CHAPTER 1
INTRODUCTION TO FINANCIAL MANAGEMENT

Basic

1. Capital budgeting (deciding on whether to expand a manufacturing plant), capital structure (deciding whether to issue new equity and use the proceeds to retire outstanding debt), and working capital management (modifying the firm's credit collection policy with its customers).

2. Disadvantages: unlimited liability, limited life, difficulty in transferring ownership, hard to raise capital funds. Some advantages: simpler, less regulation, the owners are also the managers, sometimes personal tax rates are better than corporate tax rates.

3. The primary disadvantage of the corporate form is the double taxation to shareholders of distributed earnings and dividends. Some advantages include: limited liability, ease of transferability, ability to raise capital, unlimited life, and so forth.

4. The treasurer's office and the controller's office are the two primary organizational groups that report directly to the chief financial officer. The controller's office handles cost and financial accounting, tax management, and management information systems, while the treasurer's office is responsible for cash and credit management, capital budgeting, and financial planning. Therefore, the study of corporate finance is concentrated within the treasury group's functions.

5. To maximize the current market value (share price) of the equity of the firm (whether it's publicly-traded or not).

6. In the corporate form of ownership, the shareholders are the owners of the firm. The shareholders elect the directors of the corporation, who in turn appoint the firm's management. This separation of ownership from control in the corporate form of organization is what causes agency problems to exist. Management may act in its own or someone else's best interests, rather than those of the shareholders. If such events occur, they may contradict the goal of maximizing the share price of the equity of the firm.

Intermediate

7. Such organizations frequently pursue social or political missions, so many different goals are conceivable. One goal that is often cited is revenue minimization; i.e., provide whatever goods and services are offered at the lowest possible cost to society. A better approach might be to observe that even a not-for-profit business has equity. Thus, one answer is that the appropriate goal is to maximize the value of the equity.

8. Presumably, the current stock value reflects the risk, timing, and magnitude of all future cash flows, both short-term *and* long-term. If this is correct, then the statement is false.

9. An argument can be made either way. At the one extreme, we could argue that in a market economy, all of these things are priced. There is thus an optimal level of, for example, ethical and/or illegal behavior, and the framework of stock valuation explicitly includes these. At the other extreme, we could argue that these are non-economic phenomena and are best handled through the political process. A classic (and highly relevant) thought question that illustrates this debate goes something like this: "A firm has estimated that the cost of improving the safety of one of its products is $30 million. However, the firm believes that improving the safety of the product will only save $20 million in product liability claims. What should the firm do?"

10. The goal will be the same, but the best course of action toward that goal may be different because of differing social, political, and economic institutions.

11. The goal of management should be to maximize the share price for the current shareholders. If management believes that it can improve the profitability of the firm so that the share price will exceed $35, then they should fight the offer from the outside company. If management believes that this bidder or other unidentified bidders will actually pay more than $35 per share to acquire the company, then they should still fight the offer. However, if the current management cannot increase the value of the firm beyond the bid price, and no other higher bids come in, then management is not acting in the interests of the shareholders by fighting the offer. Since current managers often lose their jobs when the corporation is acquired, poorly monitored managers have an incentive to fight corporate takeovers in situations such as this.

15. How much is too much? Who is worth more, Jack Welch or Tiger Woods? The simplest answer is that there is a market for executives just as there is for all types of labor. Executive compensation is the price that clears the market. The same is true for athletes and performers. Having said that, one aspect of executive compensation deserves comment. A primary reason executive compensation has grown so dramatically is that companies have increasingly moved to stock-based compensation. Such movement is obviously consistent with the attempt to better align stockholder and management interests. In recent years, stock prices have soared, so management has cleaned up. It is sometimes argued that much of this reward is simply due to rising stock prices in general, not managerial performance. Perhaps in the future, executive compensation will be designed to reward only differential performance, i.e., stock price increases in excess of general market increases.

CHAPTER 2
FINANCIAL STATEMENTS, TAXES, AND CASH FLOW

Basic

1.

	Balance Sheet				
CA	$2,500	CL	$1,000	OE	$= \$8,850 - 5,800 = \$3,050$
NFA	6,350	LTD	4,800	NWC	$= \$2,500 - 1,000 = \$1,500$
TA	$8,850	OE	3,050		
		TL + OE	$8,850		

2.

