# Chapter 1 -- An Overview of Financial Management

- What is finance: cash flows between capital markets and firm's operations
- The goal of a firm
- Forms of business organization
- Intrinsic value and market price of a stock
- Important business trends
- Business ethics
- Agency problem
- Career opportunities in finance

- What is finance: cash flows between capital markets and firm's operations
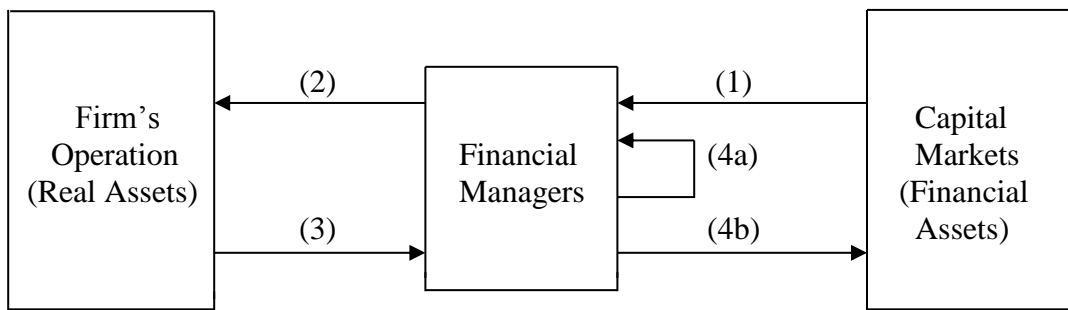
(1) Cash raised by selling financial assets in financial markets
(2) Cash invested in firm's operations and used to purchase real assets
(3) Cash generated from firm's operations
(4a) Cash reinvested in firms' operations
(4b) Cash returned to investors

Financing decisions vs. investment decisions: raising money vs. allocating money
Activity (1) is a financing decision
Activity (2) is an investment decision
Activities (4a) and (4b) are financing decisions

The role of a financial manager
Forecasting and planning of firms' financial needs
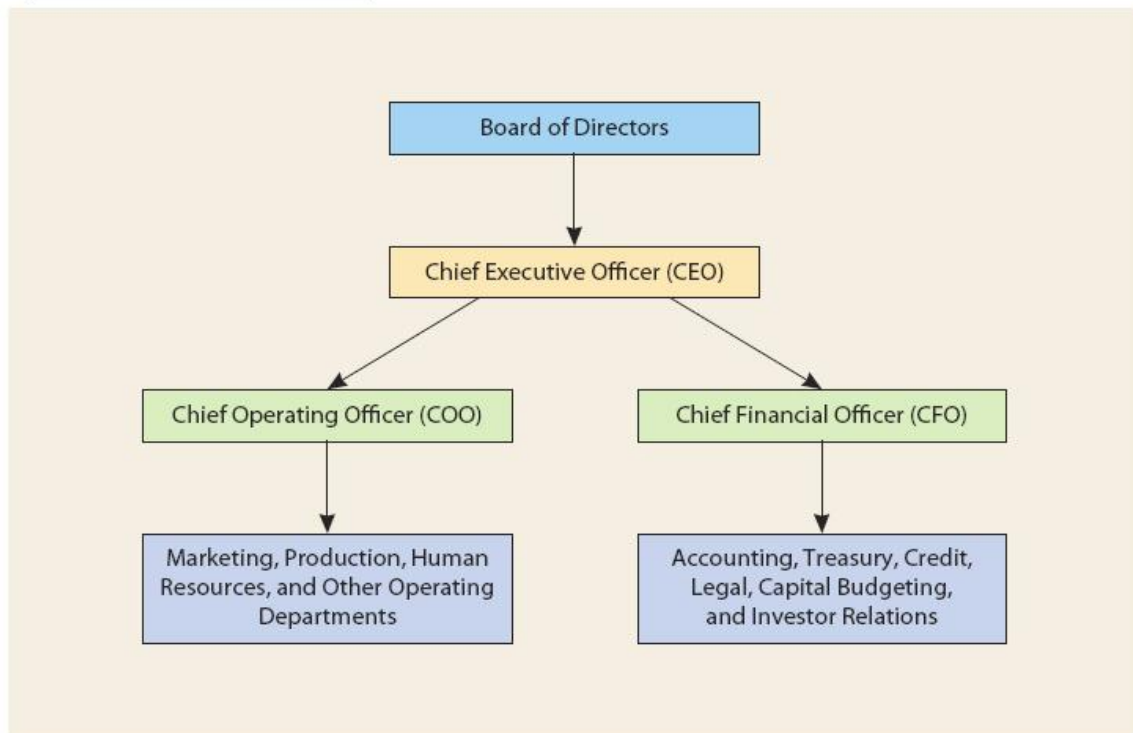Making financing and investment decisions
Coordinating with other departments/divisions
Dealing with financial markets
Managing risks

Finance within an organization: importance of finance

FIGURE 1-1   Finance within an Organization

Board of Directors
↓
Chief Executive Officer (CEO)
↓   ↓
Chief Operating Officer (COO)   Chief Financial Officer (CFO)
↓   ↓
Marketing, Production, Human   Accounting, Treasury, Credit,
Resources, and Other Operating   Legal, Capital Budgeting,
Departments   and Investor Relations

Finance includes three areas
(1) Financial management: corporate finance, which deals with decisions related to how much and what types of assets a firm needs to acquire, how a firm should raise capital to purchase assets, and how a firm should do to maximize its shareholders wealth - the focus of this class

(2) Capital markets: study of financial markets and institutions, which deals with interest rates, stocks, bonds, government securities, and other marketable securities. It also covers Federal Reserve System and its policies.

(3) Investments: study of security analysis, portfolio theory, market analysis, and behavioral finance

- The goal of a firm
    To maximize shareholder's wealth (or firm's long-run value)
    Why not profit or EPS maximization?
    Profit maximization usually ignores timing and risk of cash flows
    EPS sometimes can be manipulated or misleading

- Forms of business organization
    Proprietorship: an unincorporated business owned by one individual
    Advantages:
    Easy and inexpensive to form
    Subject to less government regulations
    Lower income taxes

    Disadvantages:
    Unlimited personal liability
    Limited lifetime of business
    Difficult to raise capital

    Partnership: an unincorporated business owned by two or more people
    Advantages vs. disadvantages: similar to those of proprietorship, in general

    Corporation: legal entity created by a state
    Advantages:
    Limited liability
    Easy to transfer the ownership
    Unlimited lifetime of business
    Easy to raise capital

    Disadvantages:
    Double taxation (at both corporate and individual levels)
    Cost of reporting

    S Corporation: allows small business to be taxed as proprietorship or partnership
    Restrictions: no more than 100 shareholders; for small and privately owned firms

    Limited Liability Company (LLC) and Limited Liability Partnership (LLP):
    Hybrid between a partnership and a corporation - limited liability but taxed as
    partnership

    LLPs are used in professional fields of accounting, law, and architecture while
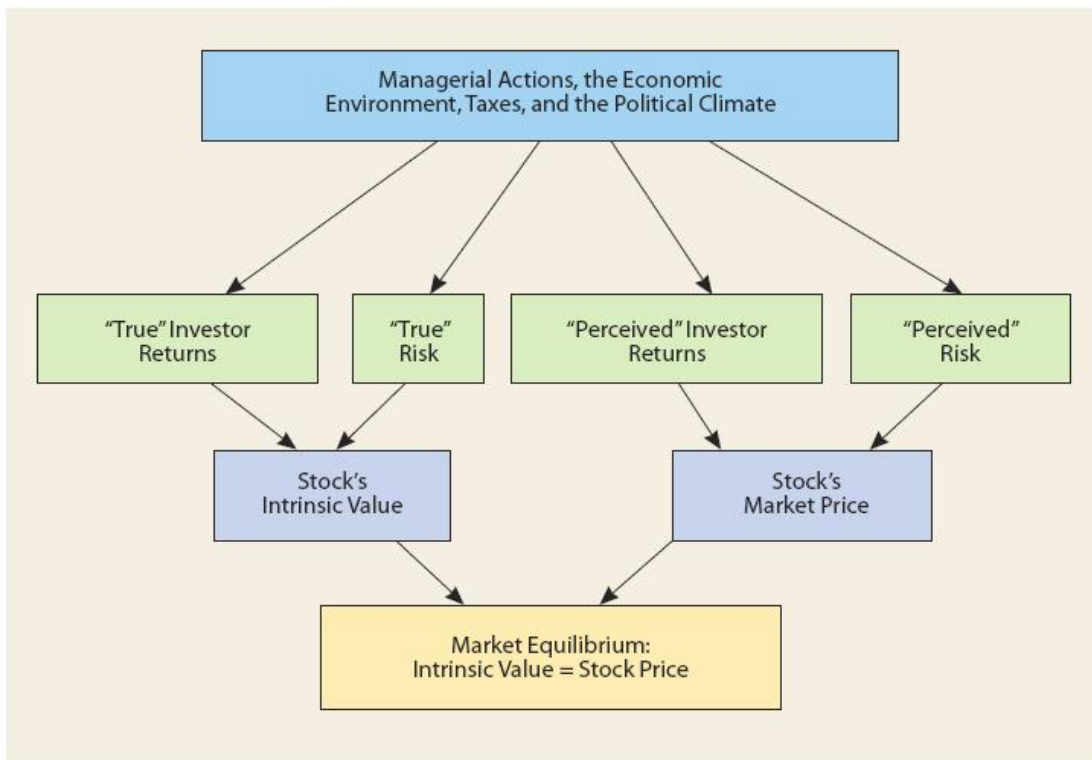   LLCs are used by other businesses

