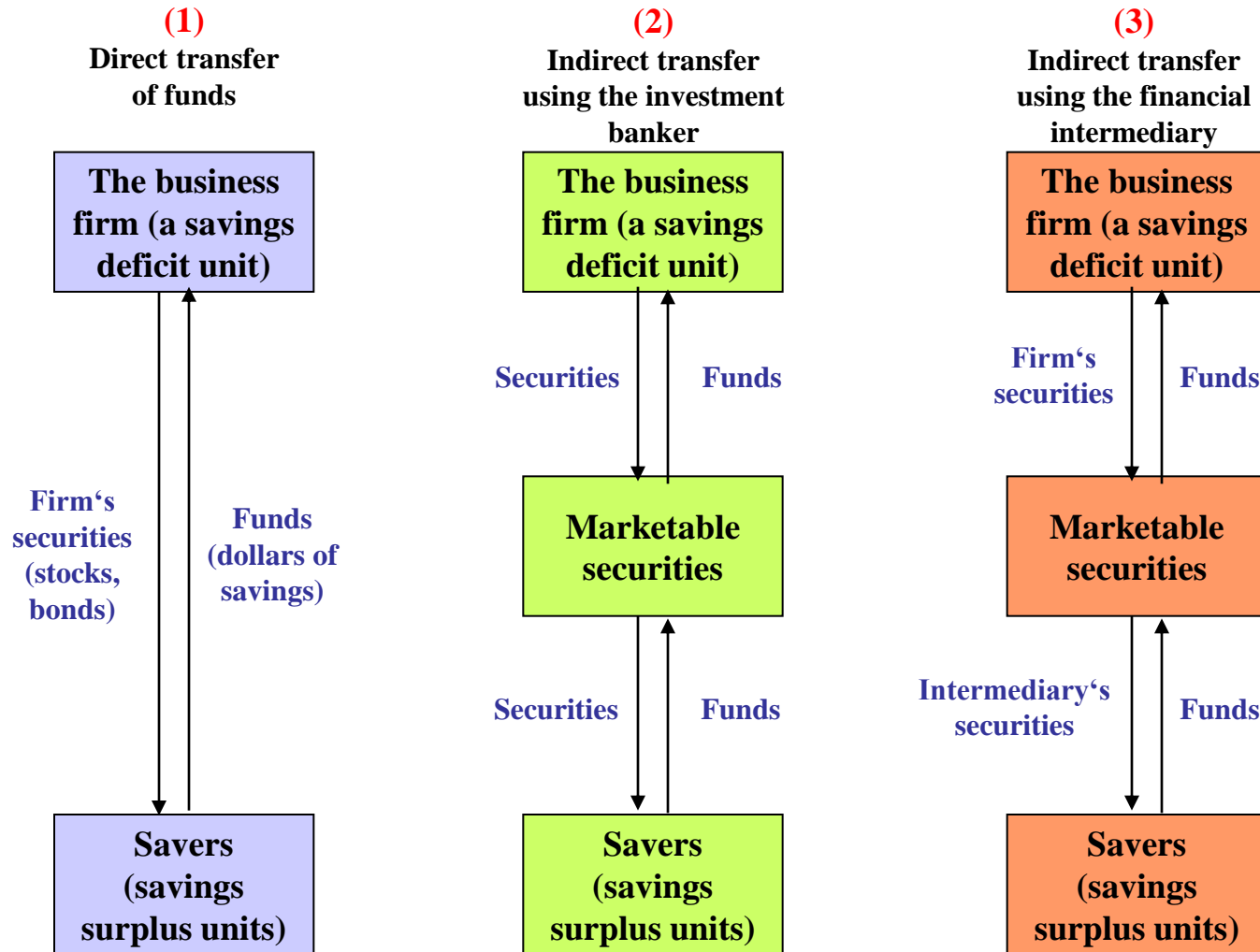
# Aggressive Financing Strategy: Permanent Reliance on Short-Term Financing



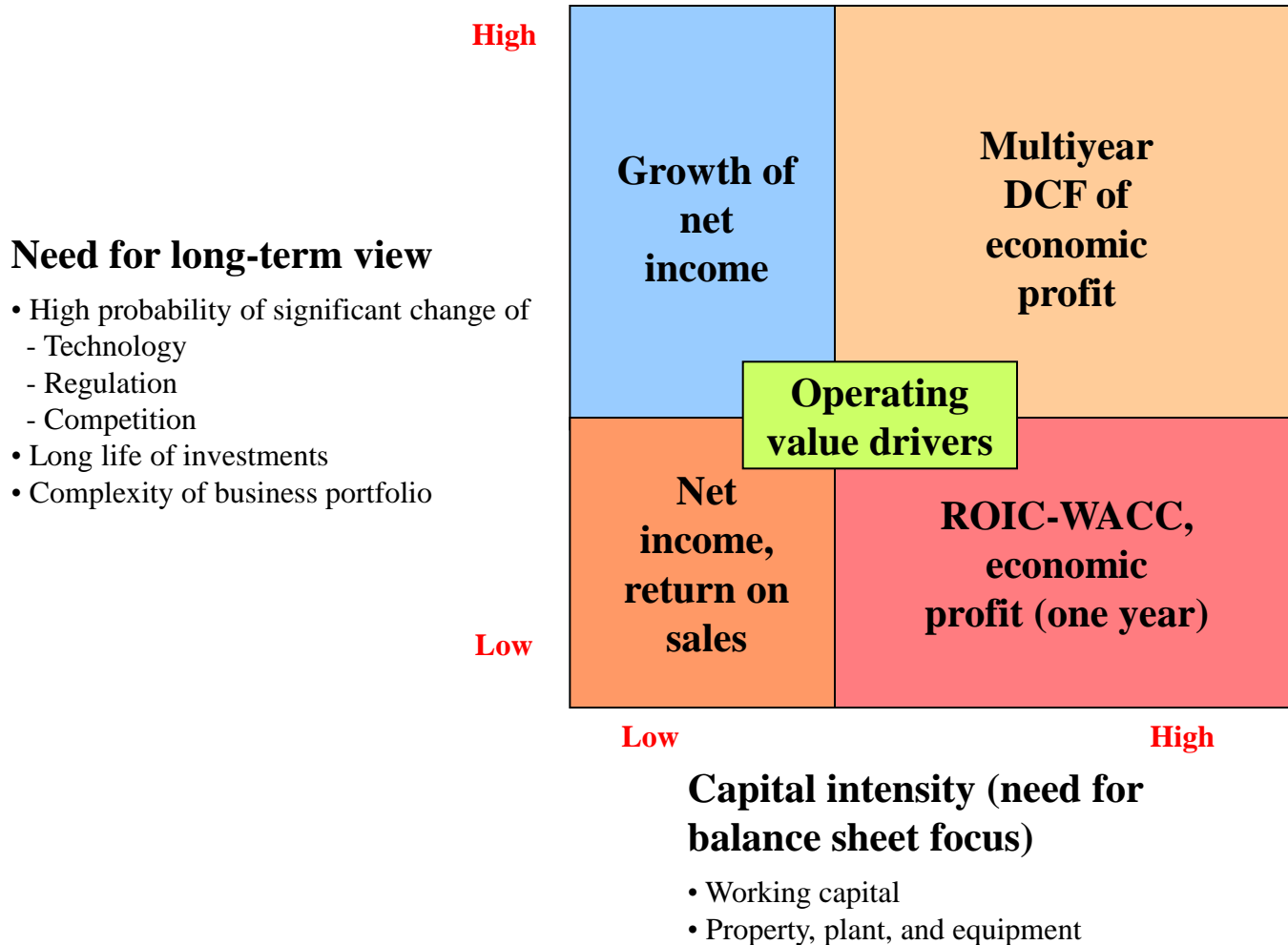
# Cash and Marketable Securities Management



