Introduction to Finance

Final Exam Revision
Date: 14 January, 2017
Lecturer: Shavkat Mamatov

Examination paper format

- Answer FOUR (4) out of SIX (6) questions
- Each question has a weighting of 25 marks.

- **Question 1**
-
- (a) Calculation (10 marks)
- (b) Theory : Discuss (15 marks)
- (25 marks)
- **Question 2**
-
- (a) Calculation (13 marks)
- (b) Theory : Discuss (12 marks)
- (25 marks)

- **Question 3**
- Theory : Explain (25 marks)
- **Question 4**
- Theory : Discuss (25 marks)
-

- **Question 5**

- Theory and show calculations to support theory:
- Evaluate and analyze and discuss (25 marks)
- **Question 6**

- a) Calculations (12 marks)
- b) Calculations (5 marks)
- c) Theory : Discuss (8 marks)
- (25 marks)

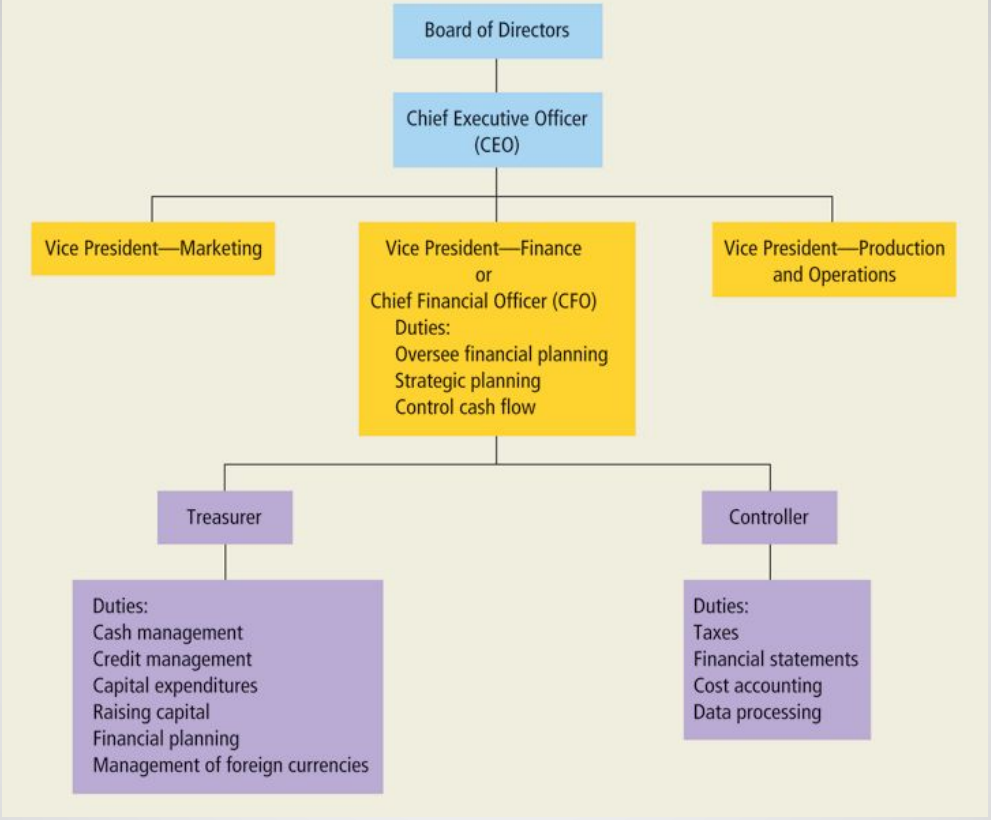
The Goal of the Firm

- The goal of the firm is to create value for the firm's legal owners (that is, its shareholders). Thus the goal of the firm is to "maximize shareholder wealth" by maximizing the price of the existing common stock.
- Good financial decisions will increase stock price and poor financial decisions will lead to a decline in stock price.

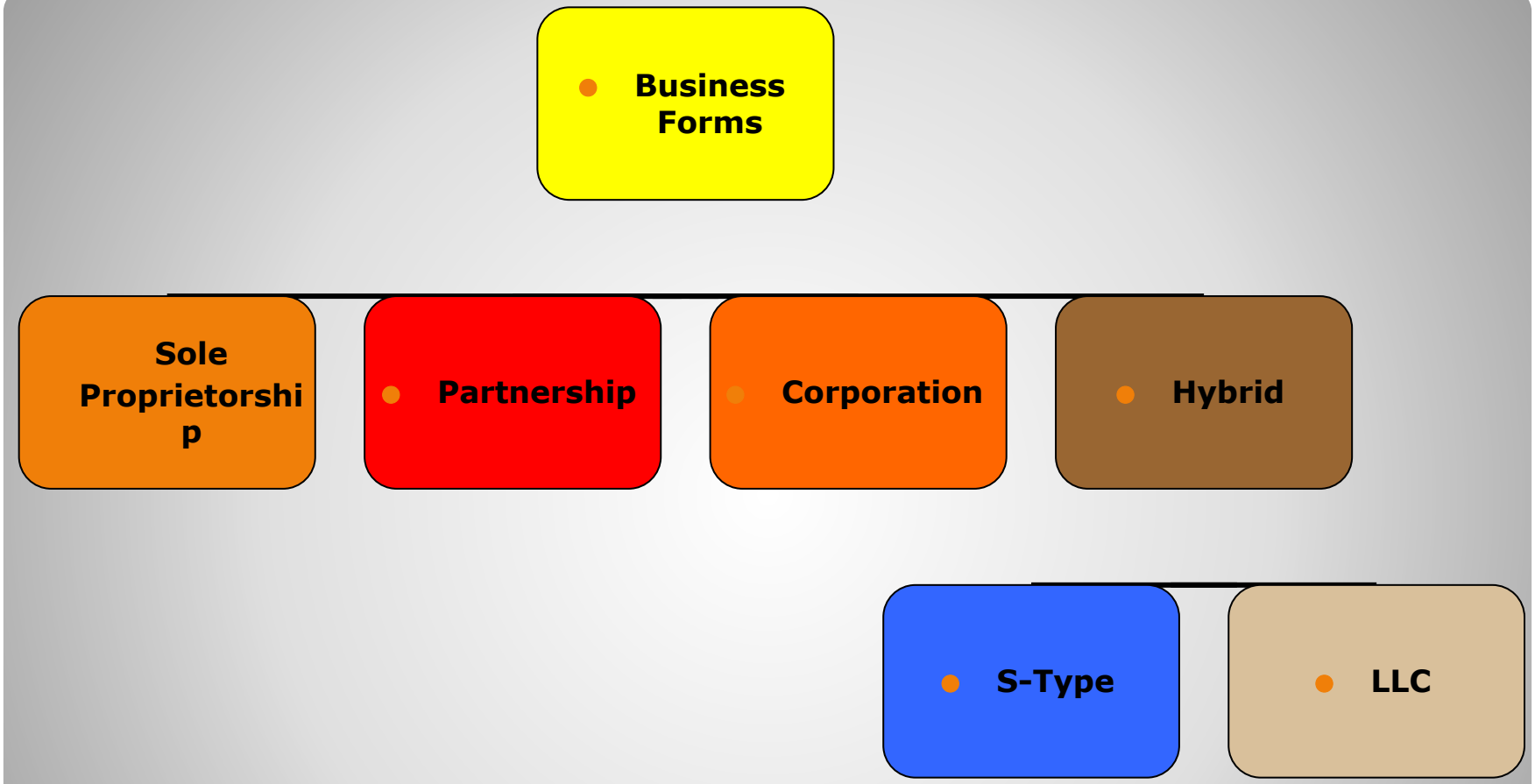
3 Roles of Finance in Business

- What long-term investments should the firm undertake? (Capital budgeting decision)
- How should the firm raise money to fund these investments? (Capital structure decision)
- How to manage cash flows arising from day-to-day operations? (Working capital decision)

FIGURE 1-2 How the Finance Area Fits into a Firm



Role of the Financial Manager



Legal Forms of Business Organization

Sole Proprietorship

- Business owned by an individual
- Owner maintains title to assets and profits
- Unlimited liability
- Termination occurs on owner's death or by the owner's choice

Partnership

- Two or more persons come together as co-owners
- General Partnership: All partners are fully responsible for liabilities incurred by the partnership.
- Limited Partnerships: One or more partners can have limited liability, restricted to the amount of capital invested in the partnership. There must be at least one general partner with unlimited liability. Limited partners cannot participate in the management of the business and their names cannot appear in the name of the firm.

Corporation

- Legally functions separate and apart from its owners
  - Corporation can sue, be sued, purchase, sell, and own property
- Owners (shareholders) dictate direction and policies of the corporation, oftentimes through elected board of directors.
- Shareholder's liability is restricted to amount of investment in company.
- Life of corporation does not depend on the owners … corporation continues to be run by managers after transfer of ownership through sale or inheritance.

Hybrid Organizations: S-Corporation

- Benefits
  - Limited liability
  - Taxed as partnership (no double taxation like corporations)
- Limitations
  - Owners must be people so cannot be used for a joint ventures between two corporations

- Benefits
  - Limited liability
  - Taxed like a partnership
- Limitations
  - Qualifications vary from state to state
  - Cannot appear like a corporation otherwise it will be taxed like one

Hybrid Organizations: Limited Liability Companies (LLCs)

Finance and The Multinational Firm: The New Role

- U.S. firms are looking to international expansion to discover profits. For example, Coca-Cola earns over 80% of its profits from overseas sales.
- In addition to US firms going abroad, we have also witnessed many foreign firms making their mark in the United States. For example, domination of auto industry by Honda, Toyota, and Nissan.

Why Do Companies Go Abroad?

- To increase revenues
- To reduce expenses (land, labor, capital, raw material, taxes)
- To lower governmental regulation standards (ex. environmental, labor)
- To increase global exposure

Risks/Challenges of Going Abroad

- Country risk (changes in government regulations, unstable government, economic changes in foreign country)
- Currency risk (fluctuations in exchange rates)
- Cultural risk (differences in language, traditions, ethical standards, etc.)

- **What Is Liquidity?**
  Liquidity is the term used to describe how easy it is to convert assets to cash. The most liquid asset, and what everything else is compared to, is cash. This is because it can always be used easily and immediately.

How Liquid Is the Firm?

- A liquid asset is one that can be converted quickly and routinely into cash at the current market price.
- Liquidity measures the firm's ability to pay its bills on time. It indicates the ease with which non-cash assets can be converted to cash to meet the financial obligations.

Liquidity is measured by two approaches:

- Comparing the firm's current assets and current liabilities
- Examining the firm's ability to convert accounts receivables and inventory into cash on a timely basis

Measuring Liquidity: Perspective 1

Compare a firm's current assets with current liabilities using:

- Current Ratio
- Acid Test or Quick Ratio

TABLE 4-1 The Home Depot, Inc. Income Statement for Year Ending January 30, 2011 ($ millions)

Sales	$ 67,997
Cost of goods sold	(44,693)
Gross profits	$ 23,304
Operating expenses:	
Marketing expenses and general and administrative expenses	($ 15,885)
Depreciation expenses	(1,616)
Total operating expenses	($ 17,501)
Operating income	$ 5,803
Interest expense	(530)
Earnings before taxes	$ 5,273
Income taxes	(1,935)
Net income (earnings available to common stockholders)	$ 3,338
Additional information:	
Numbers of common shares outstanding (millions)	1,623
Earnings per share (net income ÷ number of shares)	$ 2.06
Dividends paid to stockholders	$ 1,569
Dividends per share (total dividends ÷ number of shares)	$ 0.97

Table 4-1

TABLE 4-2 The Home Depot, Inc. Balance Sheets ($ millions) January 30, 2011	
Assets	
Cash	$ 545
Account receivables	1,085
Inventories	10,625
Other current assets	1,224
Total current assets	$13,479
Gross fixed assets	$38,471
Accumulated depreciation	(13,411)
Net fixed assets	$25,060
Other assets	1,586
Total assets	$40,125
Liabilities and Equity	
Accounts payable	$ 9,080
Short-term notes payable	1,042
Total current liabilities	$10,122
Long-term debt	$11,114
Total liabilities	$21,236
Common equity:	
Common stock:	
Par value	$ 86
Paid-in capital	7,001
Total common stock sold	$ 7,087
Treasury stock	(3,193)
Total common stock	$ 3,894
Retained earnings	14,995
Total common equity	$18,889
Total liabilities and equity	$40,125

Table 4-2

Current Ratio

- Current ratio compares a firm's current assets to its current liabilities.
- Equation:

Home Depot = $13,479M ÷ $10,122M = **1.33**

- Home Depot has $1.33 in current assets for every $1 in current liabilities. Home Depot's liquidity is marginally lower than that of Lowe's, which has a current ratio of 1.40.

Acid Test or Quick Ratio

- Quick ratio compares cash and current assets (minus inventory) that can be converted into cash during the year with the liabilities that should be paid within the year.
- Equation:

Home Depot = ($545M + $1,085M) ÷ ($10,122M) = **0.16**

- Home Depot has 16 cents in quick assets for every $1 in current debt. Home Depot is more liquid than Lowe's, which has 12 cents for every $1 in current debt.

Measuring Liquidity: Perspective 2

- Measures a firm's ability to convert accounts receivable and inventory into cash:
  - Average Collection Period
  - Inventory Turnover

- How long does it take to collect the firm's receivables?
- Equation:

$$\text{Days in receivables} = \frac{\text{accounts receivable}}{\text{daily credit sales}} = \frac{\text{accounts receivable}}{\text{annual credit sales} \div 365} \qquad (4\text{-}3)$$

Home Depot = ($1,085M) ÷ ($20,399M/365) = **19.41 days**

- Home Depot (at 19.41 days) is slower than Lowe's (at 16 days) in collecting accounts receivable.