Income Statement	
Sales	$350,000
Costs	175,000
Depreciation	25,000
EBIT	$150,000
Interest	17,000
EBT	$133,000
Taxes	45,220
Net income	$87,780

3. Net income = Divs + Add. to ret. earnings;   Add. to ret. earnings = $87,780 – 21,000 = $66,780

4. EPS = NI / shares   = $87,780 / 20,000 = $4.39 per share
DPS = Divs / shares   = $21,000 / 20,000 = $1.05 per share

5. NWC = CA – CL;   CA = 500K + 750K = $1.25M
Book value CA   = $1.25M   Market value CA   = $1.50M
Book value NFA   = $0.75M   Market value NFA   = $1M
Book value assets = 1.25 + 0.75 = $2M   Market value assets = 1.5 + 1 = $2.5M

6. Taxes = 0.15($50K) + 0.25($25K) + 0.34($25K) + 0.39($190K – $100K) = $57,350

7. Average tax rate = $57,350 / 190,000 = 30.18%;   Marginal tax rate = 39%

8.   <u>Income Statement</u>

Sales	$10,000	$OCF = EBIT + D - T$
Costs	6,350	$= 1,550 + 2,100 - 423.50 = \$3,226.50$
Depreciation	2,100	
EBIT	$1,550	
Interest	340	
Taxable income	$1,210	
Taxes (35%)	423.50	
Net income	$786.50	

9.   Net capital spending $= NFA_{end} - NFA_{beg} + Depreciation = 4.9M - 3.6M + 780K = \$2,080,000$

10.   Change in NWC $= NWC_{end} - NWC_{beg} = (CA_{end} - CL_{end}) - (CA_{beg} - CL_{beg})$
$= (1,150 - 475) - (900 - 400) = 675 - 500 = \$175$

11.   Cash flow to creditors $=$ Interest paid – Net new borrowing $= 360K - (LTD_{end} - LTD_{beg})$
$= 360K - (3.4M - 3.0M) = 360K - 400K = -\$40K$

12.   Cash flow to stockholders $=$ Dividends paid – Net new equity $= 250K - [(Common_{end} + APIS_{end}) - (Common_{beg} + APIS_{beg})]$
$= 300K - [(825K + 7.7M) - (750K + 7.2M)]$
$= 300K - [8.525M - 7.95M] = -\$275K$

13.   Cash flow from assets $=$ Cash flow to creditors + Cash flow to stockholders
$= -\$40K - 275K = -\$315K$
        Cash flow from assets $= -\$315K = OCF -$ Change in NWC – Net capital spending
$= OCF - (-\$135K) - (\$600K) = -\$315K;$
        Operating cash flow $= -\$315K - 135K + 600K = \$150K$

<u>*Intermediate*</u>

14.   <u>Income Statement</u>

Sales	$125,000	*a.* OCF	$= EBIT + D - T$
Costs	76,000		$= 32,000 + 5,000 - 9,860 = \$27,140$
Gross margin	$49,000	*b.* CFC	$=$ Interest – Net new LTD
Other expenses	12,000		$= 3,000 - (-4,500) = \$7,500$
Depreciation	5,000	*c.* CFS	$=$ Dividends – Net new equity
EBIT	$32,000		$= 4,300 - 1,200 = \$3,100$
Interest	3,000	*d.* CFA	$=$ CFC + CFS $= 7,500 + 3,100 = \$10,600$
Taxable income	$29,000		$10,600 = OCF -$ Net cap. sp. – Change in NWC;
Taxes (34%)	9,860		Net cap. sp. $=$ Inc. in NFA + Depreciation
Net income	$19,140		$= 5,050 + 5,000 = \$10,050$
Dividends	4,300		Change in NWC $= OCF -$ Net cap. sp. $-$ CFA
Add. to ret. earnings	$14,840		$= 27,140 - 10,050 - 10,600$
			$= \$6,490$

15.   Balance Sheet

Cash	$420,000	Accounts payable	$1,000,000
Accounts receivable	210,000	Notes payable	250,000
Inventory	660,000	Current liabilities	$1,250,000
Current assets	$1,290,000	Long-term debt	1,050,000
		Total liabilities	$2,300,000
Tangible net fixed assets	6,000,000		
Intangible net fixed assets	1,050,000	Common stock	??
Total assets	$8,340,000	Retained earnings	5,500,000
		Total liab. & owners' equity	$8,340,000

?? = $8,340,000 – 5,500,000 – 2,300,000 = $540,000

16.   Owners' equity = Max [(TA – TL), 0]; if TA = $4,800, OE = $300; if TA = $3,800, OE = $0

17.   *a.* Taxes X   = 0.15($50K) + 0.25($25K) + 0.34($5K) = $15,450
   Taxes Y   = 0.15($50K) + 0.25($25K) + 0.34($25K) + 0.39($235K) + 0.34($8.665M)
          = $3.06M
   b. Average tax rate for X = $15,450 / $80,000 = 19.31%
   Average tax rate for Y = $3.06M / $9.0M = 34.00%
   c. Each firm has a marginal tax rate of 34% on the next $10,000 of taxable income, despite their
   different average tax rates, so both firms will pay an additional $3,400 in taxes.