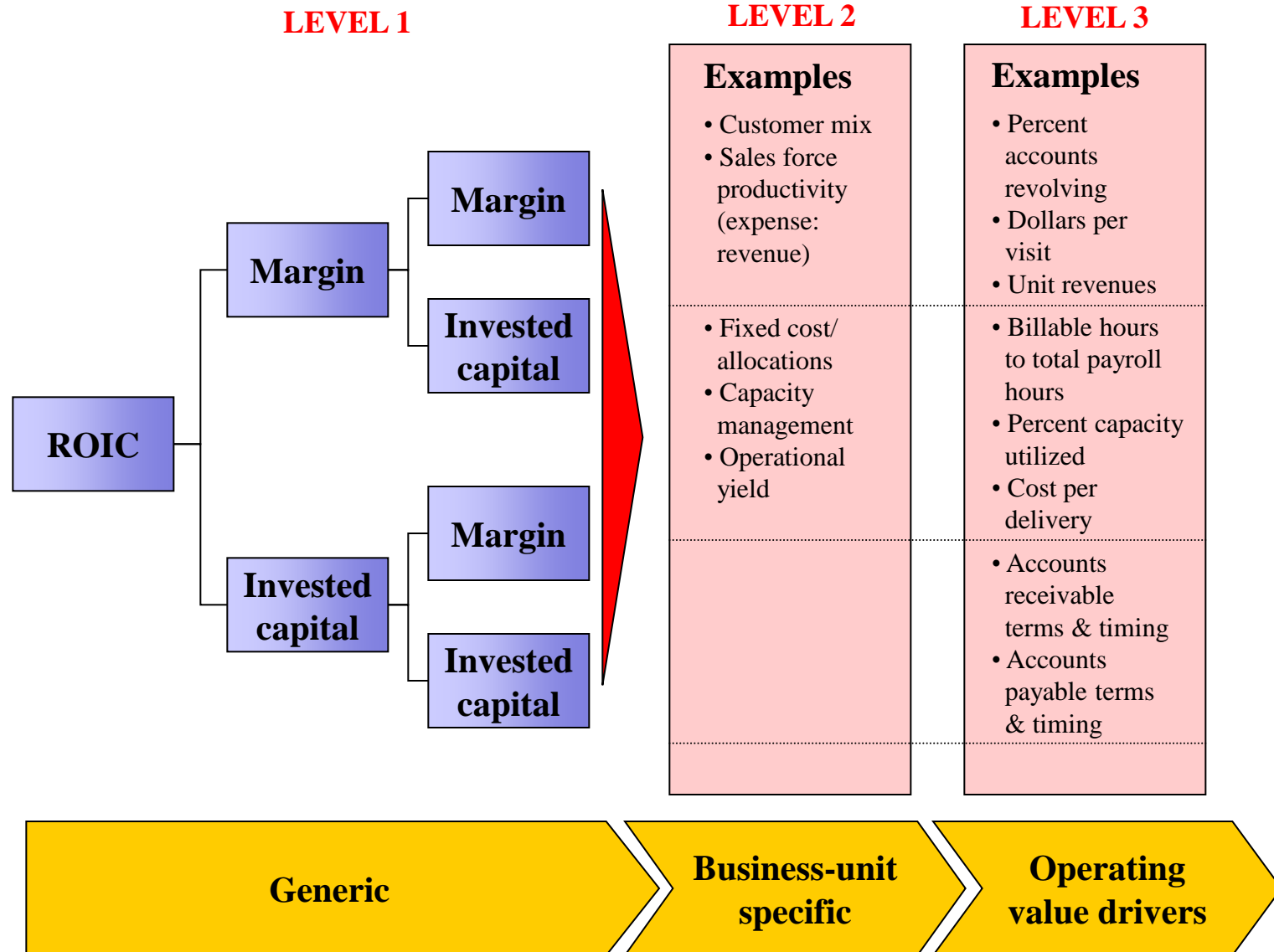
# Three Ways to Transfer Financial Capital in the Economy



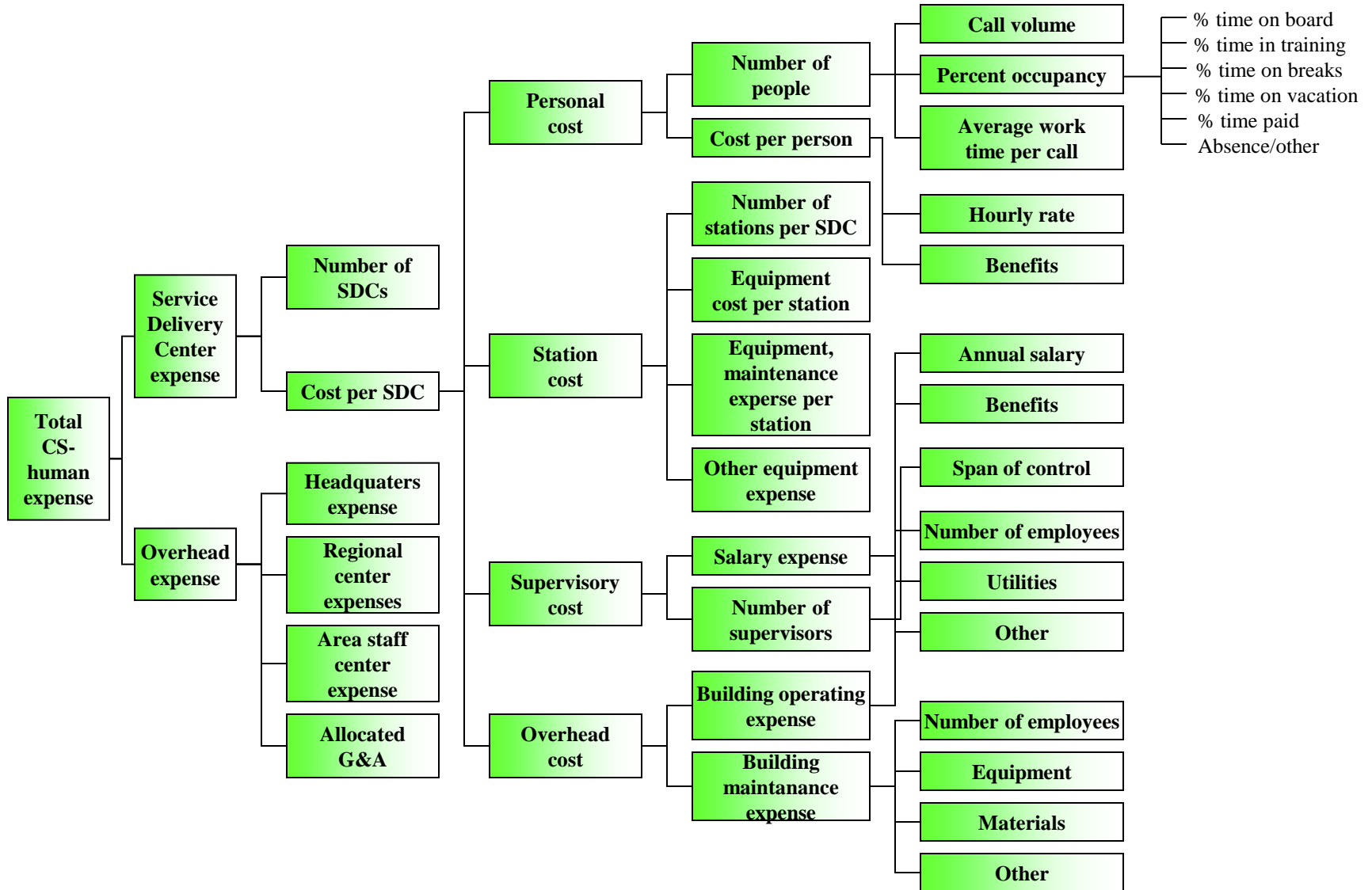
# Key Metrics Required for Different Company Situations