Days in Receivables (Average Collection Period)

Days in Inventory

- How long is the inventory held before being sold?
- Equation:

$$\text{Days in inventory} = \frac{\text{inventory}}{\text{daily cost of goods sold}} = \frac{\text{inventory}}{\text{annual cost of goods sold} \div 365} \quad (4\text{-}5)$$

Home Depot = ($10,625M) ÷ ($44,693 ÷ 365)= **86.77days**

- Home Depot carries inventory for a shorter time than Lowe's (95.80 days).

- Certificates of deposit are slightly less liquid, because there is usually a penalty for converting them to cash before their maturity date. Savings bonds are also quite liquid, since they can be sold at a bank fairly easily. Finally, shares of stock, bonds, options and commodities are considered fairly liquid, because they can usually be sold readily and you can receive the cash within a few days.

- Each of the above can be considered as cash or cash equivalents because they can be converted to cash with little effort, although sometimes with a slight penalty. (For related reading, see *The Money Market*.)
- Moving down the scale, we run into assets that take a bit more effort or time before they can be realized as cash. One example would be preferred orrestricted shares, which usually have covenants dictating how and when they might be sold.

- Other examples are items like coins, stamps, art and other collectibles. If you were to sell to another collector, you might get full value but it could take a while, even with the internet easing the way. If you go to a dealer instead, you could get cash more quickly, but you may receive less of it.

- Cash is a company's lifeblood. In other words, a company can sell lots of widgets and have good net earnings, but if it can't collect the actual cash from its customers on a timely basis, it will soon fold up, unable to pay its own obligations.
- Several ratios look at how easily a company can meet its current obligations. One of these is the current ratio, which compares the level of current assets to current liabilities. Remember that in this context, "current" means collectible or payable within one year.

- Depending on the industry, companies with good liquidity will usually have a current ratio of more than two. This shows that a company has the resources on hand to meet its obligations and is less likely to borrow money or enter bankruptcy.

- A more stringent measure is the quick ratio, sometimes called the acid test ratio. This uses current assets (excluding inventory) and compares them to current liabilities. Inventory is removed because, of the various current assets such as cash, short-term investments or accounts receivable, this is the most difficult to convert into cash. A value of greater than one is usually considered good from a liquidity viewpoint, but this is industry dependent.

- One last ratio of note is the debt/equity ratio, usually defined as total liabilities divided by stockholders' equity. While this does not measure a company's liquidity directly, it is related. Generally, companies with a higher debt/equity ratio will be less liquid, as more of their available cash must be used to service and reduce the debt. This leaves less cash for other purposes.

- The focus is on the profitability of the assets in which the firm has invested. The following ratios are considered:
  - Operating Return on Assets
  - Operating Profit Margin
  - Total Asset Turnover
  - Fixed Assets Turnover

Are the Firm's Managers Generating Adequate Operating Profits from the Company's Assets?

Operating Return on Assets (ORA)

- ORA indicates the level of operating profits relative to the firm's total assets.
- Equation: $$\text{Operating return on assets} = \frac{\text{operating profits}}{\text{total assets}} \quad (4\text{-}7)$$

Home Depot = \$5,803 ÷ \$40,125M = 0.145 or **14.5%**

- Thus managers are generating 14.5 cents of operating profit for every \$1 of assets (Lowe's=10.6%)

Managing Operations: Operating Profit Margin (OPM)

- OPM examines how effective the company is in managing its cost of goods sold and operating expenses that determine the operating profit.
- Equation:

$$\text{Operating profit margin} = \frac{\text{operating profits}}{\text{sales}} \qquad (4\text{-}9)$$

Home Depot = \$5,803 ÷ \$67,997M = 0.085 or **8.5%**

- Home Depot managers are better than Lowe's in managing the cost of goods sold and operating expenses, as the Operating Profit Margin for Lowe's is only 7.3%.

Managing Assets: Total Asset Turnover

- This ratio measures how efficiently a firm is using its assets in generating sales.
- Equation:

$$\text{Total asset turnover} = \frac{\text{sales}}{\text{total assets}} \qquad (4\text{-}10)$$

Home Depot = \$67,997 ÷ \$40,125M = **1.69X**

- Home Depot is generating \$1.69 in sales for every \$1 invested in assets, which is higher than Lowe's (1.45X).

Managing Assets: Fixed Asset Turnover

- Examines efficiency in generating sales from investment in "fixed assets"
- Equation:

$$\text{Fixed asset turnover} = \frac{\text{sales}}{\text{net fixed assets}} \qquad (4\text{-}11)$$

Home Depot = $67,997M ÷ $25,060M = **2.71X**

- Home Depot generates $2.71 in sales for every $1 invested in fixed assets, which is much higher than Lowe's (2.21X)

How Is the Firm Financing Its Assets?

- Does the firm finance its assets by debt or equity or both?
- The following two ratios are considered:
  - Debt Ratio
  - Times Interest Earned

Debt Ratio

- This ratio indicates the percentage of the firm's assets that are financed by debt (implying that the balance is financed by equity).
- Equation:

$$\text{Debt ratio} = \frac{\text{total debt}}{\text{total assets}} \qquad (4\text{–}12)$$

Home Depot = $21,236M ÷ $40,125M = 0.53 or **53%**

- Home Depot finances 53% of it's assets by debt and 47% by equity. This ratio is higher than Lowe's debt ratio of 46%.

Times Interest Earned

- This ratio indicates the amount of operating income available to service interest payments.
- Equation: Times Interest Earned = Operating Profits ÷ Interest Expense

Home Depot = $5,803M ÷ $530M = **10.9X**

- Home Depot's operating income is nearly 11 times the annual interest expense and higher than Lowe's (9X) due to its relatively higher operating profits.

Note:

- Interest is not paid with income but with cash.
- Oftentimes, firms are required to repay part of the principal annually.
- Thus, times interest earned is only a crude measure of the firm's capacity to service its debt.

- This is analyzed by computing the firm's accounting return on common stockholder's investment or return on equity (ROE).

- Equation:

$$\text{Return on equity} = \frac{\text{net income}}{\text{total common equity}} \qquad (4\text{–}14)$$

- Note common equity includes both common stock and retained earnings.

Are the Firm's Managers Providing a Good Return on the Capital Provided by the Company's Shareholders?

Home Depot = $3,338M ÷ $18,889M

= 0.177 or **17.7%**

- Owners of Home Depot are receiving a higher return (17.7%) compared to Lowe's (11.1%).
- One of the reasons for higher ROE is the higher return on assets generated by Home Depot.
- Also, Home Depot uses more debt. Higher debt translates to higher ROE under favorable business conditions.

ROE

Price/Earnings Ratio

- Measures how much investors are willing to pay for $1 of reported earnings.
- Equation: $$\text{Price/earnings ratio} = \frac{\text{market price per share}}{\text{earnings per share}} \quad (4\text{-}15)$$

Home Depot = $36.77 ÷ $2.06 = **17.85X**

- Investors are willing pay more for Home Depot for every dollar of earnings per share compared to Lowe's ($17.85 for Home Depot versus $16.90 for Lowe's).

Limitations of Financial Ratio Analysis

- It is sometimes difficult to identify industry categories or comparable peers.
- The published peer group or industry averages are only approximations.
- Industry averages may not provide a desirable target ratio.
- Accounting practices differ widely among firms.
- A high or low ratio does not automatically lead to a specific conclusion.
- Seasons may bias the numbers in the financial statements.

TABLE 5-7 Summary of Time Value of Money Equations

Calculation	Equation
Future value of a single payment	$FV_n = PV(1 + r)^n$
Present value of a single payment	$PV = FV_n\left[\frac{1}{(1 + r)^n}\right]$
Future value of an annuity	$FV \text{ of an annuity} = PMT\left[\frac{(1 + r)^n - 1}{r}\right]$
Present value of an annuity	$PV \text{ of an annuity} = PMT\left[\frac{1 - (1 + r)^{-n}}{r}\right]$
Future value of an annuity due	$FV_n(\text{annuity due}) = \text{future value of an annuity} \times (1 + r)$
Present value of an annuity due	$PV(\text{annuity due}) = \text{present value of an annuity} \times (1 + r)$
Effective annual return (EAR) =	$\left[1 + \frac{\text{quoted rate}}{m}\right]^m - 1$
Future value of a single payment with nonannual compounding	$FV_n = PV\left(1 + \frac{r}{m}\right)^{mn}$
Present value of a perpetuity	$PV = \frac{PP}{r}$

Notations: FV_n = the future value of the investment at the end of n years
n = the number of years until payment will be received or during which compounding occurs
r = the annual interest or discount rate
PV = the present value of the future sum of money
m = the number of times compounding occurs during the year
PMT = the annuity payment deposited or received at the end of each year
PP = the constant dollar amount provided by the perpetuity

Introduction to Finance

Chapter 5 – Stock valuation

Learning Objectives

- Identify the basic characteristics of preferred stock.
- Value preferred stock.
- Identify the basic characteristics of common stock.
- Value common stock.
- Calculate a stock’s expected rate of return.

Preferred Stock

- Preferred stock is often referred to as a *hybrid security* because it has many characteristics of both common stock and bonds.

Hybrid Nature of Preferred Stocks

Like common stocks, preferred stocks

- have no fixed maturity date
- failure to pay dividends does not lead to bankruptcy
- dividends are not a tax-deductible expense

Like Bonds

- dividends are fixed in amount (either as a $ amount or as a % of par value)

Characteristics of Preferred Stocks

- Multiple series of preferred stock
- Preferred stock's claim on assets and income
- Cumulative dividends
- Protective provisions
- Convertibility
- Retirement provisions

Multiple Series

- If a company desires, it can issue more than one series of preferred stock, and each series can have different characteristics (such as different protective provisions and convertibility rights).

Claim on Assets and Income

Claim on Assets: Preferred stock has priority over common stock with regard to claim on assets in the case of bankruptcy.

- Preferred stockholders claims are honored before common stockholders, but after bonds.

Claim on Income: Preferred stock also has priority over common stock with regard to dividend payments.

- Thus preferred stocks are safer than common stock but riskier than bonds.

Cumulative Dividends

- Cumulative feature (if it exists) requires that all past, unpaid preferred stock dividends be paid before any common stock dividends are declared.

Protective Provisions

- Protective provisions generally allow for *voting rights* in the event of nonpayment of dividends, or they *restrict the payment of common stock dividends* if sinking-funds payments are not met or if the firm is in financial difficulty.
- These protective provisions reduce the risk and consequently, expected return.

Convertibility

- Convertible preferred stock can, at the discretion of the holder, be converted into a predetermined number of shares of common stock.
- Almost one-third of preferred stock issued today is convertible preferred.

Retirement Provisions

- Although preferred stock has no set maturity associated with it, issuing firms generally provide for some method of retiring the stock such as a call provision or sinking fund provision.
  - Call provision entitles the corporation to repurchase its preferred stock at stated prices over a given time period.
  - Sinking fund provision requires the firm to set aside an amount of money for the retirement of its preferred stock.

- The economic or intrinsic value of a preferred stock is equal to the present value of all future dividends.

- Value of preferred stock:
  = Annual dividend/required rate of return

$$V_{ps} = \frac{\text{annual dividend}}{\text{required rate of return}} = \frac{D}{r_{ps}}$$

Example: Assume INGA's preferred stock pays an annual dividend of $3.75 and the investors required rate of return is 6%.

$$V_{ps} = \frac{D}{k_{ps}} = \frac{\$3.75}{0.06} = \$62.50$$

V=3.75(1+0.03)/(0.06-0.03)=128.75

Common Stock

- Common stock is a certificate that indicates ownership in a corporation. When you buy a share, you buy a "part/share" of the company and attain ownership rights in proportion to your "share" of the company.
- Common stockholders are the true owners of the firm. Bondholders and preferred stock holders can be viewed as creditors.

Claim on Income

- Common shareholders have the right to *residual income* after bondholders and preferred stockholders have been paid.
- Residual income can be paid in the form of dividends or retained within the firm and reinvested in the business.
- Claim on residual income implies there is no upper limit on income, but it also means that, on the downside, shareholders are not guaranteed anything and may have to settle for zero income in some years.

Claim on Assets

- Common stock has a *residual claim* on assets in the case of liquidation.
  - Residual claim implies that the claims of debt holders and preferred stockholders have to be met prior to common stockholders.
- Generally, if bankruptcy occurs, claims of the common shareholders are typically not satisfied.

Limited Liability

- The liability of shareholders is limited to the amount of their investment.
- The limited liability helps the firm in raising funds.

Voting Rights

- Most often, common stockholders are the only security holders with a vote.
  - Majority of shareholders generally vote by proxy. Proxy fights are battles between rival groups for proxy votes.
- Common shareholders are entitled to:
  - elect the board of directors
  - approve any change in the corporate charter
- Voting for directors and charter changes occur at the corporation's annual meeting.
  - *With majority voting* – each share of stock allows the shareholder one vote. Each position on the board is voted on separately.
  - *With cumulative voting* - each share of stock allows the stockholder a number of votes equal to the number of directors being elected.

Preemptive Rights

- Preemptive right entitles the common shareholder to maintain a proportionate share of ownership in the firm.
  - Thus, if a shareholder currently owns 5% of the shares, s/he has the right to purchase 5% of the shares when new shares are issued.
- These rights are issued in the form of certificates that give shareholders the option to buy new shares at a specific price during a 2- to 10- week period. These rights can be exercised, sold in the open market, or allowed to expire.