- Intrinsic value and market price of a stock
    Intrinsic value is an estimate of a stock's "fair" value (how much a stock should
    be worth)

    Market price is the actual price of a stock, which is determined by the demand and
    supply of the stock in the market

Determinants of intrinsic value and stock price

FIGURE 1-2 Determinants of Intrinsic Values and Stock Prices

Managerial Actions, the Economic Environment, Taxes, and the Political Climate

"True" Investor Returns | "True" Risk | "Perceived" Investor Returns | "Perceived" Risk

Stock's Intrinsic Value | Stock's Market Price

Market Equilibrium:
Intrinsic Value = Stock Price

Intrinsic value is supposed to be estimated using the "true" or accurate risk and return data. However, since sometimes the "true" or accurate data is not directly observable, the intrinsic value cannot be measured precisely.

Market value is based on perceived risk and return data. Since the perceived risk and return may not be equal to the "true" risk and return, the market value can be mispriced as well.

Stock in equilibrium: when a stock's market price is equal to its intrinsic value the stock is in equilibrium

Stock market in equilibrium: when all the stocks in the market are in equilibrium (i.e. for each stock in the market, the market price is equal to its intrinsic value) then the market is in equilibrium

Actual prices vs. intrinsic values

FIGURE 1-3   Graph of Actual Prices versus Intrinsic Values
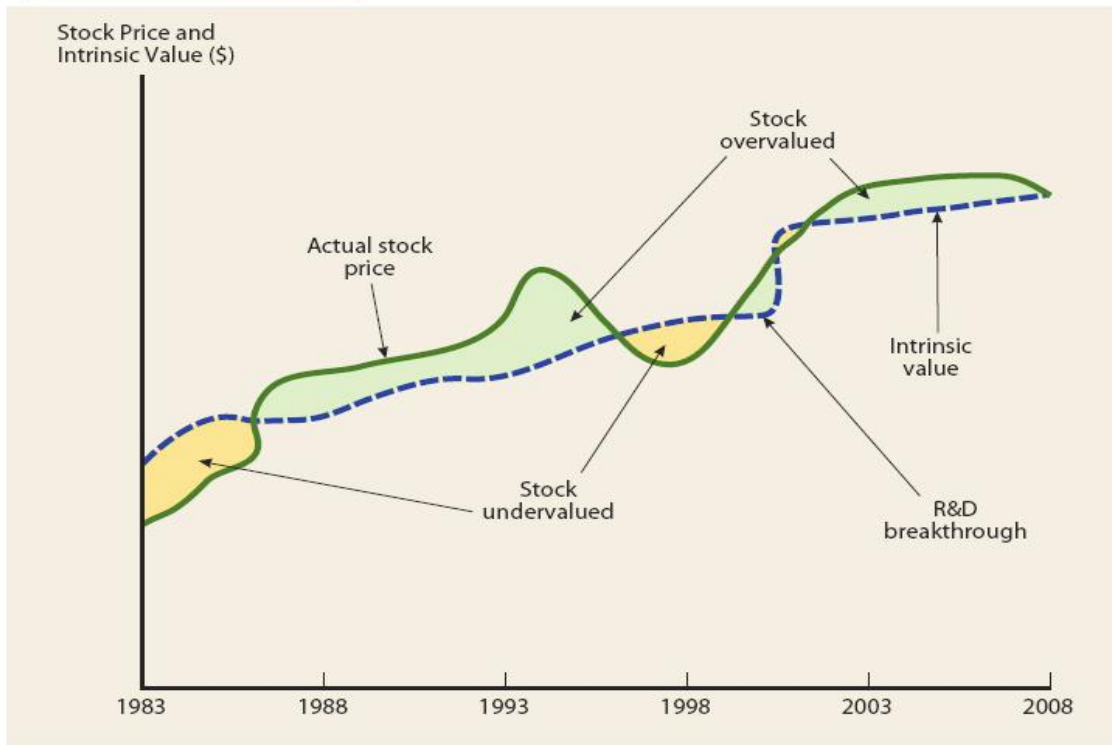
When the intrinsic value of a stock is higher than the market price of the stock, we say that the stock in the market is under-valued (under-priced)
For example, if the intrinsic value for a stock is $26 and the market price is $25, then the stock is under-valued.

When the intrinsic value of a stock is lower than the market price of the stock, we say that the stock in the market is over-valued (over-priced)
For example, if the intrinsic value for a stock is $30 and the market price is $32, then the stock is over-valued.

When the intrinsic value of a stock is equal to the market price of the stock, we say that the stock in the market is fairly priced (the stock is in equilibrium)

- Important business trends
    Globalization
    Improving information technology
    Corporate governance

- Business ethics

    Standards of conduct or moral behavior toward its employees, customers, community, and stockholders - all its stakeholders

    Measurements: tendency of its employees, adhere to laws and regulations, moral standards to product safety and quality, fair employment practice, fair marketing and selling practice, proper use of confidential information, community involvement, and no illegal payments or practice to obtain business

- Agency problem

    A potential conflict of interest between two groups of people

    Stockholders vs. managers
    Instead of shareholders' wealth maximization, managers may be interested in their own wealth maximization
    Incentives:
    Performance shares, executive stock options (positive)
    Threat of firing, hostile takeover (negative)

    Stockholders vs. bondholders
    Stockholders prefer high-risk projects for higher returns
    Bondholders receive fixed payment and therefore prefer lower risk projects

- Career opportunities in finance
    Banking
    Investments
    Insurance
    Corporations
    Government

- **Exercise**
    ST-1
    Questions: 1-8

Chapter 2 -- Financial Markets and Institutions

- Capital allocation process
- Financial markets
- Financial institutions
- The stock market and stock returns
- Stock market efficiency

- Capital allocation process
  The process of capital flows from those with surplus capital to those who need it

  Three types of transfer
  (1) Direct transfer: a business sells its security directly to investors
  (2) Indirect transfer through an investment banker: a business sells its security to an investment banker, which in turn sells the same security to individual investors
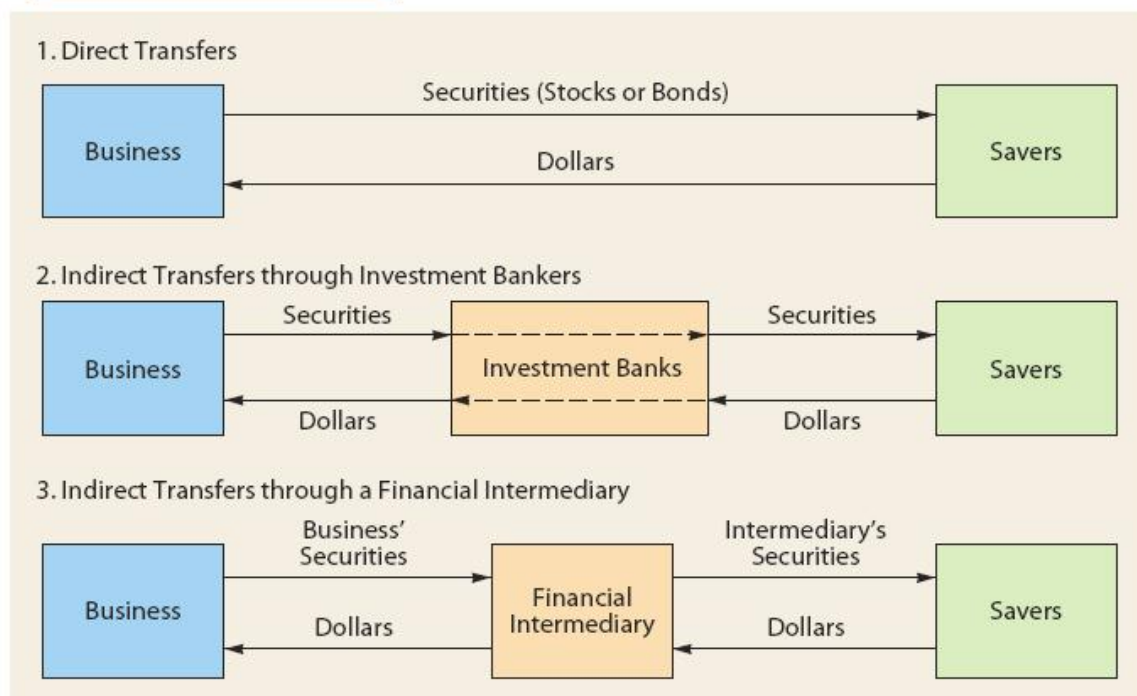 (3) Indirect transfer through a financial intermediary: a financial intermediary obtains funds from investors by offering its own securities and uses funds to buy other business securities