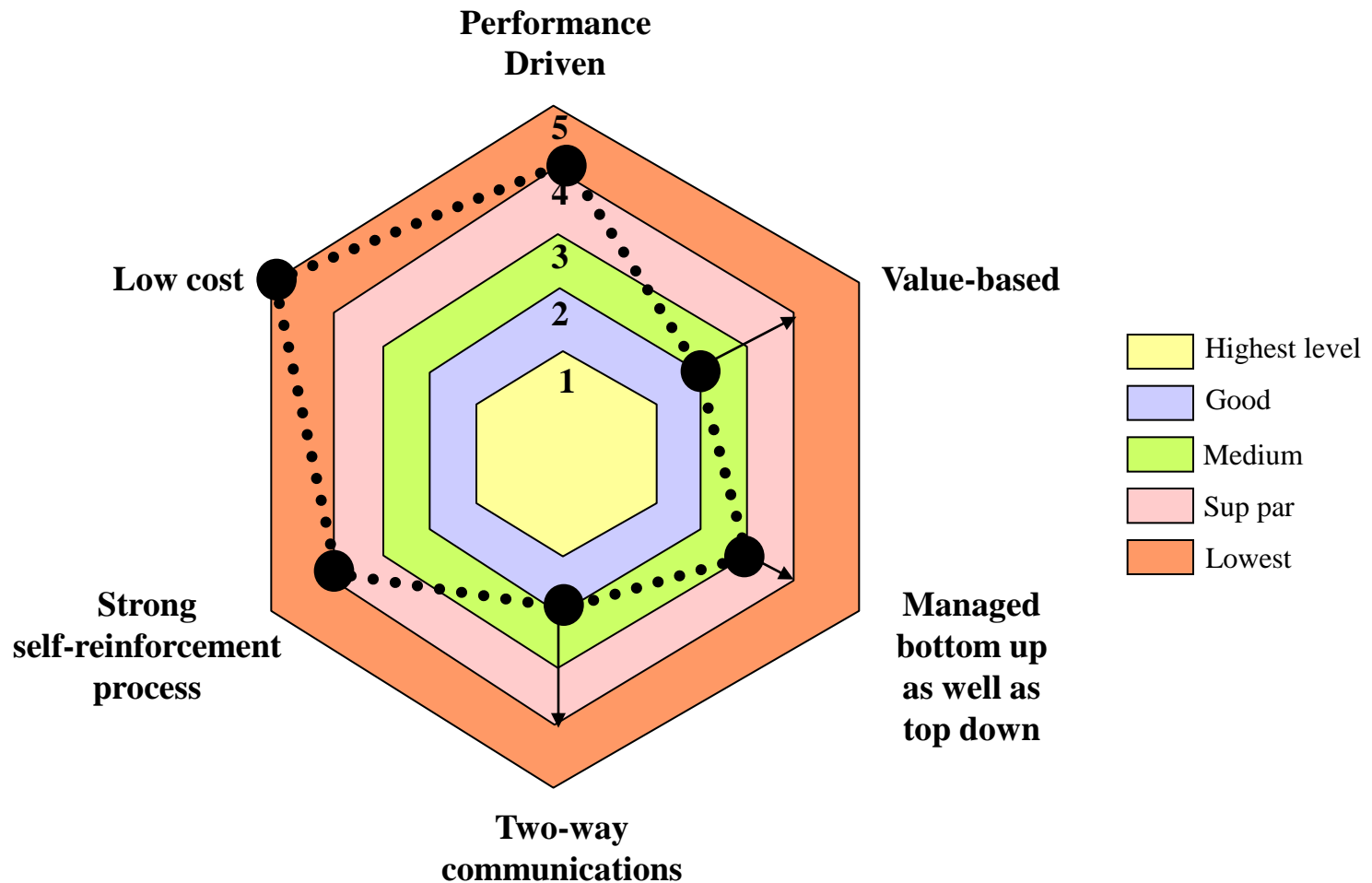
# Various Levels of Value Driver Identification



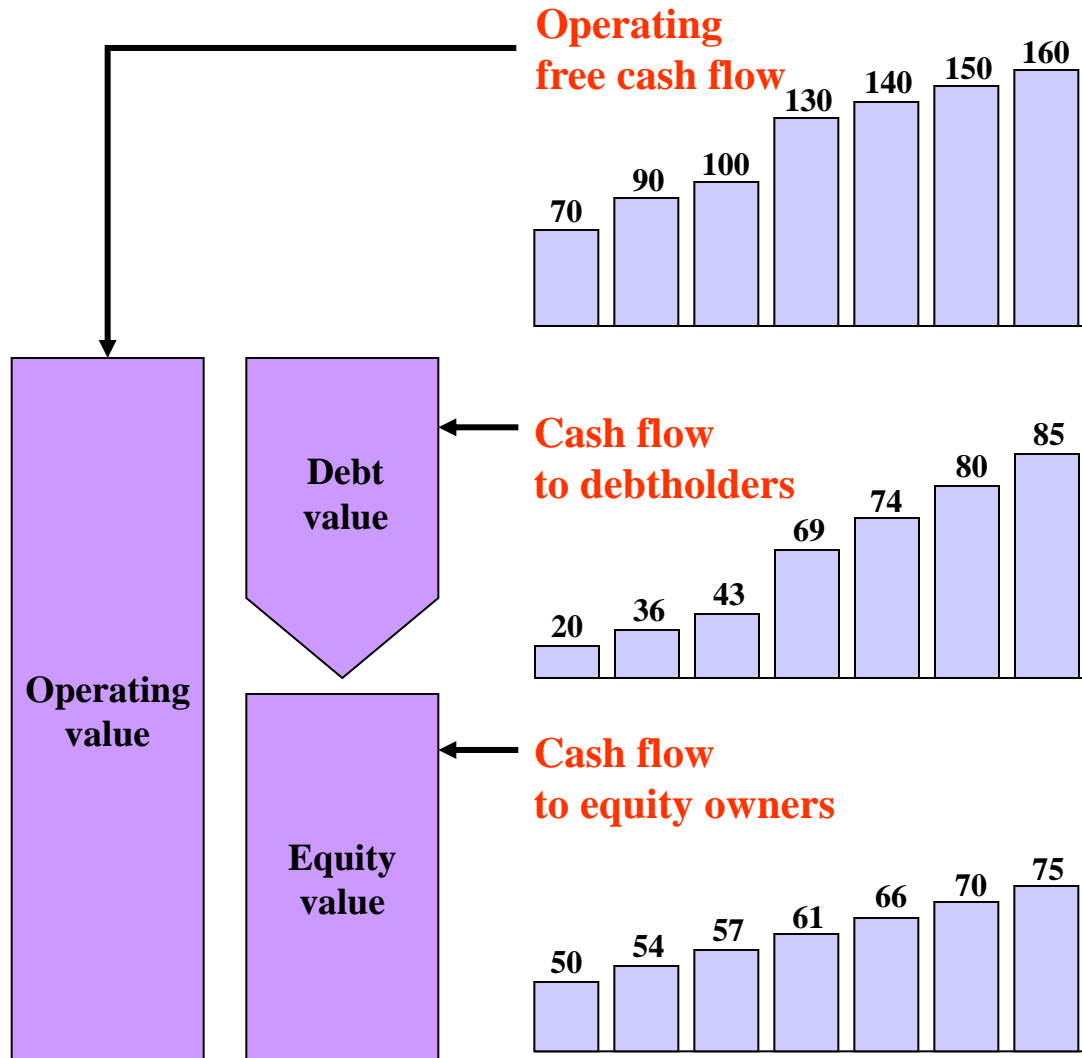
# Customer Servicing – Human Expense Flowchart