Valuing Common Stock

- Like bonds and preferred stock, the value of common stock is equal to the present value of all future expected cash flows (i.e., dividends).
- However, dividends are neither fixed nor guaranteed, which makes it harder to value common stocks compared to bonds and preferred stocks.

Dividend Model

- Unlike preferred stock, common stock dividend is not fixed.
- Dividend pattern varies among firms, but dividends generally tend to increase with the growth in corporate earnings.
- V=D1/(r-g)
- V(ex-div)

How Can a Company Grow?

- Through Infusion of capital by borrowing or issuing new common stock.
- Through Internal growth. Management retains some or all of the firm's profits for reinvestment in the firm, resulting in future earnings growth and value of stock.
- Internal growth directly affects the existing stockholders and is the only growth factor used for valuation purposes.

$g = ROE \times pr$

where:

g = the growth rate of future earnings and the growth in the common stockholders' investment in the firm

ROE = the return on equity
(net income/common book value)

pr = *% of profits retained* (profit retention rate)

Plowback ratio pr
Internal Growth

Dividend Valuation Model

- Value of Common stock
  = *PV* of future dividends
- $V_{cs} = D_1/(r_{cs} - g)$
  V_{cs} = Common stock value
  D_1 = dividend in year 1
  r_{cs} = required rate of return
  g = growth rate
- Consider the valuation of a common stock that paid $1.00 dividend at the end of the last year and is expected to pay a cash dividend in the future. Dividends are expected to grow at 10% and the investors required rate of return is 17%.

1. The dividend last year was $1. Compute the new dividend (D_1) by:

   $D_1 = D_0(1 + g)$
   $= \$1(1 + .10) = \$1.10$

2. $V_{cs} = D_1/(r_{cs} - g)$
   $= \$1.10/(.17 - .10)$
   $= \mathbf{\$15.71}$

The Expected Rate of Return of Preferred Stockholders

- The expected rate of return on a security is the required rate of return of investors who are willing to pay the market price for the security.
- Preferred Stock Expected Return:
  = Annual dividend/preferred stock market price
- Example: If the current market price of preferred stock is $75, and the stock pays $5 dividend, the expected rate of return = $5/$75 = **6.67%**

Common Stock Expected Return
= (dividend in year 1 / market price)
+ dividend growth rate
= dividend yield + growth rate

Example: The current market price of stock is $90 and the stock pays dividend of $3 with a growth rate of 5%.

$$\text{Expected Rate of Return} = \frac{3 \times 1.05}{90} + 5\%$$

$$= 3.5\% + 5\% = 8.5\%$$

V=D1/(r-g) **r-g= D1/P**

r=(D1/P)+g

Price versus Expected Return

- Typically, an investor is not concerned with the value of a stock. Rather, investor would like to know the expected rate of return if the stock is bought at its current market price.
- Given the price and expected rate of return, investor has to decide if the expected return compensates for the risk.

Bonds

- **Meaning**: A bond is a type of debt or long-term promissory note, issued by a borrower, promising to its holder a predetermined and fixed amount of interest per year and repayment of principal at maturity.

- Bonds are issued by Corporations, Government, State and Local Municipalities

Debentures

- Debentures are unsecured long-term debt.
- For an issuing firm, debentures provide the benefit of not tying up property as collateral.
- For bondholders, debentures are more risky than secured bonds and provide a higher yield than secured bonds.

Subordinated Debentures

- There is a hierarchy of payout in case of insolvency.
- The claims of subordinated debentures are honored only after the claims of secured debt and unsubordinated debentures have been satisfied.

Mortgage Bonds

- Mortgage bond is secured by a lien on real property.
- Typically, the value of the real property is greater than that of the bonds issued, providing bondholders a margin of safety.

Eurobonds

- Securities (bonds) issued in a country different from the one in whose currency the bond is denominated.
- For example, a bond issued by an American corporation in Japan that pays interest and principal in dollars.

Claims on Assets and Income

Seniority in claims

- In the case of insolvency, claims of debt, including bonds, are generally honored before those of common or preferred stock.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Par Value

- Par value is the face value of the bond, returned to the bondholder at maturity.
- In general, corporate bonds are issued at denominations or par value of $1,000.
- Prices are represented as a % of face value. Thus, a bond quoted at 112 can be bought at 112% of its par value in the market. Bonds will return the par value at maturity, regardless of the price paid at the time of purchase.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Coupon Interest Rate

- The percentage of the par value of the bond that will be paid periodically in the form of interest.
- Example: A bond with a $1,000 par value and 5% annual coupon rate will pay $50 annually (=0.05*1000) or $25 (if interest is paid semiannually).

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Zero Coupon Bonds

Zero coupon bonds have zero or very low coupon rate. Instead of paying interest, the bonds are issued at a substantial discount below the par or face value.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Maturity

Maturity of bond refers to the length of time until the bond issuer returns the par value to the bondholder and terminates or redeems the bond.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Call Provision

- Call provision (if it exists on a bond) gives a corporation the option to redeem the bonds before the maturity date. For example, if the prevailing interest rate declines, the firm may want to pay off the bonds early and reissue at a more favorable interest rate.
- Issuer must pay the bondholders a premium.
- There is also a *call protection period* where the firm cannot call the bond for a specified period of time.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Indenture

- An indenture is the legal agreement between the firm issuing the bond and the trustee who represents the bondholders.
- It provides for specific terms of the loan agreement (such as rights of bondholders and issuing firm).
- Many of the terms seek to protect the status of bonds from being weakened by managerial actions or by other security holders.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Bond Ratings

- Bond ratings reflect the future risk potential of the bonds.
- Three prominent bond rating agencies are Standard & Poor's, Moody's, and Fitch Investor Services.
- Lower bond rating indicates higher probability of default. It also means that the rate of return demanded by the capital markets will be higher on such bonds.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Bond Ratings

TABLE 7-1 Standard & Poor's Corporate Bond Ratings	
AAA	This is the highest rating assigned by Standard & Poor's for debt obligation and indicates an extremely strong capacity to pay principal and interest.
AA	Bonds rated AA also qualify as high-quality debt obligations. Their capacity to pay principal and interest is very strong; in the majority of instances, they differ from AAA issues only by a small degree.
A	Bonds rated A have a strong capacity to pay principal and interest, although they are somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions.
BBB	Bonds rated BBB are regarded as having an adequate capacity to pay principal and interest. Whereas they normally exhibit adequate protection parameters, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity to pay principal and interest for bonds in this category than for bonds in the A category.
BB B CCC CC	Bonds rated BB, B, CCC, and CC are regarded, on balance, as predominantly speculative with respect to the issuer's capacity to pay interest and repay principal in accordance with the terms of the obligation. BB indicates the lowest degree of speculation and CC the highest. Although such bonds will likely have some quality and protective characteristics, these are outweighed by large uncertainties or major risk exposures to adverse conditions.
C	The rating C is reserved for income bonds on which no interest is being paid.
D	Bonds rated D are in default, and payment of principal and/or interest is in arrears.
Plus (+) or Minus (−): To provide more detailed indications of credit quality, the ratings from AA to BB may be modified by the addition of a plus or minus sign to show relative standing within the major rating categories.	

Source: Adapted from www.standardandpoors.com, December 2005.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Factors Having a Favorable Effect on Bond Rating

- A greater reliance on equity as opposed to debt in financing the firm
- Profitable operations
- Low variability in past earnings
- Large firm size
- Minimal use of subordinated debt

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Junk Bonds

- Junk bonds are high-risk bonds with ratings of BB or below by Moody's and Standard & Poor's.
- Junk bonds are also referred to as **high-yield bonds** as they pay a high interest rate, generally 3 to 5% more than AAA-rated bonds.

TERMINOLOGY AND CHARACTERISTICS OF BONDS

Capital

- Capital represents the funds used to finance a firm's assets and operations. Capital constitutes all items on the right hand side of balance sheet, i.e., liabilities and common equity.
- Main sources: Debt, Preferred stock, Retained earnings and Common Stock

Cost of Capital

The firm's cost of capital is also referred to as the firm's Opportunity cost of capital.

Investor's Required Rate of Return

- Investor's Required Rate of Return – the minimum rate of return necessary to attract an investor to purchase or hold a security.
- Investor's required rate of return is not the same as cost of capital due to taxes and transaction costs.
  - Impact of taxes: For example, a firm may pay 8% interest on debt but due to tax benefit on interest expense, the net cost to the firm will be lower than 8%.
- Impact of transaction costs on cost of capital: For example, If a firm sells new stock for $50.00 a share and incurs $5 in flotation costs, and the investors have a required rate of return of 15%, what is the cost of capital?
- The firm has only $45.00 to invest after transaction cost.
  $0.15 \times \$50.00 = \$7.5$
  $k = \$7.5/(\$45.00)$
  $= 0.1667$ or 16.67% (rather than 15%)

Financial Policy

- A firm's financial policy indicates the desired sources of financing and the particular mix in which it will be used.
- For example, a firm may choose to raise capital by issuing stocks and bonds in the ratio of 6:4 (60% stocks and 40% bonds). The choice of mix will impact the cost of capital.

The Cost of Debt

Since firms must pay flotation costs when they sell bonds, the net proceeds per bond received by firm is less than the market price of the bond. Hence, the cost of debt capital (K_d) will be higher than the bondholder's required rate of return. It can be calculated using the following equation:

$$\text{Net proceeds per bond} = \frac{\text{interest paid in year 1}}{\left(1 + \text{cost of debt capital or } k_d\right)^1} + \frac{\text{interest paid in year 2}}{\left(1 + \text{cost of debt capital or } k_d\right)^2}$$

$$+ \frac{\text{interest paid in year 3}}{\left(1 + \text{cost of debt capital or } k_d\right)^3} + \frac{\text{principal}}{\left(1 + \text{cost of debt capital or } k_d\right)^3}$$

See Example 9.1

- Investor's required rate of return on a 8% 20-year bond trading for $908.32= 9%
- After-tax cost of debt = Cost of debt*(1-tax rate)

- At 34% tax bracket = 9.73*(1 – 0.34) = **6.422%**

The Cost of Debt

The Cost of Preferred Stock

- If flotation costs are incurred, preferred stockholder's required rate of return will be less than the cost of preferred capital to the firm.
- Thus, in order to determine the cost of preferred stock, we adjust the price of preferred stock for flotation cost to give us the net proceeds.
- Net proceeds = issue price – flotation cost
- Cost of Preferred Stock**:**

Pn = net proceeds (i.e., Issue price – flotation costs)
D_p = preferred stock dividend per share

Example: Determine the cost for a preferred stock that pays annual dividend of $4.25, has current stock price $58.50, and incurs flotation costs of $1.375 per share.
Cost = $4.25/(58.50 – 1.375) = 0.074 or **7.44%**

The Cost of Common Equity

- Cost of equity is more challenging to estimate than the cost of debt or the cost of preferred stock because common stockholder's rate of return is not fixed as there is no stated coupon rate or dividend.
- Furthermore, the costs will vary for two sources of equity (i.e., retained earnings and new issue).
- There are no flotation costs on retained earnings but the firm incurs costs when it sells new common stock.

- Note that retained earnings are not a free source of capital. There is an opportunity cost.

Cost Estimation Techniques

- Two commonly used methods for estimating common stockholder's required rate of return are:
  - The Dividend Growth Model
  - The Capital Asset Pricing Model

The Dividend Growth Model

- Investors' required rate of return (For Retained Earnings):

- D_1 = Dividends expected one year hence
- P_{cs} = Price of common stock
- g = growth rate

- Investors' required rate of return (For new issues)

- D_1 = Dividends expected one year hence
- P_{cs} = Net proceeds per share
- g = growth rate

The Dividend Growth Model

Example: A company expects dividends this year to be $1.10, based upon the fact that $1 were paid last year. The firm expects dividends to grow 10% next year and into the foreseeable future. Stock is trading at $35 a share.

Cost of retained earnings:

$K_{cs} = D_1/P_{cs} + g$

$1.1/35 + 0.10 = 0.1314$ or **13.14%**

Cost of new stock (with a $3 flotation cost):

$K_{ncs} = D_1/NP_{cs} + g$

$1.10/(35 - 3) + 0.10 = 0.1343$ or **13.43%**

- Dividend growth model is simple to use but suffers from the following drawbacks:
  - It assumes a constant growth rate
  - It is not easy to forecast the growth rate

The Capital Asset Pricing Model

$$k_c = r_f + \beta(r_m - r_f)$$

r_f = Risk-free rate

β = Beta

$r_m - r_f$ = Market Risk Premium or expected rate of return for "average security" minus the risk-free rate

Example: If beta is 1.25, risk-free rate is 1.5% and expected return on market is 10%

$k_c = r_{rf} + \boldsymbol{\beta}(r_m - r_f)$

$= 0.015 + 1.25(0.10 - 0.015)$

$= \mathbf{12.125\%}$

Capital Asset Pricing Model Variable Estimates

- CAPM is easy to apply. Also, the estimates for model variables are generally available from public sources.
- Risk-Free Rate: Wide range of U.S. government securities on which to base risk-free rate
- Beta: Estimates of beta are available from a wide range of services, or can be estimated using regression analysis of historical data.
- Market Risk Premium: It can be estimated by looking at history of stock returns and premium earned over risk-free rate.