  Capital formation process

FIGURE 2-1 Diagram of the Capital Formation Process

1. Direct Transfers
   Business → Securities (Stocks or Bonds) → Savers
   Business ← Dollars ← Savers

2. Indirect Transfers through Investment Bankers
   Business → Securities → Investment Banks → Securities → Savers
   Business ← Dollars ← Investment Banks ← Dollars ← Savers

3. Indirect Transfers through a Financial Intermediary
   Business → Business' Securities → Financial Intermediary → Intermediary's Securities → Savers
   Business ← Dollars ← Financial Intermediary ← Dollars ← Savers

- Financial markets

    Physical asset market vs. financial asset markets
    Physical asset markets are markets for real (or tangible) assets
    Financial asset markets are markets for financial assets - focus of this class

    Money markets vs. capital markets
    Money markets are markets for short-term and highly liquid debt securities (less than one year)
    Capital markets are markets for intermediate and long-term debts and stocks (one year or longer)

    Primary markets vs. secondary markets
    Primary markets are markets for issuing new securities
    Secondary markets are markets for trading existing securities

    Spot markets vs. futures markets
    Spot markets are markets for immediate delivery
    Futures markets are markets for future delivery even though the deal is made today

    Private markets vs. public markets
    In private markets: transactions are negotiated directly between two parties
    Public markets: standardized contracts are traded on organized exchanges

    Derivative markets: for derivative securities
    A derivative security is a security whose value is derived from the value of an underlying asset. For example, futures contracts and option contracts

    Why do we need financial markets?
    Bring borrowers and lenders together to exchange needs

- Financial institutions

    Investment banks (investment banking houses): specialized in underwriting and distributing new securities, such as Merrill Lynch (acquired by BOA)

    The role of investment bankers: underwriters
    Design securities with features that are attractive to investors
    Buy these securities from the issuing firm
    Resell these securities to individual investors

    Public offering vs. private placement
    Public offering: a security offering to all investors
    Private placement: a security offering to a small number of potential investors

Commercial banks: provide basic banking and checking services, such as BOA

Financial service corporations: large conglomerates that combine different financial institutions into a single corporation, such as Citigroup

S&Ls, credit unions

Life insurance companies

Pension funds

Mutual funds: sell themselves to investors and use funds to invest in securities

Exchange traded funds (ETFs): mutual funds but traded like stocks

Hedge funds: similar to mutual funds with few restrictions

- The stock market and stock returns
  Organized markets vs. over-the-counter (OTC) markets

  Organized markets (exchanges) have physical locations, such as NYSE
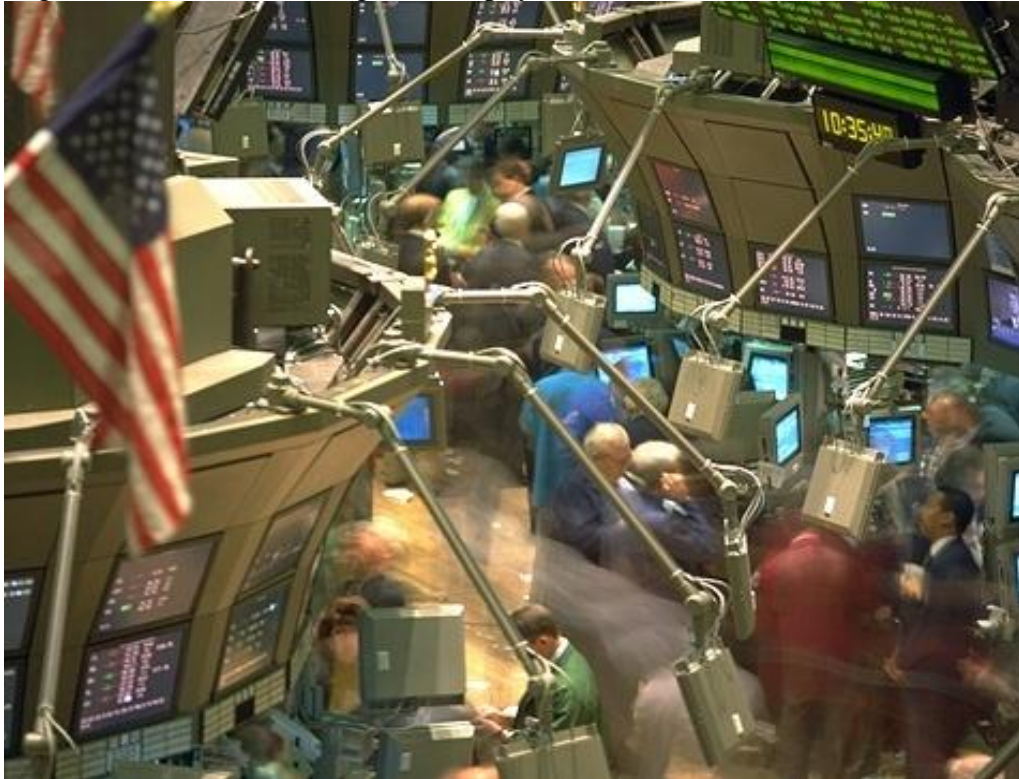
  OTC markets are connected by computer network with many dealers and brokers, such as NASDAQ

Auction markets vs. dealer markets
Organized markets are auction markets
OTC markets are dealer markets

IPO markets: markets for initial public offerings

Stock market transactions (three types)
(1) Trading outstanding (existing) shares takes place in a secondary market
(2) Selling additional shares by a publicly owned firm takes place in a primary market
(3) Selling shares to the public for the first time by a privately owned firm takes place in a primary market (IPO market)

Stock market reporting

GlaxoSmithKline PLC Common Stoc (NYSE: GSK)
Real-Time: 39.15 ↑0.29 (0.75%) 2:17pm ET

Last Trade:	39.11	Day's Range:	39.08 - 39.34
Trade Time:	2:09PM ET	52wk Range:	28.67 - 43.47
Change:	↑0.25 (0.64%)	Volume:	1,226,448
Prev Close:	38.86	Avg Vol (3m):	2,053,160
Open:	39.30	Market Cap:	99.21B
Bid:	N/A	P/E (ttm):	47.42
Ask:	N/A	EPS (ttm):	0.82
1y Target Est:	42.06	Div & Yield:	2.29 (5.90%)

GSK   Apr 9, 2:06pm EDT

Stock Symbol (GSK)
Prev close: closing price yesterday was $38.86
Change: change from the last trading price and the yesterday' closing price is
$0.25 = $39.11 - $38.86
Volume: trading volume up to 2:09 PM ET is 1,226,448 shares
Avg Vol (3m): average daily trading volume over the past 3 months is 2,053,160 shares
52 wk Range: range of the highest and lowest prices for GSK in the past 52 weeks ($28.67 - $43.47)
Day's Range: range of the highest and lowest prices for GSK for the day ($39.08 - $39.34)
Div & Yield: annual dividend and dividend yield ($2.29 is the annual dividend, or $0.5725 per share last quarter) and dividend yield is 5.9% (2.29/38.86 = 5.90%)
P/E (ttm): price to earnings (in the past 12 months) ratio is 47.42 (38.86/0.82)
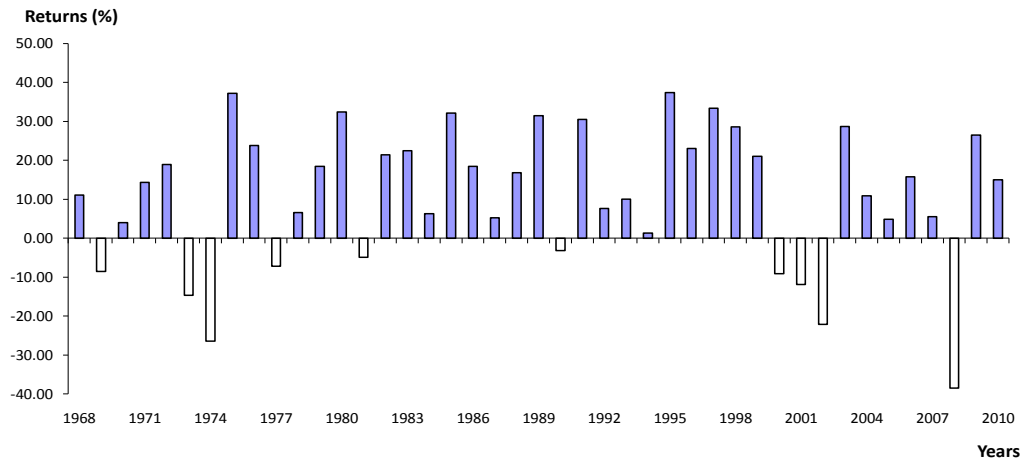
Stock market returns
Expected return: return expected to be realized, which is always positive