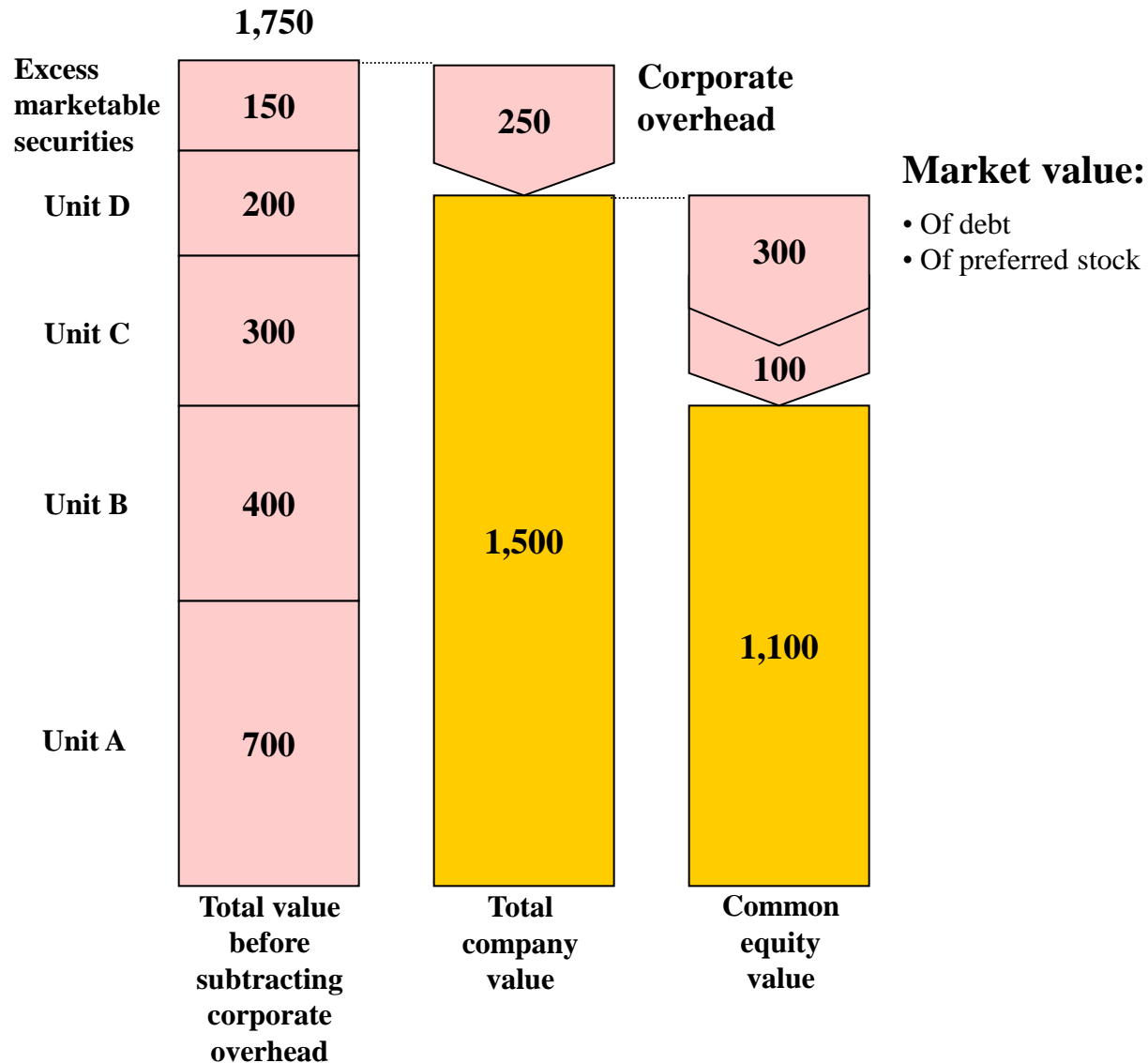
# Six Conditions for Excellent Value-Based Management



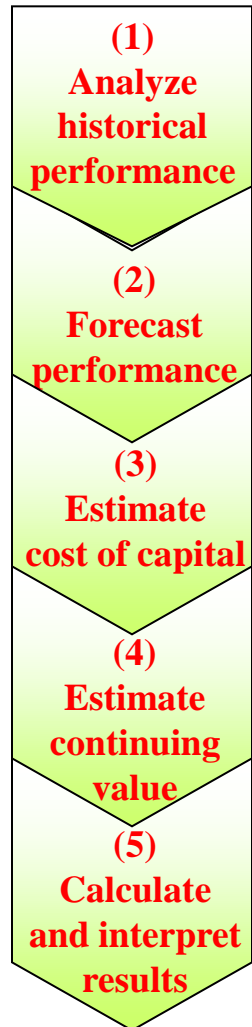
# Simple Entity Valuation of a Single-Business Company



# Entity Valuation of a Multibusiness Company



# Steps in Valuation



- Calculate NOPLAT and invested capital
  - Calculate value drivers
  - Develop an integrated historical perspective
  - Analyze financial health
- Understand strategic position
  - Develop performance scenarios
  - Forecast individual line items
  - Check overall forecast for reasonableness
- Develop target market value weights
  - Estimate cost of noequity financing
  - Estimate cost of equity financing
- Select appropriate technique
  - Select forecast horizon
  - Estimate the parameters
  - Discount continuing value to present
- Calculate and test results
  - Interpret results within decision context

# Business System Analysis



## Issues

- Product attributes
- Quality
- Time to market
- Proprietary technology

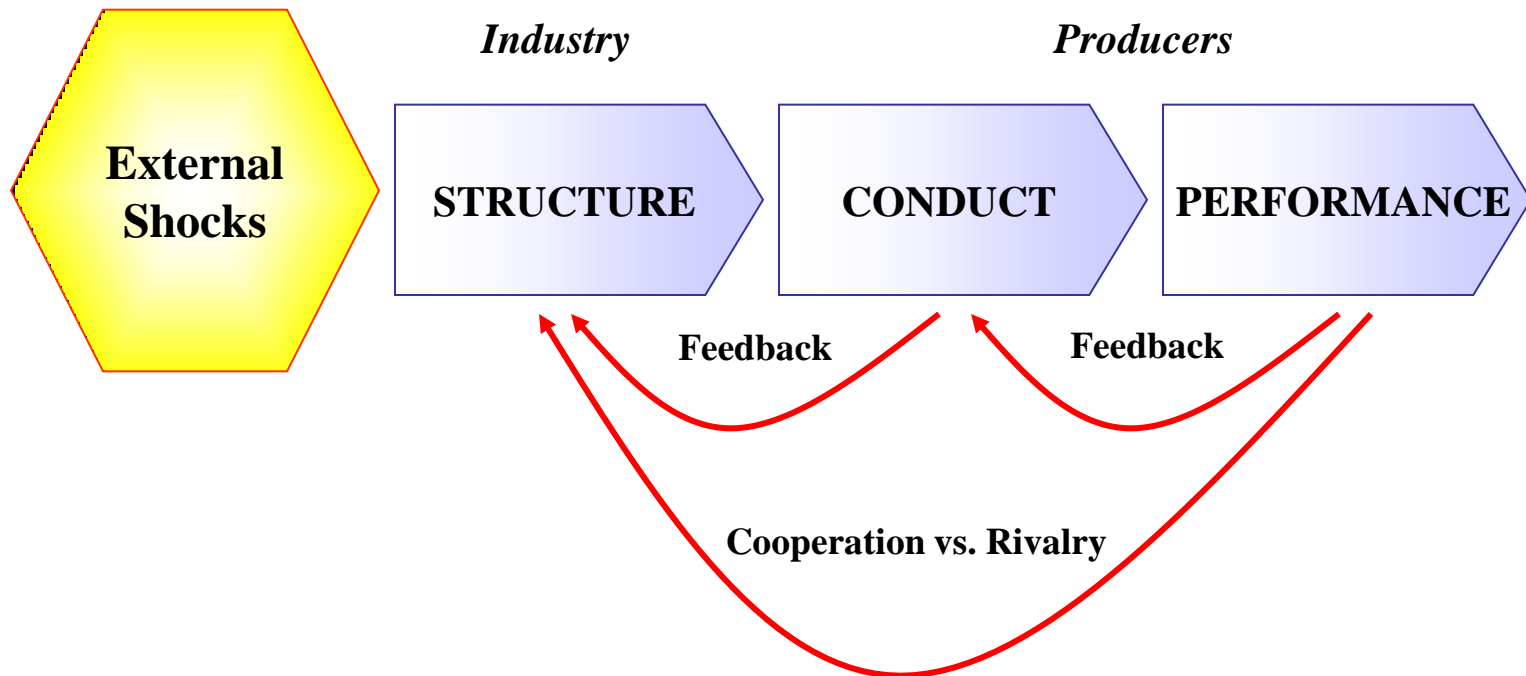
- Access to sources
- Costs
- Outsourcing