Bringing it all together: WACC

- To estimate WACC, we need to know the capital structure mix and the cost of each of the sources of capital.
- For a firm with only two sources: debt and common equity,

$$\text{Weighted average cost of capital} = \left(\begin{array}{c}\text{after-tax cost of debt}\end{array} \times \begin{array}{c}\text{proportion of debt financing}\end{array}\right) + \left(\begin{array}{c}\text{cost of equity}\end{array} \times \begin{array}{c}\text{proportion of equity financing}\end{array}\right)$$

The Weighted Average Cost of Capital

WACC Example

- A firm borrows money at 7% interest after taxes and pays 12% for equity. The company raises capital in equal proportions, i.e., 50% debt and 50% equity.
- WACC = $(0.07 \times 0.5) + (0.12 \times 0.5)$
  $= 0.095$ or **9.5%**

The Weighted Average Cost of Capital

- In practice, the calculation of cost of capital may be more complex:
  - If firms have multiple debt issues with different required rates of return.
  - If firms also use preferred stock in addition to common stock financing.

Business World Cost of capital

TABLE 9-1 Calculating the Weighted Average Cost of Capital

PANEL A: COMMON EQUITY RAISED BY RETAINED EARNINGS

Capital Structure

Source of Capital	Weights	× Cost of Capital	= Product
Bonds	w_d	$k_d(1-T_c)$	$w_d \times k_d(1-T_c)$
Preferred stock	w_{ps}	k_{ps}	$w_{ps} \times k_{ps}$
Common equity			
Retained earnings	w_{cs}	kcs	$w_{cs} \times k_{cs}$
Sum =	100%	Sum =	k_{wocc}

PANEL B: COMMON EQUITY RAISED BY SELLING NEW COMMON STOCK

Capital Structure

Source of Capital	Weights	× Cost of Capital	= Product
Bonds	w_d	$k_d(1-T_c)$	$w_d \times k_d(1-T_c)$
Preferred stock	w_{ps}	k_{ps}	$w_{ps} \times k_{ps}$
Common equity			
Common stock	w_{ncs}	k_{ncs}	$w_{ncs} \times k_{ncs}$
Sum =	100%	Sum =	k_{wacc}

TABLE 9-2 Capital Structure and Capital Costs for Ash Inc.

Source of Capital	Amount of Funds Raised ($)	Percentage of Total	After-Tax Cost of Capital
Bonds	1,750,000	35%	7%
Preferred stock	250,000	5%	13%
Retained earnings	3,000,000	60%	16%
Total	5,000,000	100%	

TABLE 9-3 The Weighted Average Cost of Capital for Ash Inc.

PANEL A: COST OF CAPITAL FOR $0 TO $5,000,000 IN NEW CAPITAL

Capital Structure

Source of Capital	Weights	Cost of Capital	Product
Bonds	35%	7%	2.45%
Preferred stock	5%	13%	0.65%
Retained earnings	60%	16%	9.60%
Total	100%	k_{wacc} =	12.70%

PANEL B: COST OF CAPITAL FOR MORE THAN $5,000,000

Capital Structure

Source of Capital	Weights	Cost of Capital	Product
Bonds	35%	7%	2.45%
Preferred stock	5%	13%	0.65%
New common stock	60%	18%	10.80%
Total	100%	k_{wacc} =	13.90%

Divisional Costs of Capital

- Firms with multiple operating divisions often have unique risks and different costs of capital for each division.
- Consequently, the WACC used in each division is potentially unique for each division.

Advantages of Divisional WACC

- Different discount rates reflect differences in the systematic risk of the projects evaluated by different divisions.
- It entails calculating one cost of capital for each division (rather than each project).
- Divisional cost of capital limits managerial latitude and the attendant influence costs.

Using Pure Play Firms to Estimate Divisional WACCs

- Divisional cost of capital can be estimated by identifying "pure play" comparison firms that operate in only one of the individual business areas.
- For example, Valero Energy Corp. may use the WACC estimate of firms that operate in the refinery industry to estimate the WACC of its division engaged in refining crude oil.

Divisional WACC Example

- Table 9-4 contains hypothetical estimates of the divisional WACC for the refining and retail (convenience store) industries.
- Panel A: Cost of debt (tax=38%)
- Panel B: Cost of equity (betas differ)
- Panels D & E: Divisional WACCs

- Sample chosen may not be a good match for the firm or one of its divisions due to differences in capital structure, and/or project risk.
- Good comparison firms for a particular division may be difficult to find.

Divisional WACC – Estimation Issues and Limitations

- Cost of capital can serve as the discount rate in evaluating new investment when the projects offer the same risk as the firm as a whole.
- If risk differs, it is better to calculate a different cost of capital for each division. Figure 9-1 illustrates the danger of not doing so.

Cost of Capital to Evaluate New Capital Investments

FIGURE 9-1 Global Energy Divisional Costs of Capital
Using a company-wide cost of capital for a multidivisional firm results in systematic overinvestment in high-risk projects and underinvestment in low-risk projects.

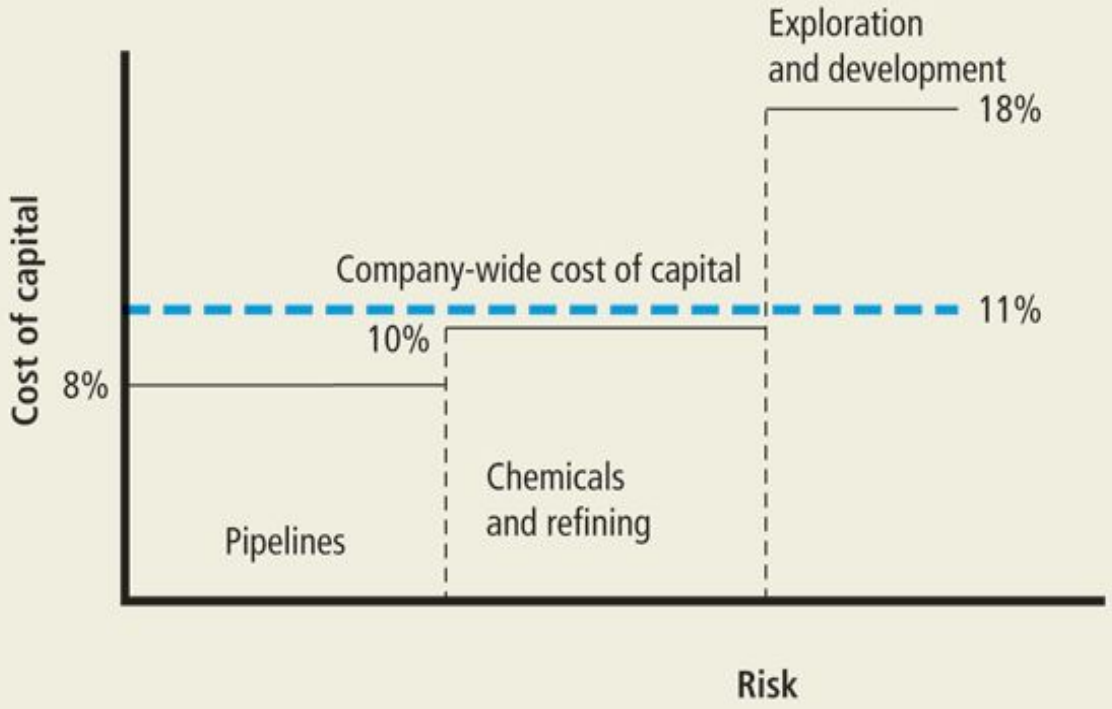


Figure 9-1

Capital Budgeting

- Meaning: The process of decision making with respect to investments in fixed assets—that is, should a proposed project be accepted or rejected.
- It is easier to"evaluate" profitable projects than to"find them"

Source of Ideas for Projects

- R&D: Typically, a firm has a research & development (R&D) department that searches for ways of improving existing products or finding new projects.
- Other sources: Employees, Competition, Suppliers, Customers.

- The Payback Period
- Net Present Value
- Profitability Index
- Internal Rate of Return

Capital-Budgeting Decision Criteria

The Payback Period

- Meaning: Number of years needed to recover the initial cash outlay related to an investment.
- Decision Rule: Project is considered feasible or desirable if the payback period is less than or equal to the firm's maximum desired payback period. In general, shorter payback period is preferred while comparing two projects.

Payback Period Example

Example: Project with an initial cash outlay of $20,000 with following free cash flows for 5 years.

YEAR	CASH FLOW	BALANCE
1	$ 8,000	($ 12,000)
2	4,000	(8,000)
3	3,000	(5,000)
4	5,000	0
5	10,000	12,000

Payback is 4 years.

The Payback Period – Trade-Offs

- Benefits:
  - Uses cash flows rather than accounting profits
  - Easy to compute and understand
  - Useful for firms that have capital constraints
- Drawbacks:
  - Ignores the time value of money
  - Does not consider cash flows beyond the payback period

Discounted Payback Period

- The discounted payback period is similar to the traditional payback period except that it uses *discounted free cash flows* rather than actual undiscounted cash flows.
- The discounted payback period is defined as the number of years needed to recover the initial cash outlay from the discounted free cash flows.

$$\text{Discounted payback period} = \text{number of years just prior to complete payback from discounted free cash flows} + \frac{\text{unpaid-back amount at the beginning of year}}{\text{discounted free cash flow in year payback is completed}} \quad (10\text{-}2)$$

Table 10-2 shows the difference between traditional payback and discounted payback methods.
With undiscounted free cash flows,
the payback period is only 2 years,
while with discounted free cash flows (at 17%), the discounted payback period is 3.07 years.

Discounted Payback Period

TABLE 10-2 Discounted Payback, Period Example Using a 17 Percent Required Rate of Return

PROJECT A Year	Undiscounted Free Cash Flows	Discounted Free Cash Flows at 17%	Cumulative Discounted Free Cash Flows
0	–$10,000	–$10,000	–$10,000
1	6,000	5,130	–4,870
2	4,000	2,924	–1,946
3	3,000	1,872	–74
4	2,000	1,068	994
5	1,000	456	1,450
PROJECT B **Year**	**Undiscounted Free Cash Flows**	**Discounted Free Cash Flows at 17%**	**Cumulative Discounted Free Cash Flows**
0	–$10,000	–$10,000	–$10,000
1	5,000	4,275	–5,725
2	5,000	3,655	–2,070
3	0	0	–2,070
4	0	0	–2,070
5	0	0	–2,070

Discounted Payback Period

Net Present Value (*NPV*)

- *NPV* is equal to the present value of all future free cash flows less the investment's initial outlay. It measures the *net value* of a project in today's dollars.

$$NPV = (\text{present value of all the future annual free cash flows}) - (\text{the initial cash outlay})$$

$$= \frac{FCF_1}{(1+k)^1} + \frac{FCF_2}{(1+k)^2} + \cdots + \frac{FCF_n}{(1+k)^n} - IO \qquad (10\text{-}1)$$

NPV Example

- Example: Project with an initial cash outlay of $60,000 with following free cash flows for 5 years.

Year	FCF	Year	FCF
Initial outlay	–60,000	3	13,000
1	–25,000	4	12,000
2	–24,000	5	11,000

- The firm has a 15% required rate of return.

$$NPV = \frac{\sum FCF}{(1+k)^n} = Initial\ Outlay$$

$$= PF\ of\ Benefits - PV\ of\ Costs$$

- *PV* of *FCF* = $60,764
- Subtracting the initial cash outlay of $60,000 leaves an *NPV* of **$764**.
- Since *NPV* > 0, project is feasible.

NPV Trade-Offs

- Benefits
  - Considers all cash flows
  - Recognizes time value of money
- Drawbacks
  - Requires detailed long-term forecast of cash flows
- *NPV* is generally considered to be the most theoretically correct criterion for evaluating capital budgeting projects.

The Profitability Index (*PI*) (Benefit-Cost Ratio)

- The profitability index (*PI*) is the ratio of the present value of the future free cash flows (*FCF*) to the initial outlay.
- It yields the same accept/reject decision as *NPV*.

$$PI = \frac{\text{present value of all the future annual free cash flows}}{\text{initial cash outlay}}$$

$$= \frac{\frac{FCF_1}{(1+k)^1} + \frac{FCF_2}{(1+k)^2} + \cdots + \frac{FCF_n}{(1+k)^n}}{IO}$$

- Decision Rule:

  $PI \geq 1$ = accept;

  $PI < 1$ = reject

Profitability Index

Profitability Index Example

- A firm with a 10% required rate of return is considering investing in a new machine with an expected life of six years. The initial cash outlay is $50,000.

	FCF	*PVF @ 10%*	*PV*
Initial Outlay	−$50,000	1.000	−$50,000
Year 1	15,000	0.909	13,636
Year 2	8,000	0.826	6,612
Year 3	10,000	0.751	7,513
Year 4	12,000	0.683	8,196
Year 5	14,000	0.621	8,693
Year 6	16,000	0.564	9,032

PI = ($13,636 + $6,612 + $7,513 + $8,196 + $8,693 + $9,032) / $50,000

= $53,682/$50,000

= 1.0736

Project's *PI* is greater than 1. Therefore, accept.

Profitability Index Example

NPV and *PI*

- When the present value of a project's free cash inflows are greater than the initial cash outlay, the project *NPV* will be positive. *PI* will also be greater than 1.
- *NPV* and *PI* will always yield the same decision.