Realized return: actual return received, which can be either positive or negative

Measuring the stock market: DJIA, S&P 500 index, NASDAQ composite index

Realized S&P 500 total returns, 1968 - 2010

S&P 500 Index, Total Returns: Dividend Yield + Capital Gain or Loss, 1968-2010

Realized stock market returns and risks, 1926 - 2007

Types of Stocks	Average Return	Standard Deviation (Risk)
Small-stocks	17.1%	32.6%
Large-stocks	12.3%	20.0%
Long-term corporate bonds	6.2%	8.4%
Long-term government bonds	5.8%	9.2%
U.S. Treasury bills	3.8%	3.1%

Positive risk-return relationship: the higher the risk, the higher the average return

- Stock market efficiency

    Efficient market: prices of securities in the market should fully and quickly reflect all available information, which means that market prices should be close to intrinsic values (market in equilibrium)

    Levels of market efficiency
    Weak-form efficiency - stock prices already reflect all information contained in the history of past price movements (only past prices, volumes, and returns)

    Semistrong-form efficiency - stock prices already reflect all publicly available information in the market (only past publicly available information)

    Strong-form efficiency - stock prices already reflect all available information in the market, including inside information (all public and private information)
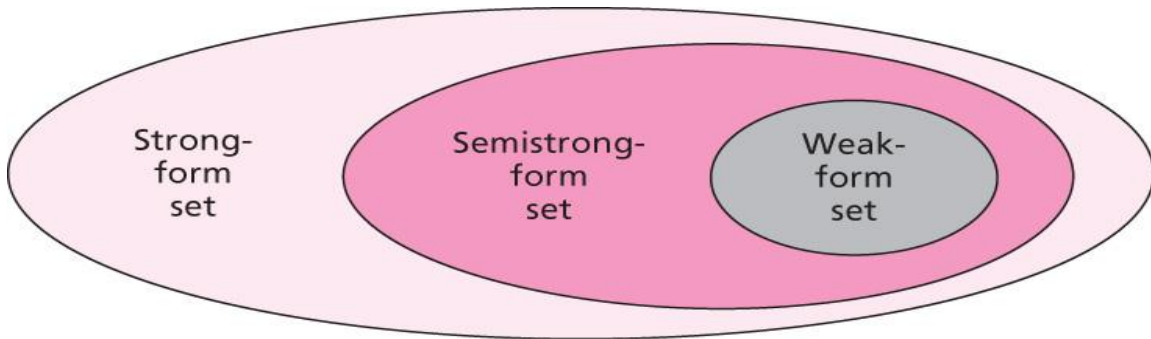
    Where is the market today?
    Less efficient   More efficient
    Small firms with less   Large firms with more
    coverage and contact   coverage and contact

- **Exercise**

    ST-1
    Questions: 2, 3, 4, and 7

    Example: investors expect a company to announce a 10% increase in earnings; instead, the company announces a 3% increase. If the market is semi-strong form efficient, which of the following would you expect to happen?   (b)

    a. The stock's price will increase slightly because the company had a slight increase in earnings.
    b. The stock's price will fall because the increase in earnings was less than expected.
    c. The stock's price will stay the same because earnings announcements have no effect if the market is semi-strong form efficient.

Chapter 3 -- Financial Statements, Cash Flow, and Taxes

- Financial statements and reports
- Basic financial statements
- Free cash flow
- MVA and EVA
- Income taxes

- Financial statements and reports
    Annual report
    A report issued annually to shareholders that contains:

    (1) Verbal statements: explain what happened and why; offer future prospects

    (2) Financial statements:
        Balance sheet
        Income statement
        Cash flow statement
        Shareholder's equity statement

    Importance of financial statements and reports
        To investors: provide valuable information regarding the firm
        To managers: for internal control and financial planning

- Basic financial statements
    (1) Balance sheet: a statement of a firms' financial position at a point in time

Cash & marketable securities	Accounts payable (A/P)
Accounts receivable (A/R)	Accrued wages and taxes (Accruals)
Inventory	Notes payable
----------------------------------	--------------------------------------
Current assets	Current liabilities ⎤
+	+ ⎬ Total liabilities
Net fixed assets	Long-term debt ⎦
+	+
Other assets	Common equity (c/s and R/E)
----------------------------------	--------------------------------------
Total assets =	Total liabilities and equity

    Note: Current liabilities + long-term debt = total liabilities
           Common equity (Shareholder's equity) = total assets - total liabilities
           Common equity = common stock (c/s) + retained earnings (R/E)
                         = paid-in capital + retained earnings
           Retained earnings are cumulative, assuming no preferred stocks
    Working capital: refers to current assets

Net working capital = current assets - current liabilities

Net operating working capital = current assets - (current liabilities - notes payable)

Market value vs. book value
Market value = the actual market price
Book value = (common equity) / (# of shares outstanding)

Table 3.1: Allied Food Product Balance Sheets

(2) Income statement: a report summarizing a firm's revenues, expenses, and profits during a reporting period

<div align="center">

Sales
- Operating cost except depreciation and amortization

EBITDA
- Depreciation and amortization

Earnings before interest and taxes (EBIT)
- Interest expenses

Earnings before Tax (EBT)
- Income tax

Net income (NI)

</div>

NI can be used for cash dividend and/or retained earnings

Commonly used terms:
Earnings per share (EPS) = NI / number of shares outstanding
Dividend per share (DPS) = cash dividend / number of shares outstanding
Dividend payout ratio = cash dividend / NI
Retention ratio = retained earnings / NI

Table 3.2: Allied Food Products Income Statements

(3) Cash flow statement: a report showing how things affect the balance sheet and income statement will affect the firm's cash flows
Cash flow statement has four sections: operating, long-term investing, financing activities, and summary on cash flows over an accounting period

Table 3.3: Allied Food Products Cash Flow Statements

(4) Shareholder's equity statement
Last year's end balance
Add this year's R/E = NI - Common stock cash dividend
This year's end balance

Table 3.4: Allied Food Products Statement of Stockholders' Equity

- Free cash flow
  Accounting profit vs. cash flow
  Accounting profit is a firm's net income reported on its income statement.

  Net cash flow is the actual net cash that a firm generates during a specified period.

  Net cash flow = NI + depreciation and amortization

  Free cash flow: a mount of cash available for payments to all investors, including stockholders and debt-holders after investments to sustain ongoing operations

  $FCF = EBIT*(1-T) + \text{depreciation and amortization} - (\text{capital expenditures} + \Delta \text{ in net working capital})$

- MVA and EVA
  MVA stands for market value added, which is the excess of the market value of equity over its book value

  EVA stands for economic value added, which is the excess of net operating profit after tax (NOPAT) over capital costs

  $NOPAT = EBIT*(1-T)$
  Capital costs = total investor-supplied operating capital*after-tax cost of capital

  Problem 3-5: MVA calculation
  $500 million of common equity, stock price is $60 per share, market value added is $130 million. How many shares are outstanding?
  Answer: (500 +130)/60 = 10.5 million shares

Problem 3-6: MVA calculation
Shareholders' equity = $35,000,000, number of shares outstanding = 2,000,000 shares, stock price = $30 per share, what is MVA?
Answer: market value of stock = 30*2,000,000 = $60,000,000
MVA = 60,000,000 - 35,000,000 = $25,000,000

- Income taxes
  Progressive tax rate system: the tax rate is higher on higher income

  Taxable income: gross income minus exceptions and allowable deductions as set forth in the Tax Code or the income that is subject to taxes

  Marginal tax rate: the tax rate applicable to the last dollar made
  Average tax rate: taxes paid divided by total taxable income

  Personal income tax:
  Interest income: taxed as ordinary income
  Dividend income: was taxed as ordinary income (currently is taxed at a maximum of 15%, will increase after 2012)
  Capital gains (short-term, less than a year): taxed as ordinary income
  Capital gains (long-term, more than a year): taxed at a maximum of 15% (will increase after 2012)
  Capital losses are tax deductible up to $3,000 or to offset capital gains

  Equivalent pre-tax yield vs. after tax return
  Equivalent pre-tax yield = tax-free return / $(1 - T)$
  After tax return = before tax return $(1 - T)$

  Example: suppose your marginal tax rate is 28%. Would you prefer to earn a 6% taxable return or 4% tax-free return? What is the equivalent taxable yield of the 4% tax-free yield?