- Costs
- Cycle time
- Quality

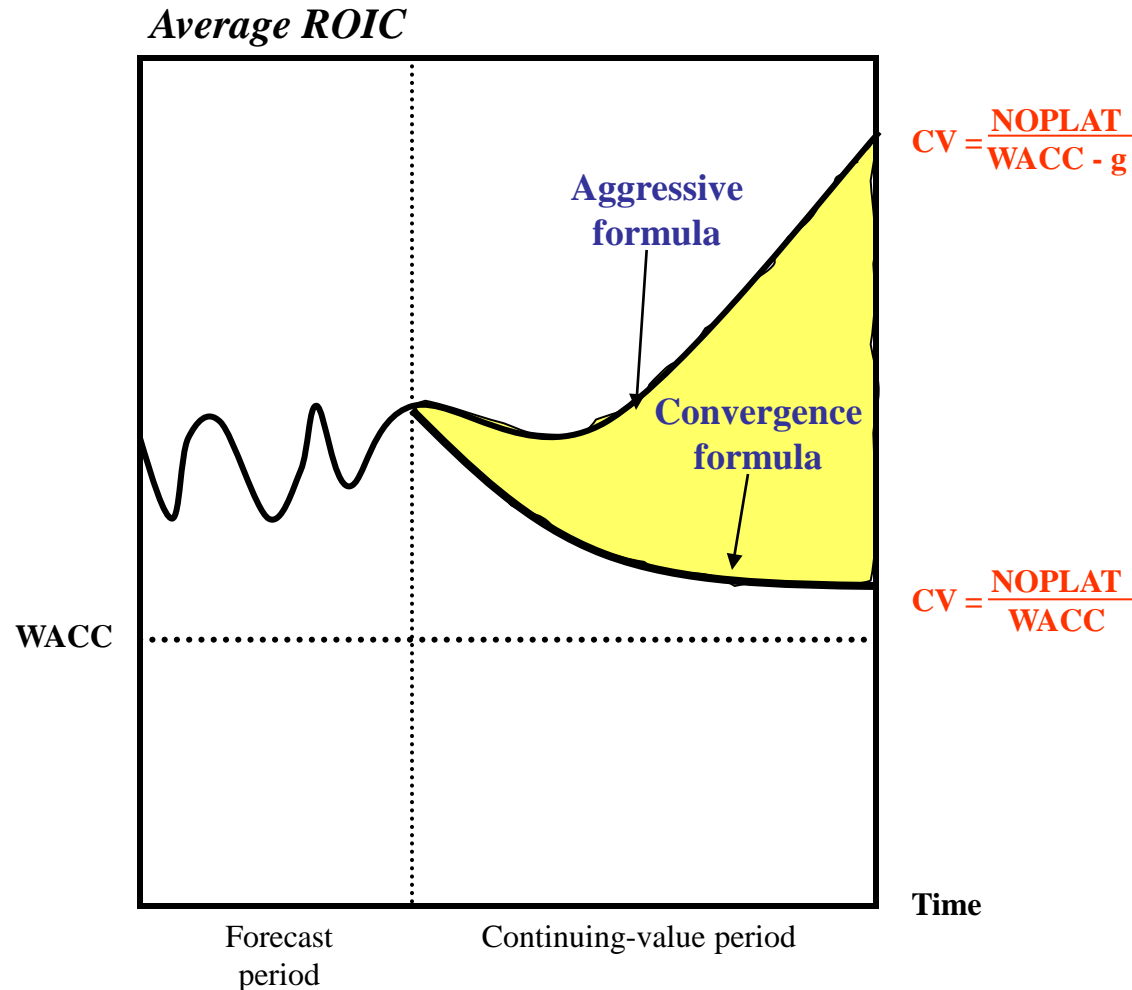
- Pricing
- Advertising/promotion
- Packaging
- Brands