Internal Rate of Return (*IRR*)

- *IRR* is the discount rate that equates the present value of a project's future net cash flows with the project's initial cash outlay (*IO*).
- $$IO = \frac{FCF_1}{(1 + IRR\ \%)^1} + \frac{FCF_2}{(1 + IRR\ \%)^2} + \cdots + \frac{FCF_n}{(1 + IRR\ \%)^n}$$

- Decision Rule:
  - If *IRR* ≥ Required Rate of Return, accept
  - If *IRR* < Required Rate of Return, reject

FIGURE 10-1 An Example of the Net Present Value Profile of a Project

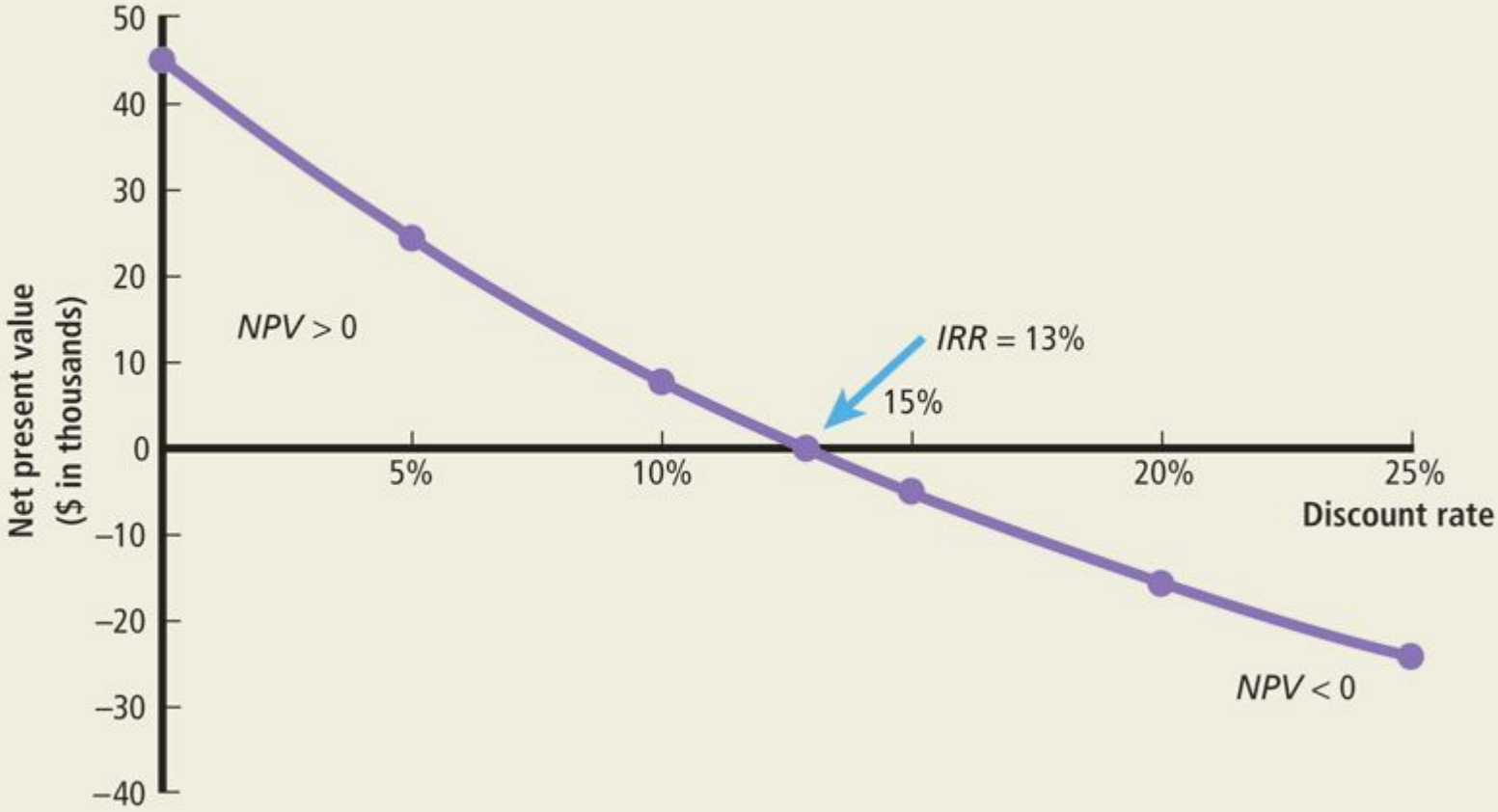


Figure 10-1

IRR and *NPV*

- If *NPV* is positive, *IRR* will be greater than the required rate of return
- If *NPV* is negative, *IRR* will be less than required rate of return
- If *NPV* = 0, *IRR* is the required rate of return.

IRR Example

- Initial Outlay: $3,817
- Cash flows: Yr. 1 = $1,000, Yr. 2 = $2,000, Yr. 3 = $3,000

Discount rate	**NPV**
15%	$4,356
20%	$3,958
22%	$3,817

- *IRR* is **22%** because the *NPV* equals the initial cash outlay at that rate.

Guidelines for Capital Budgeting

- To evaluate investment proposals, we must first set guidelines by which we measure the value of each proposal.
- We must know what is and what isn't relevant cash flow.

Guidelines for Capital Budgeting

- Use Free Cash Flows Rather than Accounting Profits
- Think Incrementally
- Beware of Cash Flows Diverted From Existing Products
- Look for Incidental or Synergistic Effects
- Work in Working-Capital Requirements
- Consider Incremental Expenses
- Sunk Costs Are Not Incremental Cash Flows
- Account for Opportunity Costs
- Decide If Overhead Costs Are Truly Incremental Cash Flows
- Ignore Interest Payments and Financing Flows

CALCULATING A PROJECT'S FREE CASH FLOWS

- Three components of free cash flows:
  - The initial outlay,
  - The annual free cash flows over the project's life, and
  - The terminal free cash flow

Three Perspectives on Risk

- Project standing alone risk
- Project's contribution-to-firm risk
- Systematic risk

Project Standing Alone Risk

- This is a project's risk ignoring the fact that much of the risk will be diversified away as the project is combined with other projects and assets.
- This is an inappropriate measure of risk for capital-budgeting projects.

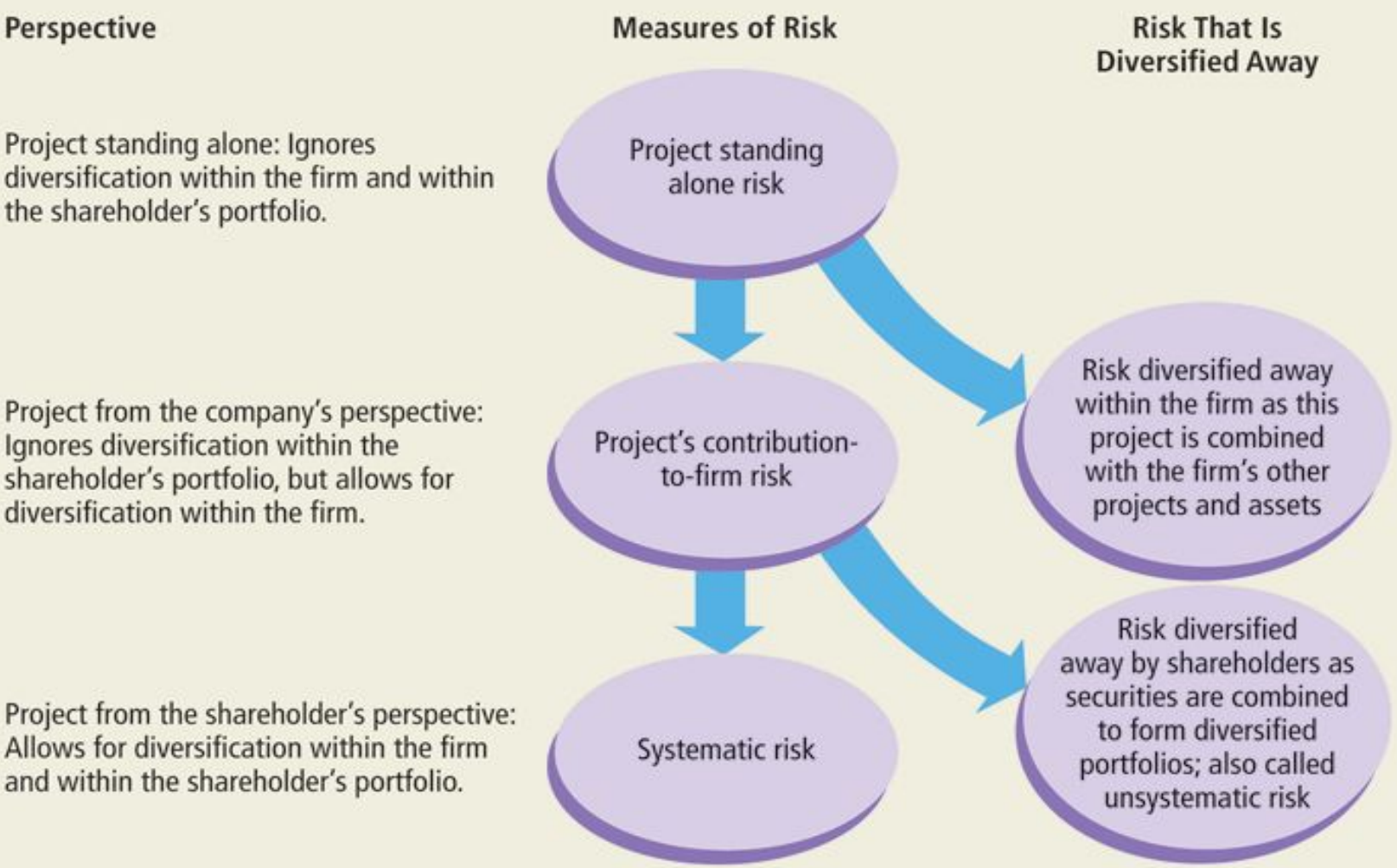
Contribution-to-Firm Risk

- This is the amount of risk that the project contributes to the firm as a whole.
- This measure considers the fact that some of the project's risk will be diversified away as the project is combined with the firm's other projects and assets but ignores the effects of the diversification of the firm's shareholders.

Systematic Risk

- Risk of the project from the viewpoint of a well-diversified shareholder.
- This measure takes into account that some of the risk will be diversified away as the project is combined with the firm's other projects and in addition, some of the remaining risk will be diversified away by the shareholders as they combine this stock with other stocks in their portfolios.

FIGURE 11-4 Looking at Three Measures of a Project's Risk



Relevant Risk

- Theoretically, the only risk of concern to shareholders is systematic risk.
- Since the project's contribution-to-firm risk affects the probability of bankruptcy for the firm, it is a relevant risk measure.
- Thus we need to consider both the project's contribution-to-firm risk and the project's systematic risk.

Incorporating Risk into Capital Budgeting

- Investors demand higher returns for more risky projects.
- As the risk of a project increases, the required rate of return is adjusted upward to compensate for the added risk.
- This **risk-adjusted discount rate** is then used for discounting free cash flows (in *NPV* model) or as the benchmark required rate of return (in *IRR* model).

Risk

- Risk is variability associated with expected revenue or income streams. Such variability may arise due to:
  - Choice of business line (business risk)
  - Choice of an operating cost structure (operating risk)
  - Choice of a capital structure (financial risk)

Business Risk

- Business risk is the variation in the firm's expected earnings attributable to the industry in which the firm operates. There are four determinants of business risk:
  - The stability of the domestic economy
  - The exposure to, and stability of, foreign economies
  - Sensitivity to the business cycle
  - Competitive pressures in the firm's industry

Operating Risk

- Operating risk is the variation in the firm's operating earnings that results from firm's cost structure (mix of fixed and variable operating costs).
- Earnings of firms with higher proportion of fixed operating costs are more vulnerable to change in revenues.

Financial Risk

- Financial risk is the variation in earnings as a result of firm's financing mix or proportion of financing that requires a fixed return.

Capital Structure Theory

- Theory focuses on the effect of financial leverage on the overall cost of capital to the enterprise.
- In other words, **Can the firm affect its overall cost of funds, either favorably or unfavorably, by varying the mixture of financing used?**
- According to Modigliani & Miller, the total **value of the firm** is not influenced by the firm's capital structure**.** In other words, the financing decision is ***irrelevant!***
- Their conclusions were based on restrictive assumptions (such as no taxes, capital structure consisting of only stocks and bonds, perfect or efficient markets).
- Firms strive to minimize the cost of using financial capital so as to maximize shareholder's wealth.

Capital Structure Theory

- Figure 12-5 shows that the firm's value remains the same, despite the differences in financing mix.
- Figure 12-6 shows that the firm's cost of capital remains constant, although cost of equity rises with increased leverage.