  Answer: 6%*(1-28%) = 4.32%   or   4% / (1-28%) = 5.56%
  You should prefer 6% taxable return because you get a higher return after tax, ignoring the risk

  Corporate income tax:
  Interest income is taxed as ordinary income
  Interest expenses are tax deductible
  Dividend income is 70% tax-exempt (70% dividend exclusion)
  Dividend paid is not tax deductible
  Capital gains are taxed as ordinary income
  Capital losses can only offset capital gains (carry back for 3 years or carry forward for 5 years)

Operating losses can offset taxable income (carry back for 2 years or carry forward for 20 years)

Deprecation: plays an important role in income tax calculation - the larger the depreciation, the lower the taxable income, the lower the tax bill

Depreciation methods:
Straight-line method
Double-declining balance method
Modified accelerated cost recovery system (MACRS)

Example:	Corporate tax calculation	
	Sales	$4,500,000
	OC excluding depreciation	(3,000,000)
	Depreciation	(1,000,000)
	Operating income	$ 500,000
	Interest income	10,000
	Dividend income $10,000	3,000 (because 70% exclusion)
	Interest payment	(200,000)
	Capital gains	20,000
	Total taxable income	$ 333,000

Table 3-6

Corporate Tax Rates as of January 2008

If a Corporation's Taxable Income Is	It Pays This Amount on the Base of the Bracket	Plus This Percentage on the Excess over the Base (Marginal Rate)	Average Tax Rate at Top of Bracket
Up to $50,000	$ 0	15%	15.0%
$50,000–$75,000	7,500	25	18.3
$75,000–$100,000	13,750	34	22.3
$100,000–$335,000	22,250	39	34.0
$335,000–$10,000,000	113,900	34	34.0
$10,000,000–$15,000,000	3,400,000	35	34.3
$15,000,000–$18,333,333	5,150,000	38	35.0
Over $18,333,333	6,416,667	35	35.0

[16] On December 26, 2007, President Bush signed legislation that (1) increases the AMT exemption amounts for 2007 to $44,350 for single taxpayers and $66,250 for joint filers and (2) allows taxpayers to take several tax credits for AMT purposes through 2007.

Total tax = 22,250 + (333,000 – 100,000) * (0.39) = $113,120
Marginal tax rate = 39%; Average tax rate = (113,120 / 333,000) = 33.97%

- **Exercise**
  ST-1 and ST-2
  Problems: 1, 2, 3, 4, 8, and 9

Chapter 4 -- Financial Statement Analysis

- Financial ratio analysis
- Du Pont equations
- Benchmarking
- Trend analysis
- Limitations in ratio analysis
- Looking beyond the numbers

- Financial ratio analysis

  Evaluating a firm's financial statement to predict the firm's future performance

  (1) Liquidity ratios: show a firm's ability to pay off short-term debt (the relationship of a firm's cash and other current assets to its current liabilities)

  Current ratio = current assets / current liabilities

  Quick ratio (acid test ratio) = (current assets - inventory) / current liabilities

  Questions:
  Is it always good to have a very high current or quick ratio?
  What would happen if they were very low?
  Why would you like to keep current and quick ratios close to industry averages?

  (2) Asset management ratios: measure how effectively a firm manages its assets

  Inventory turnover = sales / inventory

  Days Sales Outstanding (DSO) = account receivables / average daily sales

  Fixed asset turnover = sales / net fixed assets

  Total asset turnover = sales / total assets

  Firms want to increase turnover ratios and keep DSO as low as possible

  (3) Debt management ratios: show how the firm has financed its assets as well as the firm's ability to pay off its long-term debt (how effectively a firm manages its debt)

  Using debt has tax benefit (interests on debt are tax deductible). On the other hand, too much debt increases the firm's risk of being bankruptcy.

Effect of Financial Leverage (effect of using debt)

Table 4-1	Effects of Financial Leverage on Stockholder Returns

FIRM U [UNLEVERAGED (NO DEBT)]

Current assets	$ 50	Debt	$ 0
Fixed assets	50	Common equity	100
Total assets	$100	Total liabilities and equity	$100

	STATE OF THE ECONOMY		
	Good	Expected	Bad
Sales revenues	$150.0	$100.0	$75.0
Operating costs Fixed	45.0	45.0	45.0
Variable	60.0	40.0	30.0
Total operating costs	105.0	85.0	75.0
Operating income (EBIT)	$ 45.0	$ 15.0	$ 0.0
Interest (Rate = 10%)	0.0	0.0	0.0
Earnings before taxes (EBT)	$ 45.0	$ 15.0	$ 0.0
Taxes (Rate = 40%)	18.0	6.0	0.0
Net income (NI)	$ 27.0	$ 9.0	$ 0.0
ROE_U	27.0%	9.0%	0.0%

FIRM L [LEVERAGED (SOME DEBT)]

Current assets	$ 50	Debt	$ 50
Fixed assets	50	Common equity	50
Total assets	$100	Total liabilities and equity	$100

	STATE OF THE ECONOMY		
	Good	Expected	Bad
Sales revenues	$150.0	$100.0	$75.0
Operating costs Fixed	45.0	45.0	45.0
Variable	60.0	40.0	30.0
Total operating costs	105.0	85.0	75.0
Operating income (EBIT)	$ 45.0	$ 15.0	$ 0.0
Interest (Rate = 10%)	5.0	5.0	5.0
Earnings before taxes (EBT)	$ 40.0	$ 10.0	−$ 5.0
Taxes (Rate = 40%)	16.0	4.0	0.0
Net income (NI)	$ 24.0	$ 6.0	−$ 5.0
ROE_L	48.0%	12.0%	−10.0%

Debt ratio = total debt / total assets

Times interest earned (TIE) = operating income (EBIT) / interest expenses
The higher the TIE, the better

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(4) Profitability ratios: show how profitable a firm is operating and utilizing its assets (shows the combined effects)

Operating profit margin = EBIT / sales

Profit margin = net income / sales

Return on assets (ROA) = net income / total assets

Basic earnings power (BEP) = EBIT / total assets

Return on equity (ROE) = net income / common equity

The higher the returns, the better the performance

(5) Market value ratios: relate stock price to earnings and book value and show what investors think about the firm and its future prospects

Price / earnings ratio (P/E ratio) = price per share / earnings per share

Market / book ratio = market price / book value

- Du Pont equations
  ROA = net income / total assets = (net income / sales) * (sales / total assets)
  = profit margin* total assets turnover

  In order to increase ROA, firms can try to improve profit margin and/or total asset turnover

  ROE = net income / common equity
  = (net income / sales)* (sales / total assets) * (total assets / common equity)
  = profit margin * total assets turnover * equity multiplier

  In order to increase ROE, firms can try to improve profit margin and/or total asset turnover and/or equity multiplier

  Example 1: Problem 4-10
  Given ROA = 3%, ROE = 5%, total assets turnover = 1.5x

  Questions:
  What is profit margin? Answer = 2%
  What is debt ratio? Answer = 40%

Example 2: Problem 4-13
Given ROE was 3% last year; management developed a plan to raise debt ratio to 60% with interest charges of $300,000; it expects EBIT of $1,000,000 on sales of $10,000,000 and a total asset turnover of 2; marginal tax rate is 34%

Question:
What should be new ROE?
Answer: NI = (1,000,000 – 300,000) * (1 – 0.34) = $462,000
           Profit margin = NI / Sales = 462,000 / 10,000,000 = 4.62%
           Debt ratio = 60% = 3/5, then EM = 5/2
           New ROE = profit margin * total asset turnover * EM
                       = 4.62% * 2 * (5/2) = 23.1%

- Benchmarking
  The process of comparing a particular company with a set of benchmark companies

Table 4-4	Benchmark Companies Ranked by ROE			
	ROE	= Profit Margin	× Turnover	× Equity Multiplier
Campbell Soup	59.4%	10.3%	1.1	5.24
H.J. Heinz	39.3	8.8	0.9	4.96
Hershey Foods	33.6	4.3	1.2	6.51
Sara Lee	21.9	4.8	1.1	4.15
Dean Foods	17.4	1.6	1.6	6.80
Flowers Foods	15.5	4.8	2.2	1.47
Allied Foods	**12.5**	**3.9**	**1.5**	**2.13**
Del Monte Foods	8.0	3.2	0.7	3.57
Averages	25.9%	5.2%	1.3	4.35
Averages for entire food industry	26.8%	10.5%	1.1	2.32

Note: Rounding causes some variations in the numbers.
Source: Data on the benchmark companies were obtained from http://moneycentral.msn.com, February 11, 2008. Similar data can be obtained from Yahoo, Google, and a number of other online and print sources.