- Sales effectiveness
- Costs
- Channels
- Transportation

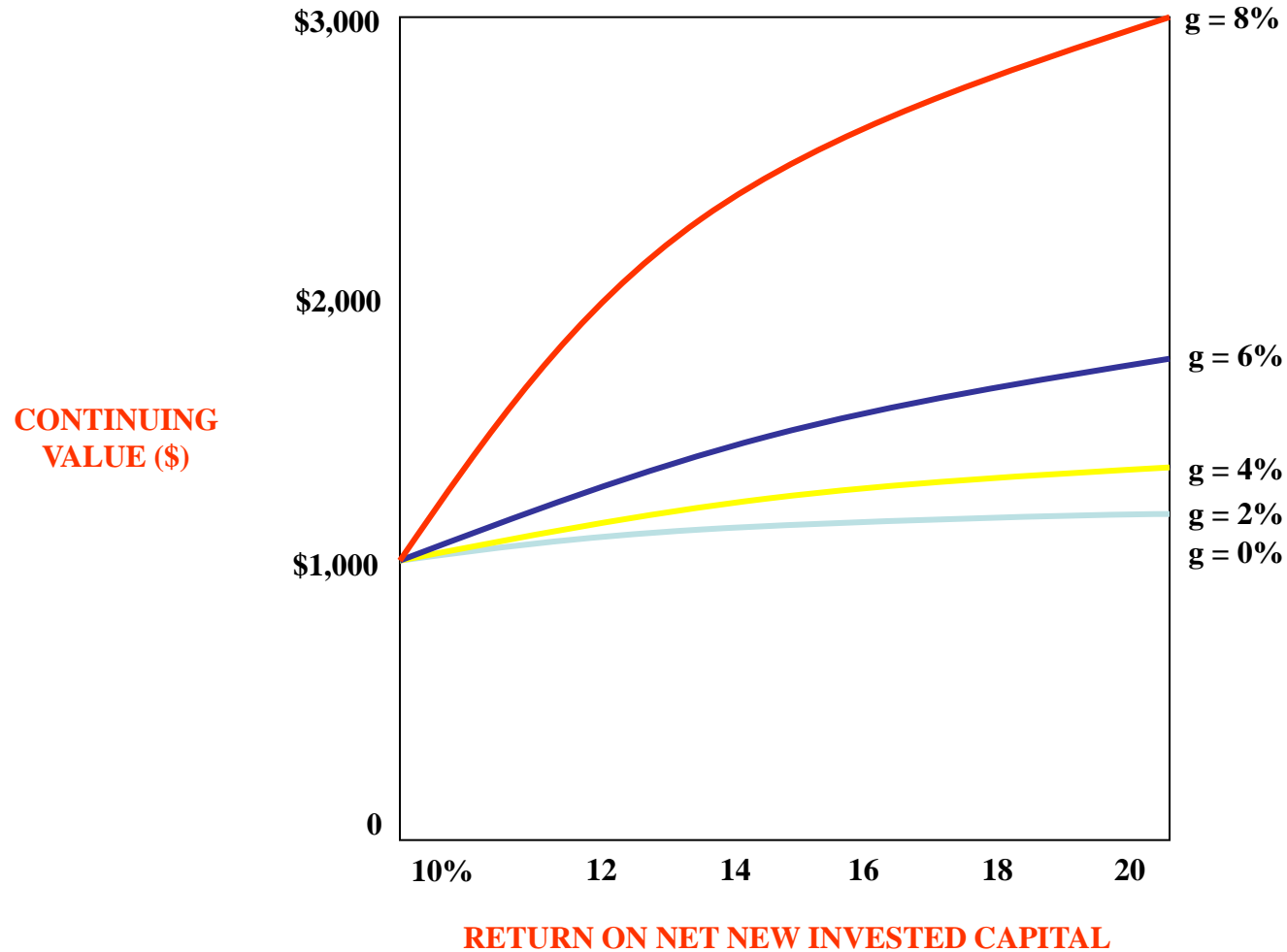
# Structure-Conduct-Performance Model



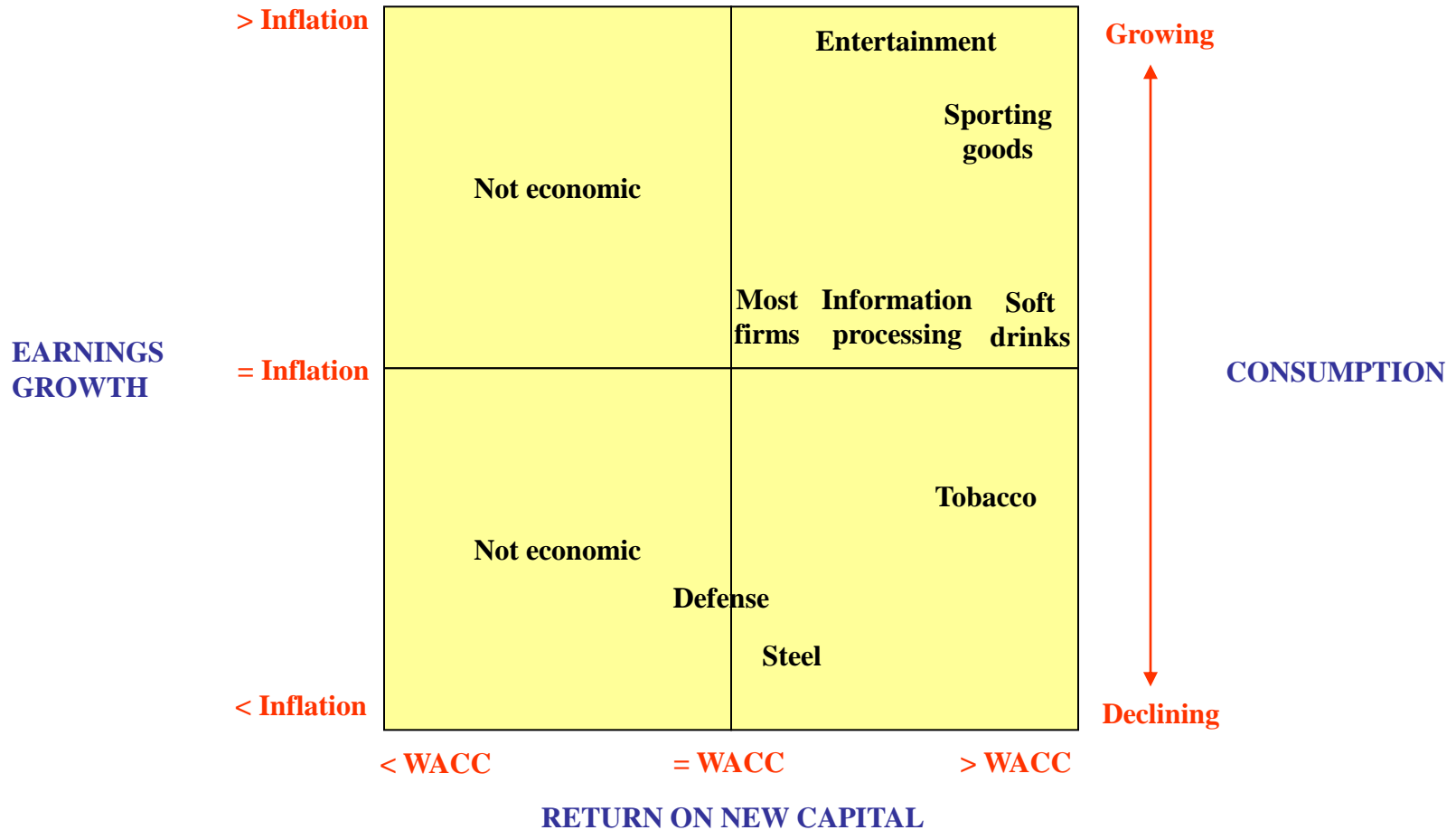
# Rates of Return Implied by Alternative Continuing-Value Formulas



# Impact of Continuing-Value Assumptions



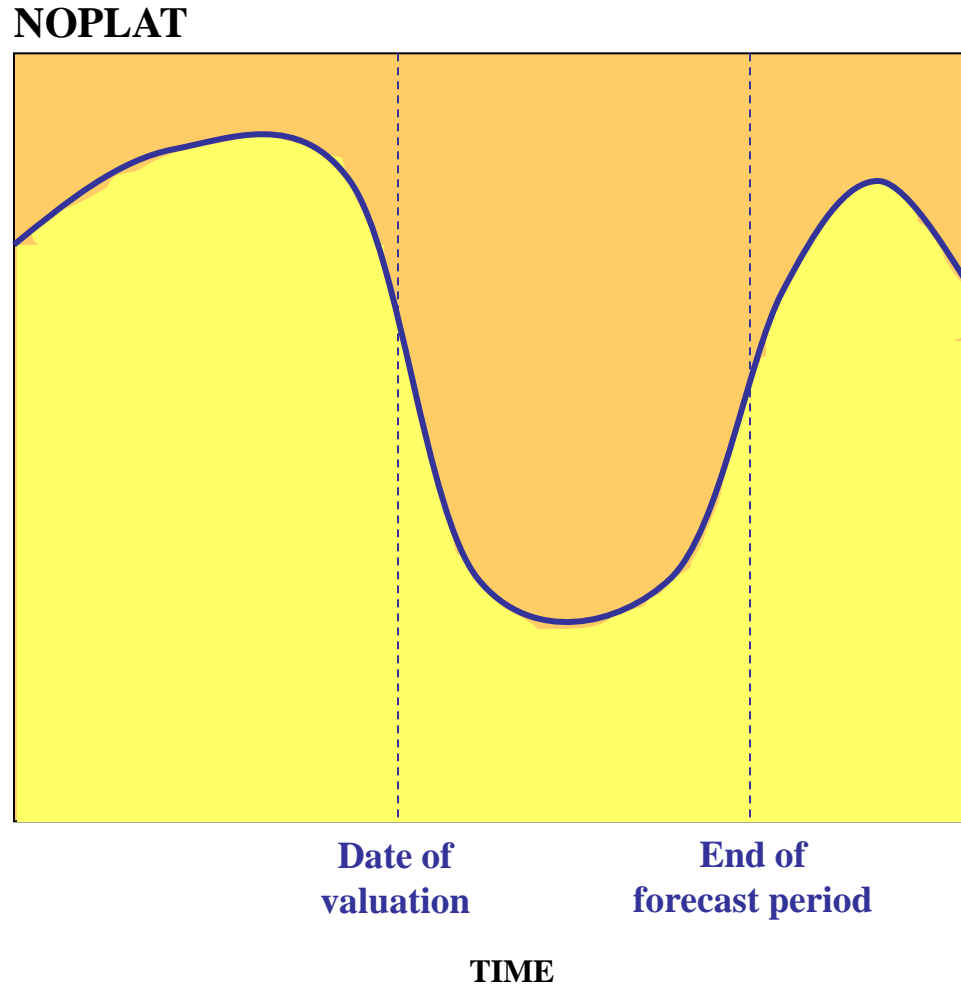
# Relative Positions of Selected Industries Along Continuing-Value Parameters



**Factors affecting returns**

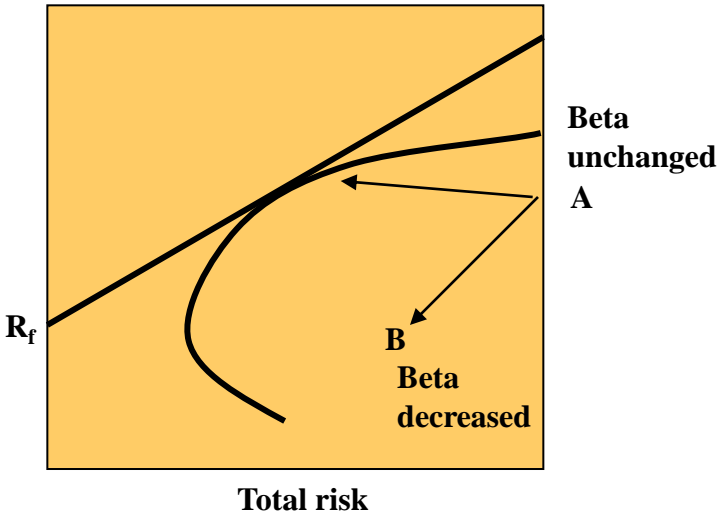
Low	←	Entry costs	→	High
Many	←	Substitutes	→	Few
Short	←	Life cycle	→	Long
High	←	Price elasticity	→	Low