FIGURE 12-5 Firm Value and Capital Structure Design

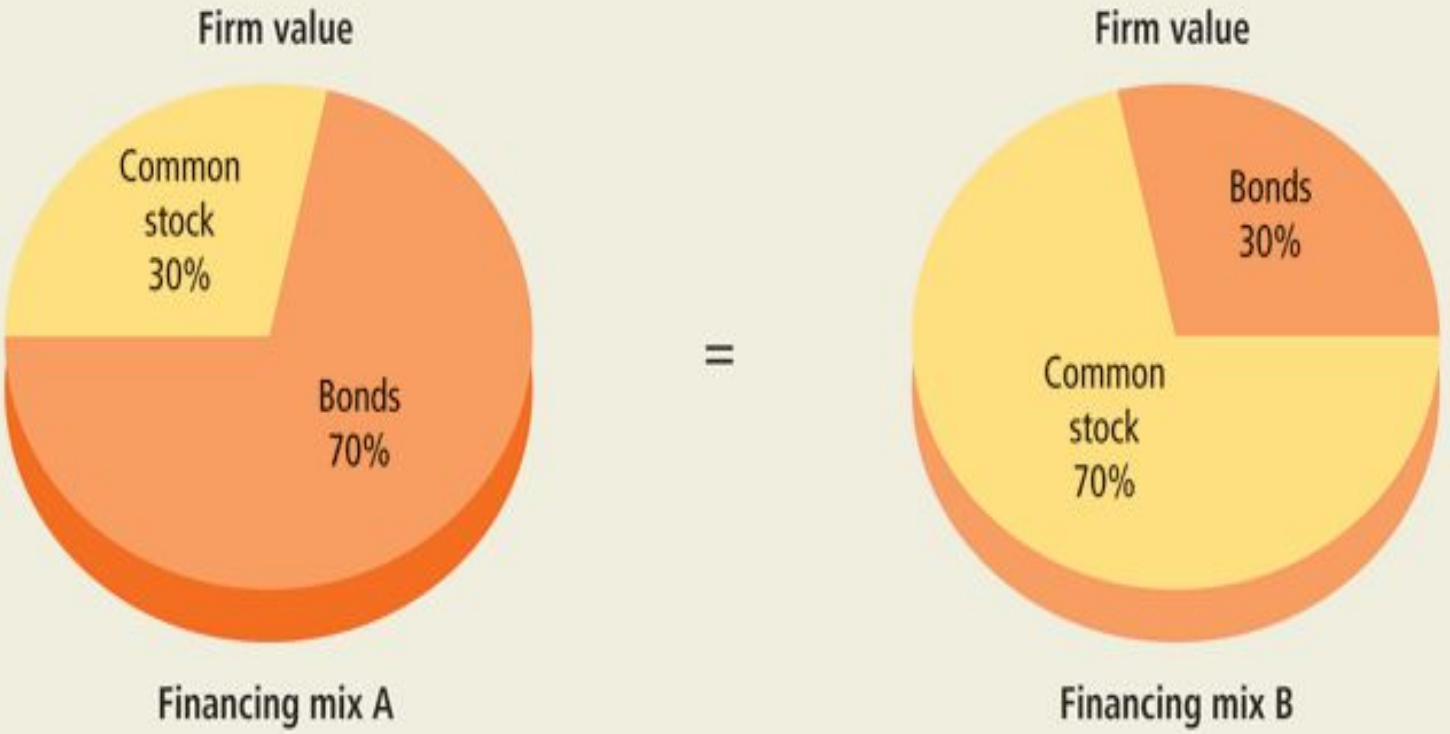
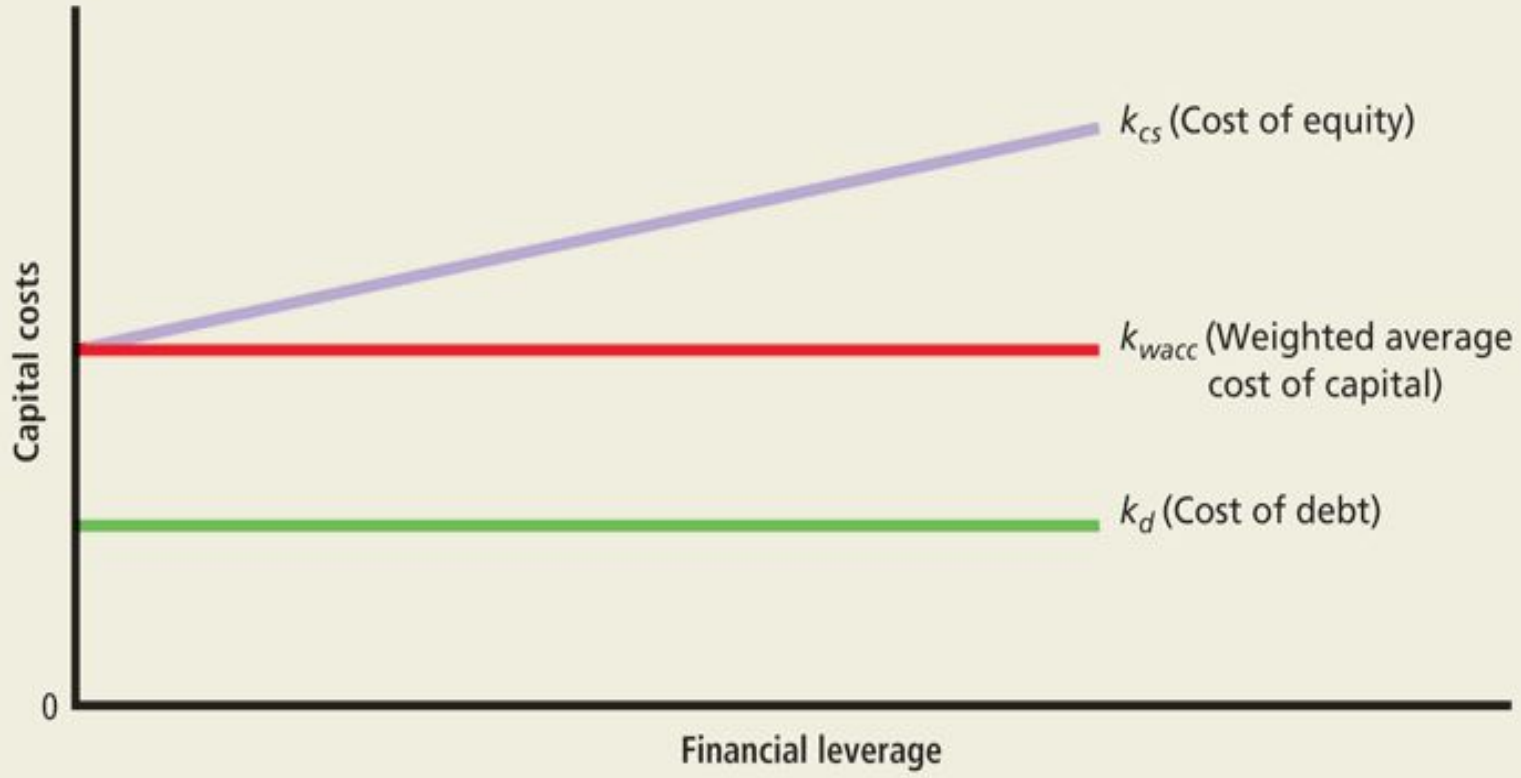


FIGURE 12-6 Capital Costs and Financial Leverage: No Taxes—Independence Hypothesis



Capital Structure Theory

- The implication of these figures for financial managers is that one capital structure is just as good as any other.
- However, the above conclusion is possible only under strict assumptions.
- We next turn to a market and legal environment that relaxes these restrictive assumptions.

Extensions to Independence Hypothesis: The Moderate Position

- The moderate position considers how the capital structure decision is affected when we consider:
  - Interest expense is tax deductible (a benefit of debt)
  - Debt financing increases the risk of default (a disadvantage of debt)
- Combining the above (benefit & drawback) provides a conceptual basis for designing a prudent capital structure.

Impact of Taxes on Capital Structure

- Interest expense is tax deductible.
- Because interest is deductible, the use of debt financing should result in higher total market value for firms outstanding securities.
- Tax shield benefit = $r_d(m)(t)$
  r = rate, m = principal, t = marginal tax rate

Impact of Taxes on Capital Structure

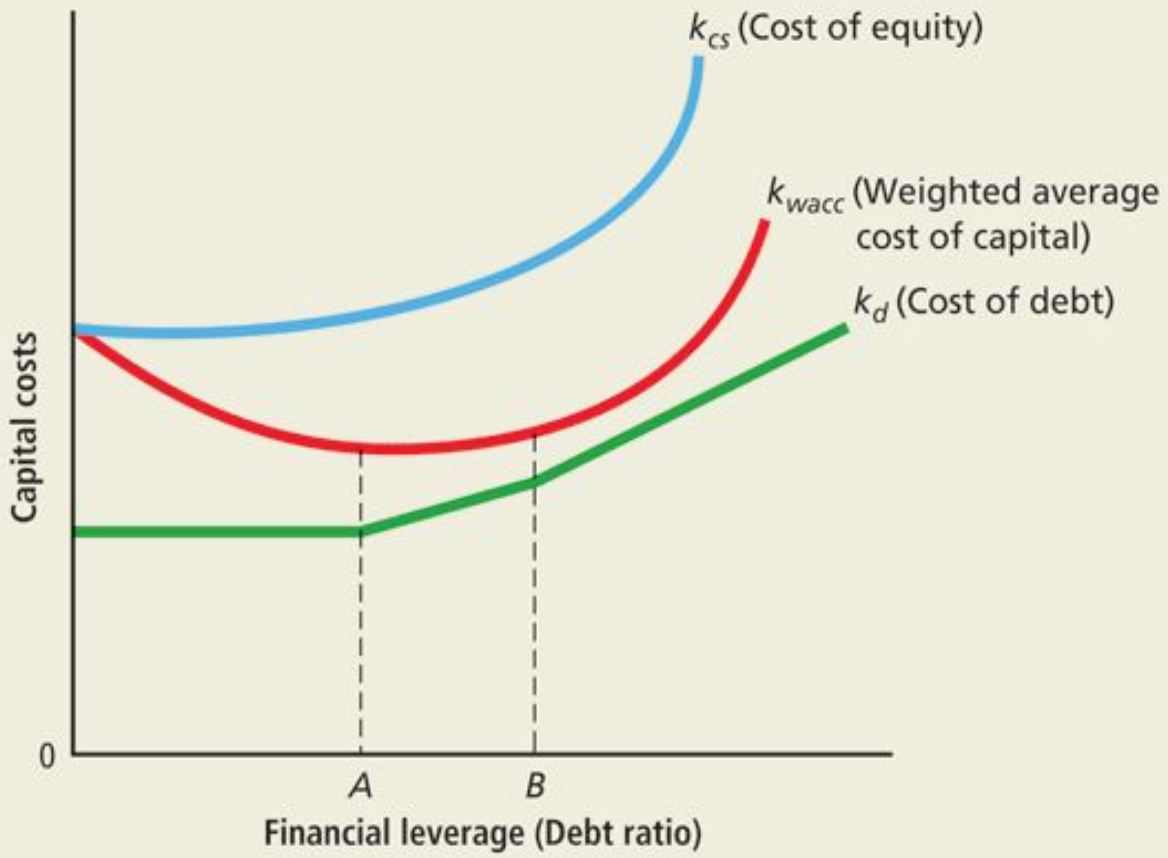
- Since interest on debt is tax deductible, the higher the interest expense, the lower the taxes.
- Thus, one could suggest that firms should maximize debt … indeed, firms should go for 100% debt to maximize tax shield benefits!!
- But we generally do not see 100% debt in the real world … *why not?*
- One possible explanation is:

  Bankruptcy costs

- The probability that a firm will be unable to meet its debt obligations increases with debt. Thus probability of bankruptcy (and hence costs) increase with increased leverage. Threat of financial distress causes the cost of debt to rise.
- As financial conditions weaken, expected costs of default can be large enough to outweigh the tax shield benefit of debt financing.
- So, higher debt does not always lead to a higher value … after a point, debt reduces the value of the firm to shareholders.
- This explains a firm's tendency to restrain itself from maximizing the use of debt.
- Debt capacity indicates the maximum proportion of debt the firm can include in its capital structure and still maintain its lowest composite cost of capital (see Figure 12-7).

Impact of Bankruptcy on Capital Structure

FIGURE 12-7 Capital Costs and Financial Leverage: The Moderate View, Considering Taxes and Financial Distress



Firm Value and Agency Costs

To ensure that agent-managers act in shareholders best interest, firms must:

1. Have proper incentives
2. Monitor decisions
   - bonding the managers
   - auditing financial statements
   - structuring the organization in unique ways that limit useful managerial decisions
   - reviewing the costs and benefits of management perquisites

The costs of the incentives and monitoring must be borne by the stockholders.

Managerial Implications

- Determining the firm's financing mix is critically important for the manager.
- The decision to maximize the market value of leveraged firm is influenced primarily by the present value of tax shield benefits, present value of bankruptcy costs, and present value of agency costs.