By decomposing ROE into a product of three independent ratios, we can see why Allied Food has a low ROE and how the firm can improve it.

Main problems: profit margin and equity multiplier are too low, compared with industry peers

Comparing a particular company with industrial averages

Table 4-3	Allied Food Products: Summary of Financial Ratios (Millions of Dollars)				
Ratio	Formula	Calculation	Ratio	Industry Average	Comment
Liquidity					
Current	$\dfrac{\text{Current assets}}{\text{Current liabilities}}$	$\dfrac{\$1,000}{\$310}$	= 3.2×	4.2×	Poor
Quick	$\dfrac{\text{Current assets} - \text{Inventories}}{\text{Current liabilities}}$	$\dfrac{\$385}{\$310}$	= 1.2×	2.2×	Poor
Asset Management					
Inventory turnover	$\dfrac{\text{Sales}}{\text{Inventories}}$	$\dfrac{\$3,000}{\$615}$	= 4.9×	10.9×	Poor
Days sales outstanding (DSO)	$\dfrac{\text{Receivables}}{\text{Annual sales/365}}$	$\dfrac{\$375}{\$8.2192}$	= 46 days	36 days	Poor
Fixed assets turnover	$\dfrac{\text{Sales}}{\text{Net fixed assets}}$	$\dfrac{\$3,000}{\$1,000}$	= 3.0×	2.8×	OK
Total assets turnover	$\dfrac{\text{Sales}}{\text{Total assets}}$	$\dfrac{\$3,000}{\$2,000}$	= 1.5×	1.8×	Somewhat low
Debt Management					
Total debt to total assets	$\dfrac{\text{Total debt}}{\text{Total assets}}$	$\dfrac{\$1,060}{\$2,000}$	= 53.0%	40.0%	High (risky)
Times interest earned (TIE)	$\dfrac{\text{Earnings before interest and taxes (EBIT)}}{\text{Interest charges}}$	$\dfrac{\$283.8}{\$88}$	= 3.2×	6.0×	Low (risky)
Profitability					
Operating margin	$\dfrac{\text{Operating income (EBIT)}}{\text{Sales}}$	$\dfrac{\$283.8}{\$3,000}$	= 9.5%	10.0%	Low
Profit margin	$\dfrac{\text{Net income}}{\text{Sales}}$	$\dfrac{\$117.5}{\$3,000}$	= 3.9%	5.0%	Poor
Return on total assets (ROA)	$\dfrac{\text{Net income}}{\text{Total assets}}$	$\dfrac{\$117.5}{\$2,000}$	= 5.9%	9.0%	Poor
Basic earning power (BEP)	$\dfrac{\text{Earnings before interest and taxes (EBIT)}}{\text{Total assets}}$	$\dfrac{\$283.8}{\$2,000}$	= 14.2%	18.0%	Poor
Return on common equity (ROE)	$\dfrac{\text{Net income}}{\text{Common equity}}$	$\dfrac{\$117.5}{\$940}$	= 12.5%	15.0%	Poor
Market Value					
Price/earnings (P/E)	$\dfrac{\text{Price per share}}{\text{Earnings per share}}$	$\dfrac{\$23.06}{\$2.35}$	= 9.8×	11.3×	Low
Market/book (M/B)	$\dfrac{\text{Market price per share}}{\text{Book value per share}}$	$\dfrac{\$23.06}{\$18.80}$	= 1.2×	1.7×	Low

By comparing Allied Food's ratios with the industrial averages, we can see the areas where Allied Food is lacking relative to the industry

Try to improve in the weak areas:
Current and quick ratios; Inventory turnover; DSO; Debt ratio; Profit margin; ROA; BEP; ROE

- Trend analysis

    Analyzing a firm's financial ratios over time to estimate the likelihood of improvement or deterioration in its financial conditions

    Figure 4-1

- Limitations in ratio analysis

    Different divisions in different industries
    Industry average
    Accounting methods
    Inflation
    Window dressing
    Seasonality

- Beyond the numbers

    Tied to one customer?
    Tied to one product?
    Rely on one supplier?
    Operations overseas?
    Competition?
    Future products?
    Legal issues?

- **Exercise**

    ST-1, ST-2, and ST-3
    Problems: 2, 4, 6, 10, 11, and 13

Chapter 5 -- Time Value of Money

- Time line
- Future value (FV) and present value (PV)
- Future value annuity (FVA) and present value annuity (PVA)
- Perpetuity
- Uneven cash flows
- Semiannual and other compounding periods
- Amortization
- Applications

- Time line
   Time line: an important tool used to show timing of cash flows

	50	50	50	50	
0	1	2	3	4	...
-100					
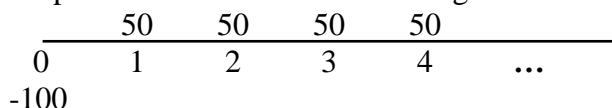
   Cash outflows vs. cash inflows: cash outflows are negative and cash inflows are positive

- Future value (FV) and present value (PV)
   FV: the amount to which a cash flow will grow over a given number of periods
   Compounding: an arithmetic process of determining the final value of a cash flow or a series of cash flows when compound interest is applied
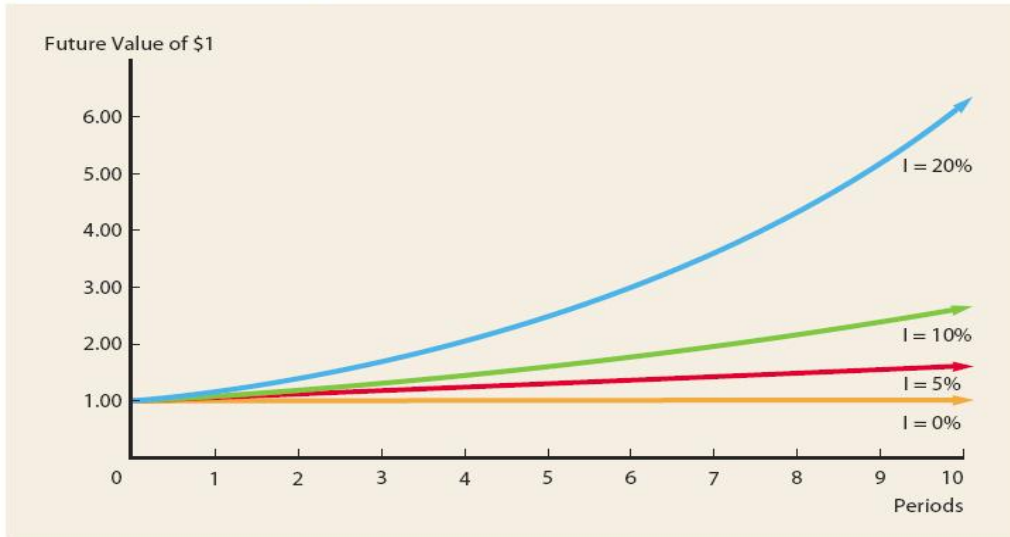
   Example: if PV = -$100, I/YR = 5%, N = 3 years, PMT = 0, FV = $115.76

Table 5-1   Summary of Future Value Calculations

	A	B	C	D	E	F	G
14	Investment	= CF$_0$ = PV =	−$100.00				
15	Interest rate	= I =	5.00%				
16	No. of periods	= N =	3				
17				Periods:	0	1	2	3
18								
19								
20			Cash Flow Time Line:	−$100			FV = ?
21	Step-by-Step Approach:			$100 →	$105.00 →	$110.25 →	$115.76
22							
23	Formula Approach: FV$_N$ = PV(1 + I)^N				FV$_N$ = $100(1.05)^3	=	$115.76
24							
25				3	5	−$100.00	$0
26	Calculator Approach:			N	I/YR	PV	PMT	FV
27								$115.76
28								
29	Excel Approach:			Fixed inputs:	FV$_N$ =	=FV(0.05,3,0,−100) =	$115.76
30				Cell references:	FV$_N$ =	=FV(C15,C16,0,C14) =	$115.76
31								
32	In the Excel formula, the terms are entered in this sequence: interest, periods, 0 to indicate no intermediate cash flows, and then the PV. The data can be entered as fixed numbers or as cell references.						