# A Forecast Period that Will Result in a Poor Valuation of a Cyclical Business

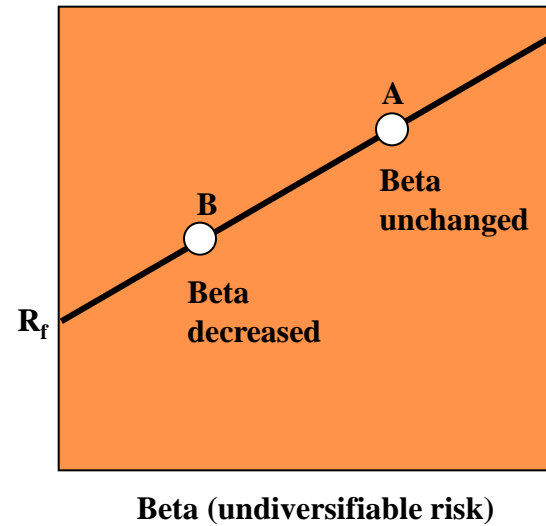


# Risk/Return Trade-Offs of Hedging Programs

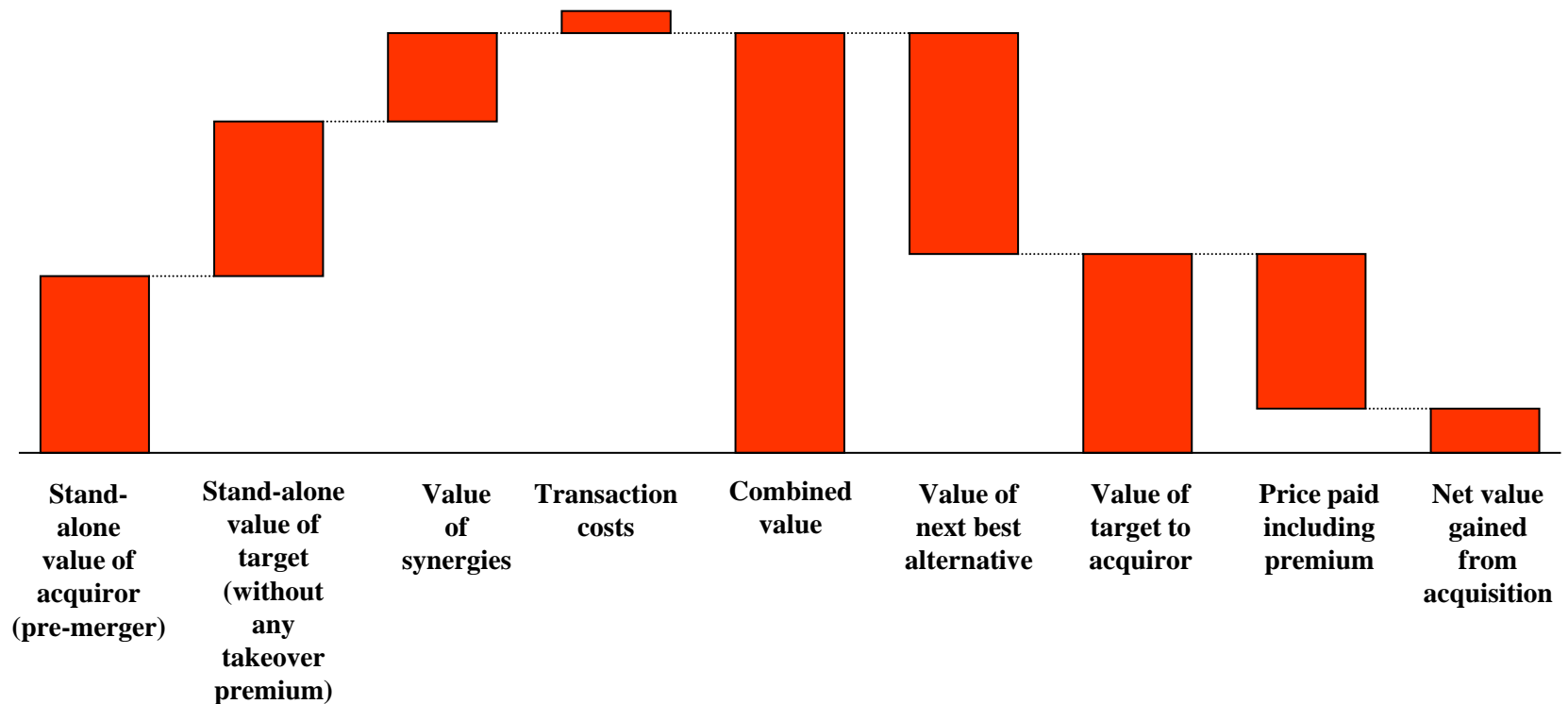
E (Return)



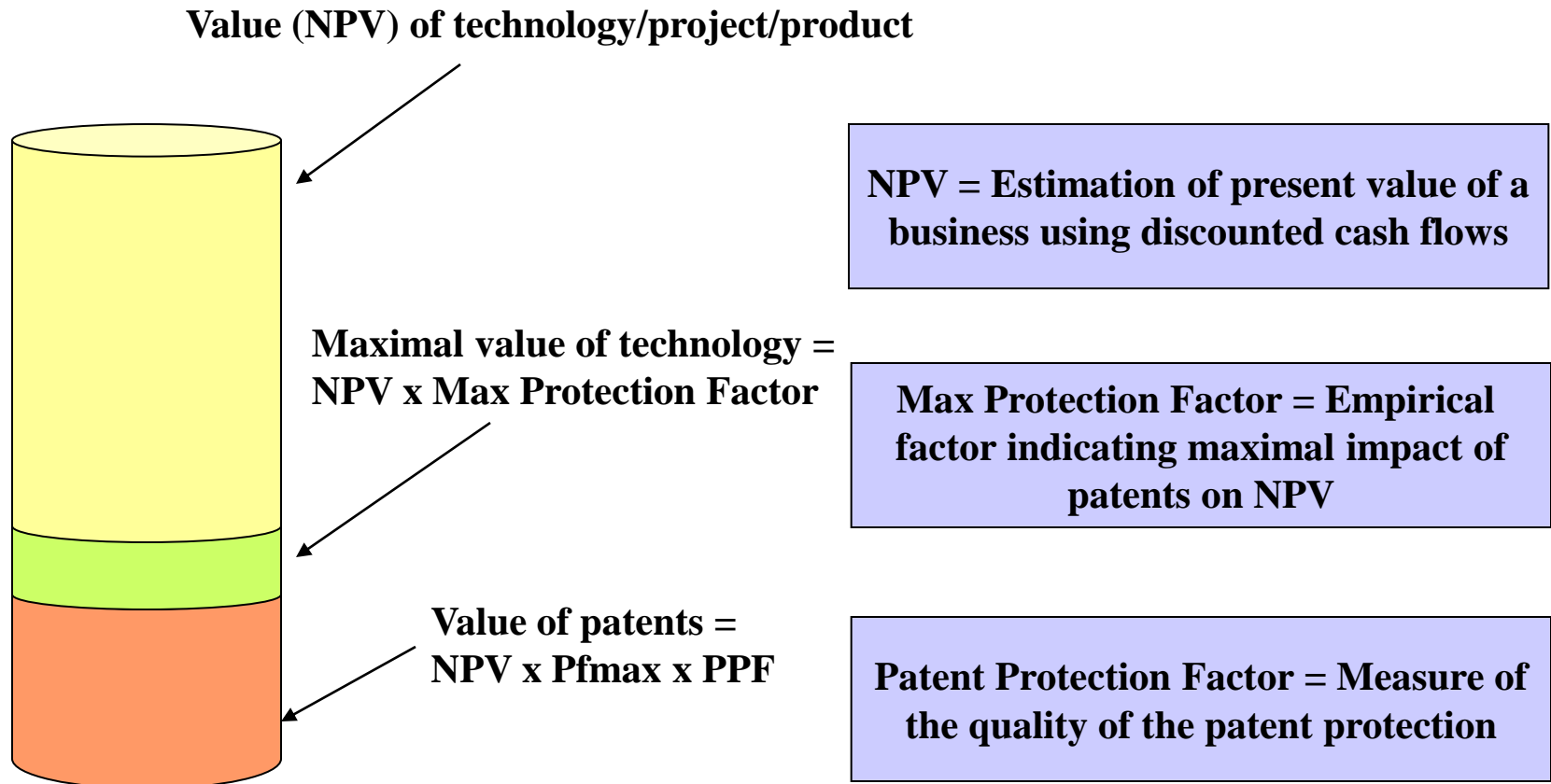
E (Return)