Dividends

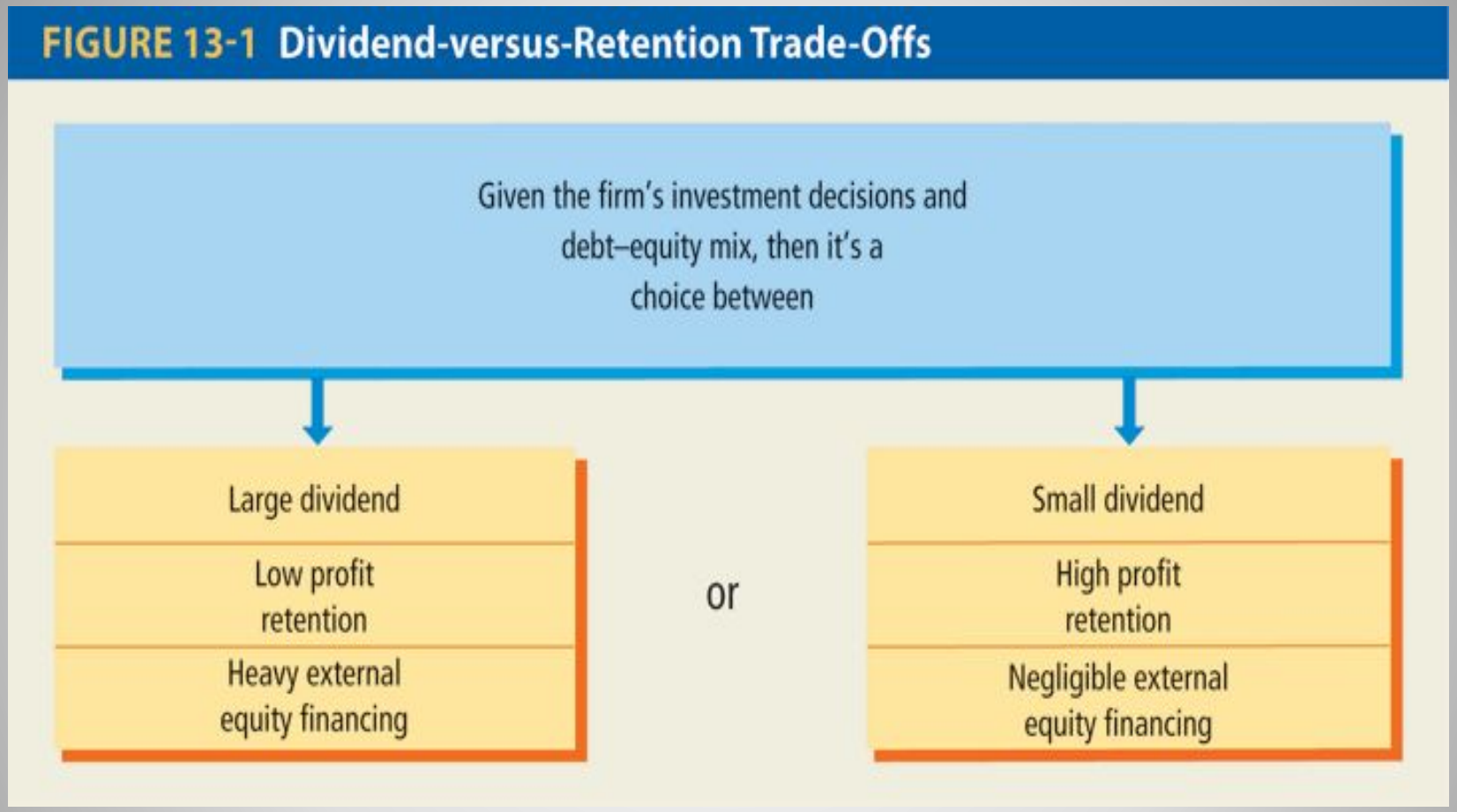
- Dividends are distribution from the firm's assets to the shareholders.
- Firms are not obligated to pay dividends or maintain a consistent policy with regard to dividends.
- Dividends could be paid in: cash or stocks

Dividend Policy

- A firm's dividend policy includes two components:
- Dividend Payout ratio
  - Indicates amount of dividend paid relative to the company's earnings.
  - Example: If dividend per share is $1 and earnings per share is $4, the payout ratio is 25% (1/4)
- Stability of dividends over time

Trade-Offs:

- If management has decided how much to invest and has chosen the debt-equity mix, decision to pay a large dividend means retaining less of the firm's profits. This means the firm will have to rely more on external equity financing.
- Similarly, a smaller dividend payment will lead to less reliance on external financing.



Dividend-versus-Retention Trade-Offs

DOES DIVIDEND POLICY MATTER TO STOCKHOLDERS?

- There are three basic views with regard to the impact of dividend policy on share prices:
  - Dividend policy is irrelevant
  - High dividends will increase share prices
  - Low dividends will increase share prices

- **Dividend policy is irrelevant**
  - Irrelevance implies shareholder wealth is not affected by dividend policy (whether the firm pays 0% or 100% of its earnings as dividends).
  - This view is based on two assumptions:

    (a) Perfect capital markets; and

    (b) Firm's investment and borrowing decisions have been made and will not be altered by dividend payment.

View #1

- **High dividends increase stock value**
  - This position in based on "bird-in-the-hand theory," which argues that investors may prefer "dividend today" as it is less risky compared to "uncertain future capital gains."
  - This implies a higher required rate for discounting a dollar of capital gain than a dollar of dividends.

View #2

- **Low dividend increases stock values**
  - In 2003, the tax rates on capital gains and dividends were made equal to 15 percent.
  - However, current dividends are taxed immediately while the tax on capital gains can be deferred until the stock is actually sold. Thus, using present value of money, capital gains have definite financial advantage for shareholders.
  - Thus stocks that allow tax deferral (i.e., low dividends and high capital gains) will possibly sell at a premium relative to stocks that require current taxation (i.e., high dividends and low capital gains).

View #3

- The Residual Dividend Theory
- Clientele Effect
- The Information Effect
- Agency Costs
- The Expectations Theory

Some Other Explanations

Residual Dividend Theory

- Determine the optimal capital budget
- Determine the amount of equity needed for financing
  - First, use retained earnings to supply this equity
  - If retained earnings still available, distribute the residual as dividends.

- Dividend Policy will be influenced by:
  (a) investment opportunities or capital budgeting needs, and
  (b) availability of internally generated capital.

The Clientele Effect

- Different groups of investors have varying preferences towards dividends.
- For example, some investors may prefer a fixed income stream so would prefer firms with high dividends while some investors, such as wealthy investors, would prefer to defer taxes and will be drawn to firms that have low dividend payout. Thus there will be a clientele effect.

The Information Effect

- Evidence shows that large, unexpected change in dividends can have a significant impact on the stock prices.
- A firm's dividend policy may be seen as a signal about firm's financial condition. Thus, high dividend could signal expectations of high earnings in the future and vice versa.

Agency Costs

- Dividend policy may be perceived as a tool to minimize agency costs.
- Dividend payment may require managers to issue stock to finance new investments. New investors will be attracted only if they are convinced that the capital will be used profitably. Thus, payment of dividends indirectly monitors management's investment activities and helps reduce agency costs, and may enhance the value of the firm.

The Expectations Theory

- Expectation theory suggests that the market reaction does not only reflect response to the firms actions, it also indicates investors' expectations about the ultimate decision to be made by management.
- Thus if the amount of dividend paid is equal to the dividend expected by shareholders, the market price of stock will remain unchanged. However, market will react if dividend payment is not consistent with shareholders expectations.
- Thus deviation from expectations is more important than actual dividend payment.

Conclusions on Dividend Policy

Here are some conclusions about the relevance of dividend policy:

1. As a firm's investment opportunities increase, its dividend payout ratio should decrease.
2. Investors use the dividend payment as a source of information of expected earnings.
3. Relationship between stock prices and dividends may exist due to implications of dividends for taxes and agency costs.
4. Based on expectations theory, firms should avoid surprising investors with regard to dividend policy.
5. The firm's dividend policy should effectively be treated as a long-term residual.

Legal Restrictions

- Statutory restrictions may prevent a company from paying dividends.
- Debt and preferred stock contracts may impose constraints on dividend policy.

Liquidity Constraints

- A firm may show large amount of retained earnings but it must have cash to pay dividends.

Earnings Predictability

- A firms with stable and predictable earnings is more likely to pay larger dividends.

Maintaining Ownership Control

- Ownership of common stock gives voting rights. If existing stockholders are unable to participate in a new offering, control of current stockholders is diluted and issuing new stock will be considered unattractive.

The Dividend Decision in Practice

The Dividend Decision in Practice – Alternative Dividend Policies

- Constant dividend payout ratio
  - The percentage of earnings paid out in dividends is held constant.
  - Since earnings are not constant, the dollar amount of dividend will vary every year.
- Stable dollar dividend per share
  - This policy maintains a relatively constant dollar of dividend every year.
  - Management will increase the dollar amount only if they are convinced that such increase can be maintained.

The Dividend Decision in Practice – Alternative Dividend Policies

- A small regular dividend plus a year-end extra
  - The company follows the policy of paying a small, regular dividend plus a year-end extra dividend in prosperous years.

Dividend Payment Procedures

- Generally, companies pay dividend on a quarterly basis. The final approval of a dividend payment comes from the firm's board of directors.
- For example, on February 6, 2009, GE announced that it would pay quarterly dividend of $0.31 each to its shareholders for 2009. The annual dividend would be $0.31*4 = $1.24 per share.

Important Dates

- Declaration date – The date when the dividend is formally declared by the board of directors (for example, February 6)
- Date of record – Investors shown to own stocks on this date receive the dividend (February 23)
- Ex-dividend date – Two working days prior to date of record (for example, February 19, since Feb. 23 was a Monday). Shareholders buying stock on or after ex-dividend date will not receive dividends.
- Payment date – The date when dividend checks are mailed (for example, April 27)

Stock Dividends

- A stock dividend entails the distribution of additional shares of stock in lieu of cash payment.
- While the number of common stock outstanding increases, the firm's investments and future earnings prospects do not change.

Stock Splits

- A stock split involves exchanging more (or less in the case of "reverse" split) shares of stock for firm's outstanding shares.
- While the number of common stock outstanding increases (or decreases in the case of reverse split), the firm's investments and future earnings prospects do not change.
- Stock splits and stock dividends are far less frequent than cash dividends.

Stock Repurchases

- A stock repurchase (stock buyback) occurs when a firm repurchases its own stock. This results in a reduction in the number of shares outstanding.
- From shareholder's perspective, a stock repurchase has potential tax advantage as opposed to cash dividends.

Stock Repurchase -- Benefits

- A means of providing an internal investment opportunity
- An approach for modifying the firm's capital structure
- A favorable impact on earnings per share
- The elimination of a minority ownership group of stockholders
- The minimization of the dilution in earnings per share associated with mergers
- The reduction in the firm's costs associated with servicing small stockholders

A Share Repurchase as a Dividend, Financing, Investment Decision

- When a firm repurchases stock when it has excess cash, it can be regarded as a *dividend decision*.
- If a firm issues debt and then repurchases stock, it alters the debt-equity mix and thus can be regarded as a *financing or capital structure decision*.
- If a firm repurchases stock because it feels the prices are depressed, the decision to repurchase may be seen as an *investment decision*. Of course, no company can survive or prosper by investing only its own stock!

Unsecured Sources: Trade Credit

- Trade credit arises spontaneously with the firm's purchases. Often, the credit terms offered with trade credit involve a cash discount for early payment.
- For example, the terms "2/10 net 30" means a 2% discount is offered for payment within 10 days, or the full amount is due in 30 days.
- In this case, a 2% penalty is involved for not paying within 10 days.

TABLE 15-3 The Rates of Interest on Selected Trade Credit Terms

Credit Terms	Effective Rates
2/10, net 60	14.69%
2/10, net 90	9.18
3/20, net 60	27.84
6/10, net 90	28.72

Effective Cost of Passing Up a Discount

- Ex.: Terms 2/10 net 30
- The equivalent *APR* of this discount is:

  APR = \$0.02/\$.98 × [1/(20/360)]
  = 0.3673 or 36.73%
- The effective cost of delaying payment for 20 days is 36.73%.

Unsecured Sources: Bank Credit

- Commercial banks provide unsecured short-term credit in two forms:
  - **Lines of credit**
  - **Transaction loans** (notes payable)

Line of Credit

- Informal agreement between a borrower and a bank about the maximum amount of credit the bank will provide the borrower at any one time.
- There is no legal commitment on the part of the bank to provide the stated credit.
- Banks usually require that the borrower maintain a minimum balance in the bank throughout the loan period (known as compensating balance).
- Interest rate on a line of credit tends to be floating.

Revolving Credit

- Revolving credit is a variant of the line of credit form of financing.
- A legal obligation is involved.

- A transaction loan is made for a specific purpose. This is the type of loan that most individuals associate with bank credit and is obtained by signing a promissory note.

Transaction Loans

Unsecured Sources: Commercial Paper

- The largest and most credit-worthy companies are able to use commercial paper—a short-term promise to pay that is sold in the market for short-term debt securities.
- Maturity: Usually 6 months or less.
- Interest Rate: Slightly lower (1/2 to 1%) than the prime rate on commercial loans.
- New issues of commercial paper are placed directly or dealer placed.

Commercial Paper: Advantages

- **Interest rates**
  - Rates are generally lower than rates on bank loans
- **Compensating-balance requirement**
  - No minimum balance requirements are associated with commercial paper
- **Amount of credit**
  - Offers the firm with very large credit needs a single source for all its short-term financing
- **Prestige**
  - Signifies credit status

Secured Sources of Loans

- Secured loans have assets of the firm pledged as collateral. If there is a default, the lender has first claim to the pledged assets. Because of its liquidity, accounts receivable is regarded as the prime source for collateral.
- **Accounts Receivable Loans**
  - Pledging Accounts Receivable
  - Factoring Accounts Receivable
- **Inventory Loans**

Pledging Accounts Receivable

- Borrower pledges accounts receivable as collateral for a loan obtained from either a commercial bank or a finance company.
- The amount of the loan is stated as a percentage of the face value of the receivables pledged.
- If the firm pledges a general line, then all of the accounts are pledged as security (simple and inexpensive).
- If the firm pledges specific invoices, each invoice must be evaluated for creditworthiness (more expensive).

Pledging Accounts Receivable

- Credit Terms: Interest rate is 2–5% higher than the bank's prime rate. In addition, handling fee of 1–2% of the face value of receivables is charged.
- While pledging has the attraction of offering considerable flexibility to the borrower and providing financing on a continuous basis, the cost of using pledging as a source of short-term financing is relatively higher compared to other sources.

Pledging Accounts Receivable

- Factoring accounts receivable involves the outright sale of a firm's accounts to a financial institution called a factor.
- A factor is a firm (such as commercial financing firm or a commercial bank) that acquires the receivables of other firms. The factor bears the risk of collection in exchange for a fee of 1–3 percent of the value of all receivables factored.

Secured Sources: Inventory Loans

- These are loans secured by inventories.
- The amount of the loan that can be obtained depends on the marketability and perishability of the inventory.

Types of Inventory Loans

Floating or Blanket Lien Agreement

- The borrower gives the lender a lien against all its inventories.