The relationship among future value, interest rate, and time

FIGURE 5-1   Growth of $1 at Various Interest Rates and Time Periods

PV: the value today of a future cash flow
Discounting: a process of finding the present value of a cash flow or a series of cash flows from the future

Example: if FV = $115.76, I/YR = 5%, N = 3 years, PMT = 0, PV = -$100

Table 5-2   Summary of Present Value Calculations

	A	B	C	D	E	F	G
64	Future payment	= CF$_N$ = FV =	$115.76				
65	Interest rate	= I =	5.00%				
66	No. of periods	= N =	3				
67			Periods:	0	1	2	3
68							
69			Cash Flow Time Line:	PV = ?			$115.76
70							
71	Step-by-Step Approach:			$100.00	$105.00	$110.25	$115.76
72							
73	Formula Approach: PV = FV$_N$/(1 + I)^N			PV = $115.76/(1.05)^3		=	$100.00
74							
75				3	5	$0	$115.76
76	Calculator Approach:			N	I/YR	PV	PMT	FV
77						−$100.00	
78							
79	Excel Approach:			Fixed inputs:	PV =	=PV(0.05,3,0,115.76) =	−$100.00
80				Cell references:	PV =	=PV(C65,C66,0,C64) =	−$100.00
81							
82	In the Excel formula, 0 indicates that there are no intermediate cash flows.						

The relationship among present value, interest rate, and time

FIGURE 5-2 Present Value of $1 at Various Interest Rates and Time Periods

Present Value of $1

- $I = 0\%$
- $I = 5\%$
- $I = 10\%$
- $I = 20\%$
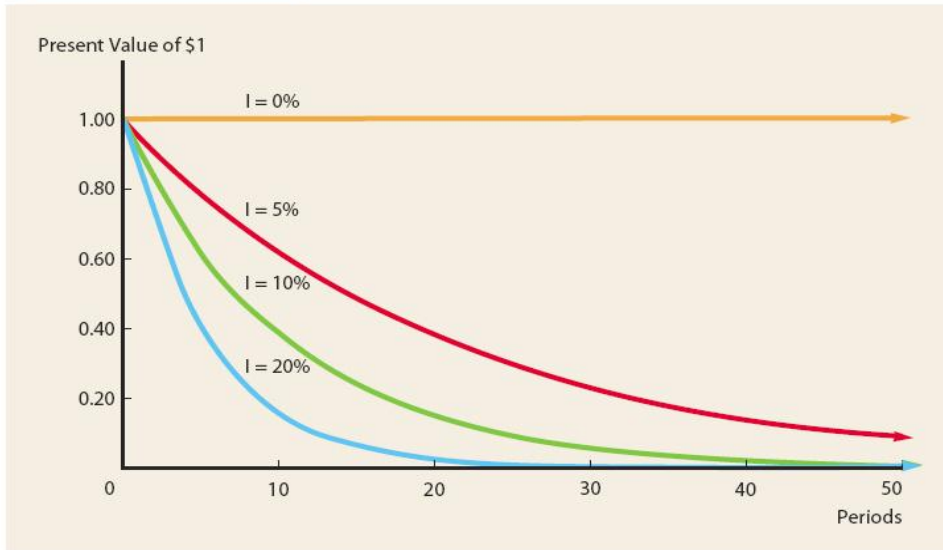
Periods

- Future value annuity (FVA) and present value annuity (PVA)
    Annuity: a series of equal payments for a number of specified periods
    Ordinary annuity: an annuity with payments made at the **end** of each period
    FVA: the future value of an annuity for a number of specified periods

    Example: if PV = 0, PMT = -$100, I/YR = 5%, N = 3 years, FVA = $315.25

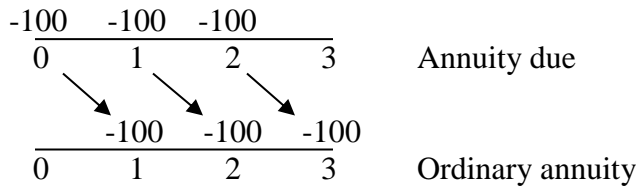**Table 5-3** Summary: Future Value of an Ordinary Annuity

	A	B	C	D	E	F	G
131	Payment amount	= PMT =	$100.00				
132	Interest rate	= I =	5.00%				
133	No. of periods	= N =	3				
134							
135	Periods:		0	1	2	3	
136							
137	Cash Flow Time Line:			-$100	-$100	-$100	
138	Step-by-Step Approach.						
139	Multiply each payment by						
140	$(1+I)^{N-t}$ and sum these FVs to					-$100.00	
141	find FVA$_N$:					-$105.00	
142						-$110.25	
143						-$315.25	
144	Formula Approach:						
145							
146	FVA$_N$ =		$PMT \times \left(\dfrac{(1+I)^N - 1}{I}\right)$		=	$315.25	
147							
148				3	5	$0	-$100.00
149	Calculator Approach:			N	I/YR	PV	PMT	FV
150				N	I/YR	PV	PMT	FV
151							$315.25	
152	Excel Function Approach:		Fixed inputs:	FVA$_N$ =	=FV(0.05,3,-100,0) =	$315.25	
153								
154			Cell references:	FVA$_N$ =	=FV(C132,C133,-C131,0) =	$315.25	
155			Excel entries correspond with these calculator keys:		I/YR N PMT PV	FV	

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Annuity due: an annuity with payments made at the **beginning** of each period

```
-100    -100    -100
 0       1       2       3        Annuity due


        -100    -100    -100
 0       1       2       3        Ordinary annuity
```

Each payment in annuity due earns one period of additional interest

$FVA_{due} = FVA_{ordinary} * (1+I/YR) = \$315.25 * (1 + 0.05) = \$331.01$ (use BGN mode)

Note: your calculator has two modes (END for ordinary annuities and BGN for annuity dues) to deal with different types of annuities. Most often, you use END mode to deal with ordinary annuities.

PVA: the present value of an annuity over a number of periods

Example: if FV = 0, N = 3, I/YR = 5%, and PMT = -$100, then
PVA = $272.32 (using END mode for an ordinary annuity)

If it is an annuity due, PVA = $285.94 (using BGN mode)

$PVA_{due} = PVA_{ordinary} * (1+I/YR) = \$272.32 * (1 + 0.05) = \$285.94$

Finding annual payments (PMT), periods (N), and interest rates (I/YR)

Example 1: how long will it take to double your money if interest rate is 6%, compounded annually?   N = 11.90 years

Example 2: if you want to double your money in 10 years, what should be the annual interest rate?   I/YR = 7.18%

Rule of 72: to double your money, I/YR*N = 72 (approximation)

Example 3: you have $15,000 student loan and you want to reply it in next 5 years. The first payment will be made at the end of the year. The annual interest rate is 4%. What should be your annual payment?   PMT = $3,369.41
In the above question, what should be your annual payment if the first payment is made today?   PMT = $3,239.81

Example 4: you win a lottery and face two choices. You can receive a lump sum of $100,000 today or you will receive $5,000 per year in next 30 years, starting from today. What is the annual interest rate embedded?   I/YR = 3.08%

- Perpetuity
    Annuity that lasts forever

    Present value of a perpetuity = payment / interest rate = PMT / (I/YR)

- Uneven cash flows
    A series of cash flows that varies in amount from one period to the other

    (1) Annuity plus additional final payment

		100	100	100	100	1,000 100
0		1	2	3	4	5

    If I/YR = 5%
    FV = $FVA_{ordinary}$ + 1,000 = 552.56 + 1,000 = 1,552.56
    PV = $PVA_{ordinary}$ + PV of 1,000 (1,000 discounted at 5% for 5 years)
        = 432.95 + 783.53 = 1,216.48

    Alternative: PMT = 100, FV = 1,000, N = 5, I/YR = 5%, then PV = 1,216.48

    (2) Irregular cash flows
    Looking for patents or treat each cash flow separately (using CF functions)