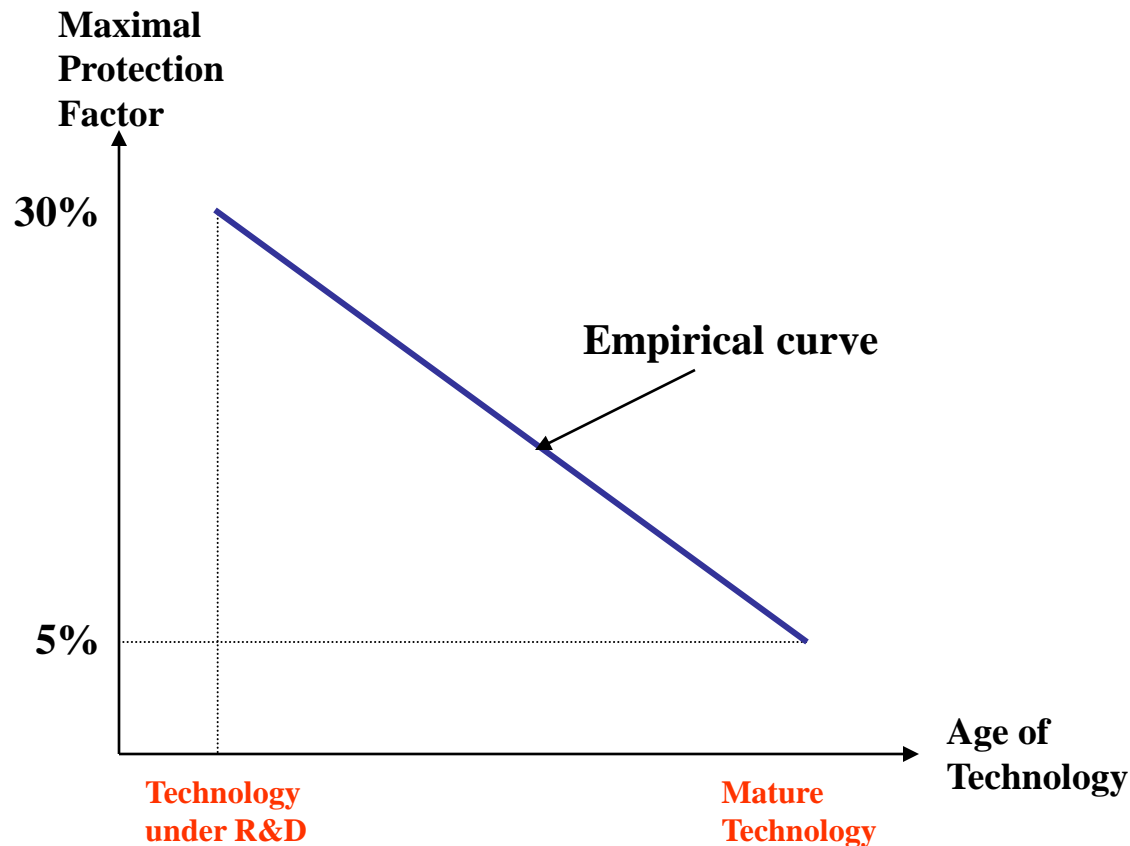
# Framework for Evaluating the Value of an Acquisition



# Patent Valuation: DCF Method Overview

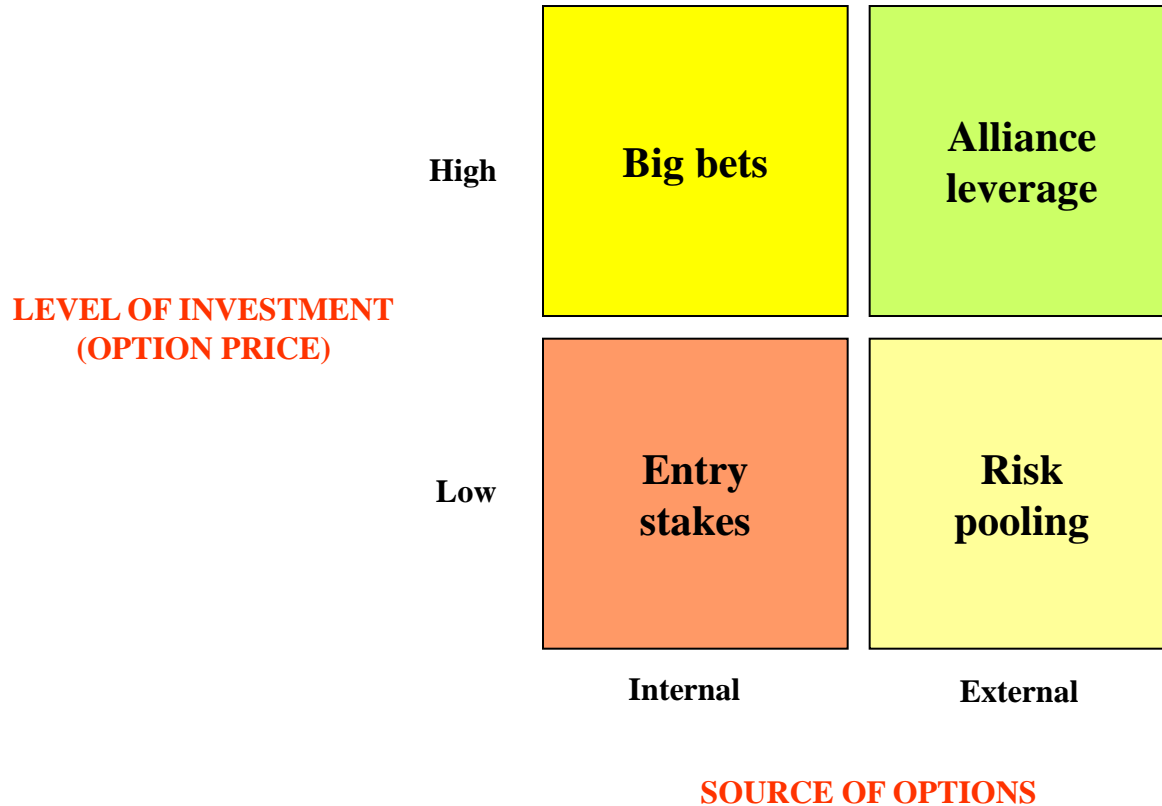


# Patent Valuation: Maximal Protection Factor



$$\text{Patent-Value} = \text{Maximal-Protection-Factor} \times \text{Patent-Protection-Factor} \times \text{NPV}_{\text{tec}}$$
$$P_{\text{val}} = P_{\text{max}} \times \text{PPF} \times \text{NPV}_{\text{tec}}$$

# Acquisition of Real Options



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