Chattel Mortgage Agreement

- The inventory is identified and the borrower retains title to the inventory but cannot sell the items without the lender's consent.

Field Warehouse-Financing Agreement

- Inventories used as collateral are physically separated from the firm's other inventories and are placed under the control of a third-party field-warehousing firm.

Terminal Warehouse Agreement

- Inventories pledged as collateral are transported to a public warehouse that is physically removed from the borrower's premises.

Working Capital

- Working capital - The firm's total investment in current assets.
- Net working capital - The difference between the firm's current assets and its current liabilities.

Managing Net Working Capital

- Managing net working capital is concerned with managing the firm's liquidity. This entails managing two related aspects of the firm's operations:

1. Investment in current assets
2. Use of short-term or current liabilities

- This question is addressed by hedging principle of working-capital management

How Much Short-Term Financing Should a Firm Use?

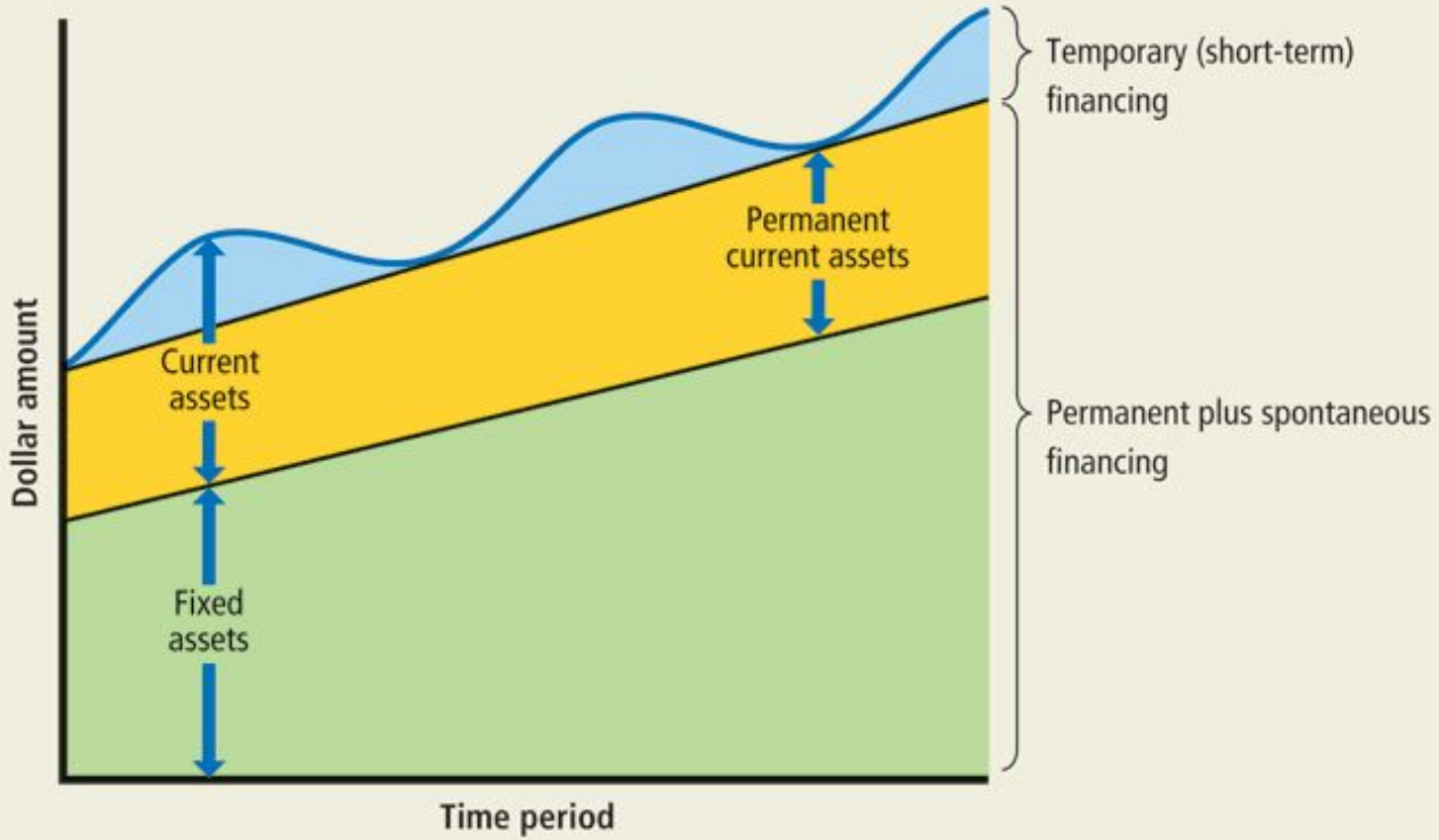
The Appropriate Level of Working Capital

- Managing working capital involves interrelated decisions regarding investments in current assets and use of current liabilities.
- Hedging principle or principle of self-liquidating debt provides a guide to the maintenance of appropriate level of liquidity.

The Hedging Principle

- The hedging principle involves matching the cash-flow-generating characteristics of an asset with the maturity of the source of financing used to finance its acquisition.
- Thus, a seasonal need for inventories should be financed with a short-term loan or current liability.
- On the other hand, investment in equipment that is expected to last for a long time should be financed with long-term debt.

FIGURE 15-1 The Hedging Principle Illustrated



Permanent and Temporary Assets

Permanent investments

- Investments that the firm expects to hold for a period longer than one year

Temporary investments

- Current assets that will be liquidated and not replaced within the current year

Temporary and Permanent Sources of Financing

- Temporary sources of financing consist of current liabilities such as short-term secured and unsecured notes payable.
- Permanent sources of financing include intermediate-term loans, long-term debt, preferred stock, and common equity.

TABLE 15-1 The Hedging Principle Applied to Working-Capital Management

A firm's asset needs that are not financed by spontaneous sources of financing should be financed in accordance with the following "matching rule" —permanent-asset investments are financed with permanent sources, and temporary-asset investments are financed with temporary sources of financing.

Classification of a Firm's Investments in Assets	Definitions and Examples	Classification of a Firm's Sources of Financing	Definitions and Examples
Temporary investments	*Definition*: Current assets that will be liquidated and not replaced within the year. *Examples*: Seasonal expansions in inventories and accounts receivable.	Spontaneous financing	*Definition*: Financing that arises more or less automatically in response to the purchase of an asset. *Examples*: Trade credit that accompanies the purchase of inventories and other types of accounts payable created by the purchase of services (for example, wages payable).
		Temporary financing	*Definition*: Current liabilities other than spontaneous sources of financing. *Examples*: Notes payable and revolving credit agreements that must be repaid in a period less than 1 year.
Permanent investments	*Definition*: Current and long-term asset investments that the firm expects to hold for a period longer than 1 year. *Examples*: Minimum levels of inventory and accounts receivable the firm maintains throughout the year as well as its investments in plant and equipment.	Permanent financing	*Definition*: Long-term liabilities not due and payable within the year and equity financing. *Examples*: Term loans, notes, and bonds as well as preferred and common equity.

The Cash Conversion Cycle

- A firm can minimize its working capital by speeding up collection on sales, increasing inventory turns, and slowing down the disbursement of cash. This is captured by the cash conversion cycle (CCC).
- CCC = days of sales outstanding + days of sales in inventory – days of payables outstanding.
- Figure 15-2 shows that both Dell and Apple have been effective in reducing their CCC.
- CCC is below zero due to effective management of inventories and being able to receive favorable credit terms.
- See Table 15-2 for Dell's CCC.

FIGURE 15-2 Cash Conversion Cycles for Apple and Dell: 1995–2005

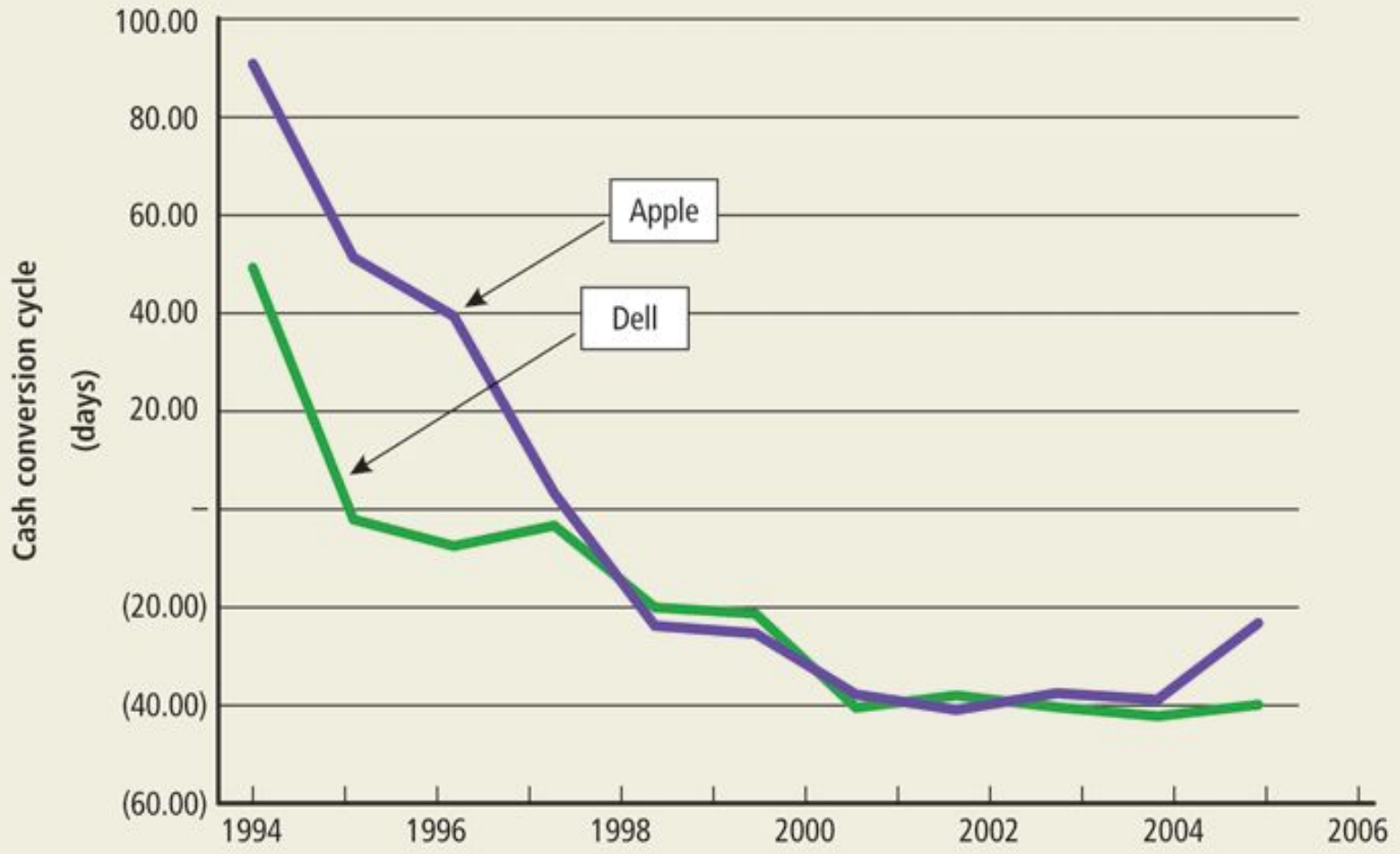


TABLE 15-2 The Determinants of Dell Computer Corporation's Cash Conversion Cycle for 1995–2005

Cash conversion cycle (CCC) = days of sales outstanding (DSO) + days of sales in inventory (DSI) − days of payables outstanding (DPO)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Days of sales outstanding (DSO)	50.04	42.48	44.00	49.64	38.69	33.14	26.57	26.66	32.01	32.74	35.59
Days of sales in inventory (DSI)	37.36	15.15	8.92	7.10	7.17	5.79	3.99	9.22	7.75	4.20	4.65
Days of payables outstanding (DPO)	40.58	62.79	62.87	62.34	64.92	62.07	72.87	75.79	79.41	81.46	79.41
Cash conversion cycle (CCC)	46.81	(5.15)	(9.96)	(5.60)	(19.06)	(23.14)	(42.30)	(39.90)	(39.64)	(44.51)	(39.17)

$$\text{Interest} = \text{principal} \times \text{rate} \times \text{time} \qquad (15\text{-}5)$$

$$APR = \frac{\text{interest}}{\text{principal} \times \text{time}} \qquad (15\text{-}6)$$

$$APR = \frac{\text{interest}}{\text{principal}} \times \frac{1}{\text{time}} \qquad (15\text{-}7)$$

Cost of Short-Term Credit

APR example

- A company plans to borrow $1,000 for 90 days. At maturity, the company will repay the $1,000 principal amount plus $30 interest. What is the *APR*?

  APR = ($30/$1,000) × [1/(90/360)]
  = 0.03 × (360/90)
  = **0.12 or 12%**

Annual Percentage Yield (*APY*)

- *APR* does not consider compound interest. To account for the influence of compounding, we must calculate *APY* or annual percentage yield.
- $APY = (1 + i/m)^m - 1$
- Where:

  i is the nominal rate of interest per year

  m is number of compounding periods within a year

APY example

- In the previous example,
  # of compounding periods 360/90 = 4
  Rate = 12%

- $APY = (1 + 0.12/4)^4 - 1$
  $= \mathbf{0.0126\% \text{ or } 12.6\%}$

- Because the differences between *APR* and *APY* are usually small, we can use the simple interest values of *APR* to compute the cost of short-term credit.

APR or *APY* ?