	100	300	300	300	500
0	1	2	3	4	5

    If I/YR = 5%, then PV = 1,265.07 and FV = 1,614.59

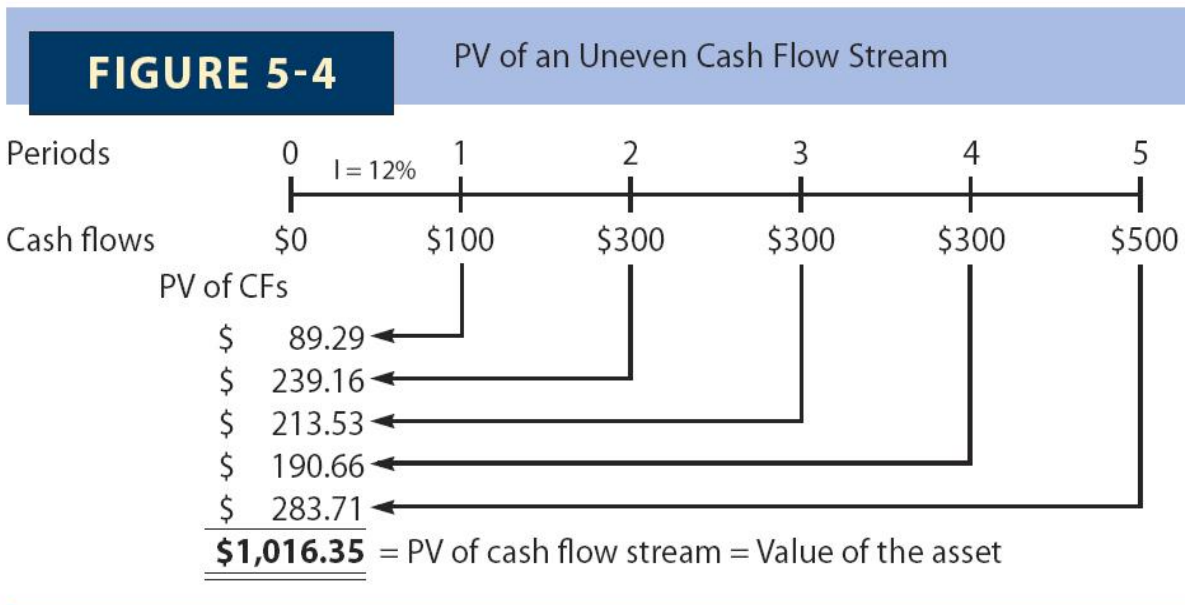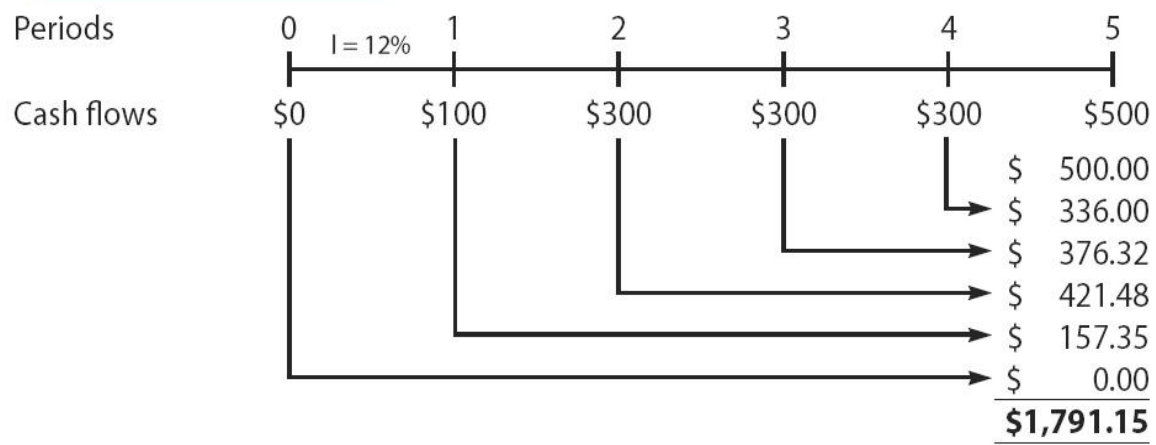   Naïve way to deal with uneven cash flows: deal with one cash flow at a time

FIGURE 5-4   PV of an Uneven Cash Flow Stream

Periods	0	1	2	3	4	5
		I = 12%				
Cash flows	$0	$100	$300	$300	$300	$500

PV of CFs
$ 89.29
$ 239.16
$ 213.53
$ 190.66
$ 283.71
$1,016.35 = PV of cash flow stream = Value of the asset

FIGURE 5-5   FV of an Uneven Cash Flow Stream

Periods	0	1	2	3	4	5
		I = 12%				
Cash flows	$0	$100	$300	$300	$300	$500

$ 500.00
$ 336.00
$ 376.32
$ 421.48
$ 157.35
$ 0.00
$1,791.15

- Semiannual and other compounding periods
  - Annual compounding: interest payment is calculated once a year
  - Semiannual compounding: interest payment is calculated twice a year
  - Other compounding periods: quarterly, monthly, daily, and continuously, etc.

  Effective rate $= (1 + i / m)^m - 1$, where i is the nominal annual rate and m is the number of compounding (for example, for quarterly compounding, m = 4)

  Example: suppose you have $1,000 to invest and are choosing among banks A, B, and C. Each bank offers the following nominal annual rate and compounding method.

  Bank A: 7% compounded annually
  Bank B: 6.9% compounded quarterly
  Bank C: 6.8% compounded daily

  Question: which bank would you like to choose?
  Answer: you should choose Bank B because
  Effective rate (Bank A) = 7%
  Effective rate (Bank B) = 7.08%
  Effective rate (Bank C) = 7.04%

  Note: If all three banks offer the same annual rate, which bank should you choose?
  Answer: Bank C
  Why? Because it offers the highest effective rate

- Amortization
    Amortized loan: a loan that is repaid in equal payments over its lift

| | **Table 5 - 4** | | Loan Amortization Schedule, $100,000 at 6% for 5 Years | | |

Amount borrowed: $100,000
Years: 5
Rate: 6%
PMT: −$23,739.64

Year	Beginning Amount (1)	Payment (2)	Interest[a] (3)	Repayment of Principal[b] (4)	Ending Balance (5)
1	$100,000.00	$23,739.64	$6,000.00	$17,739.64	$82,260.36
2	82,260.36	23,739.64	4,935.62	18,804.02	63,456.34
3	63,456.34	23,739.64	3,807.38	19,932.26	43,524.08
4	43,524.08	23,739.64	2,611.44	21,128.20	22,395.89
5	22,395.89	23,739.64	1,343.75	22,395.89	0.00

[a] Interest in each period is calculated by multiplying the loan balance at the beginning of the year by the interest rate. Therefore, interest in Year 1 is $100,000.00(0.06) = $6,000; in Year 2, it is $4,935.62; and so forth.
[b] Repayment of principal is equal to the payment of $23,739.64 minus the interest charge for the year.

- Applications
    Bond and stock valuations (will be covered later)

    Example1: saving for your dream car
    Your dream car costs $50,000 now and the price will increase by 4% per year. The interest rate in a bank is 6% per year. How much should you save every year (in same amount) in next four year (each deposit will be made at the end of the year) in order to buy the car in 4 years? How much should you save every month in next four years to buy the car, assuming each deposit is made at the end of each month?

    Answer:
    Step1: price of the car in four years = 58,492.93
    (PV = -50,000, I/YR = 4%, N = 4, PMT = 0, FV = 58,492.93)
    Step 2: for annual deposit, FV = 58,492.93, I/YR = 6%, N = 4, PV = 0, and solve for PMT to get PMT = $13,370.99
    Step 3: for monthly deposit, FV = 58,492.93, I/YR = 6% / 12 = 0.5%, PV = 0, N = 4*12 = 48, solve for PMT = 1,081.24

Example 2: saving for your retirement
Suppose you save $100 a month for 10 years, starting from age 20, and invest the money in mutual funds for an average return of 12% per year (1% per month, compounded monthly). How much will you have when you reach 60? At what age will you become a millionaire?

Answer:
Step 1: value of mutual funds when you are 30 years old
        PMT = -100, I/YR = 1%, N =120, PV = 0, FV = 23,003.87
Step 2: money you will have when retiring
        PV = -23,003.87, I/YR = 1%, N = 360, PMT = 0, and solve for FV
        FV = $826,981
Step 3: when FV reaches 1 million
        PV = -23,003.87, I/YR = 1%, PMT = 0, FV = 1,000,000, solve for
        N = 379.09
        379.09 / 12 = 31.59 years
        When you are about 62 years old you will become a millionaire.

- **Exercise**
    ST-2, ST-3, and ST-4
    Problems: 21, 22, 24, 25, 31, and 33