18.

	Income Statement		
Sales	$725,000	*b.* OCF = EBIT + D – T
COGS	427,000	= 15,000 + 60,000 – 0 = $75,000
Gross margin	$298,000	*c.* Net income was negative because of the
Other expenses	223,000	tax deductibility of depreciation and int-
Depreciation	60,000	erest expense. However, the actual cash
EBIT	$15,000	flow from operations was positive
Interest	55,000	because depreciation is a non-cash
Taxable Income	($40,000)	expense and interest is a financing, not
Taxes (35%)	0	an operating, expense.
a. Net income	($40,000)	

19.   A firm can still pay out dividends if net income is negative; it just has to be sure there is sufficient
   cash flow to make the dividend payments.

   Change in NWC = Net cap. sp. = Net new equity = 0. (Assumed)
   Cash flow from assets   = OCF – Change in NWC – Net cap. sp. = 75K – 0 – 0 = $75K
   Cash flow to stockholders = Dividends – Net new equity = 25K – 0 = $25K
   Cash flow to creditors   = Cash flow from assets – Cash flow to stockholders = 75K – 25K = $50K
   Cash flow to creditors   = Interest – Net new LTD;
   Net new LTD = Interest – Cash flow to creditors = 55K – 50K = $5K.

20.

<u>Income Statement</u>

Sales	$6,000	*b.*	OCF = EBIT + D − T = 700 + 800 − 204 = $1,296
Cost of goods sold	4,500	*c.*	Change in NWC = NWC_{end} − NWC_{beg}
Depreciation	800		= (CA_{end} − CL_{end}) − (CA_{beg} − CL_{beg})
EBIT	$700		= (1,550 − 900) − (1,000 − 750)
Interest	100		= 650 − 250 = $400
Taxable income	$600		Net cap. sp. = NFA_{end} − NFA_{beg} + D
Taxes (34%)	204		= 4,200 − 4,000 + 800 = $1,000
a. Net income	$396		CFA = OCF − Change in NWC − Net cap.sp.
			= 1,296 − 400 − 1,000 = −$104

The cash flow from assets can be positive or negative, since it represents whether the firm raised funds or distributed funds on a net basis. In this problem, even though net income and OCF are positive, the firm invested heavily in both fixed assets and net working capital; it had to raise a net $104 in funds from its stockholders and creditors to make these investments.

d.   Cash flow to creditors   = interest − net new LTD = 100 − 0 = $100
Cash flow to stockholders   = cash flow from assets − cash flow to creditors
= −104 − 100 = −$204 = dividends − net new equity;
Net new equity = 150 + 204 = $354
The firm had positive earnings in an accounting sense (NI > 0) and had positive cash flow from operations. The firm invested $400 in new net working capital and $1,000 in new fixed assets. The firm had to raise $104 from its stakeholders to support this new investment. It accomplished this by raising $354 in the form of new equity. After paying out $150 of this in the form of dividends to shareholders and $100 in the form of interest to creditors, $104 was left to meet the firm's cash flow needs for investment.

21.   *a.*   Total assets 1997 = 475 + 2,100 = $2,575;   Total liabilities 1997 = 205 + 1,200 = $1,405
Owners' equity 1997 = 2,575 − 1,405 = $1,170
Total assets 1998 = 503 + 2,330 = $2,833;   Total liabilities 1998 = 301 + 1,400 = $1,701
Owners' equity 1998 = 2,833 − 1,701 = $1,132
b.   NWC 1997 = CA97 − CL97 = 475 − 205 = $270
NWC 1998 = CA98 − CL98 = 503 − 301 = $202
Change in NWC 1998 = NWC98 − NWC97 = 202 − 270 = −$68
c.   Net cap. sp. = NFA98 − NFA97 + D98 = 2,330 − 2,100 + 600 = $830
Net cap. sp. = Fixed assets bought − Fixed assets sold
830 = 1,000 − Fixed assets sold; Fixed assets sold = 1,000 − 830 = $170
OCF98 = EBDIT − T = 3,540 − (.35)(7,100 − 3,560 − 600 − 108)
= 3,540 − 991.20 = $2,548.80
Cash flow from assets = OCF − Inc. in NWC − Inc. in cap. sp.
= 2,548.80 + 68 − 830 = $1,786.80
d.   Net new borrowing = LTD98 − LTD97 = 1,400 − 1,200 = $200
Cash flow to creditors = Interest − Net new LTD = 108 − 200 = −$92
Net new borrowing = 200 = Debt issued − Debt retired;   Debt retired = 300 − 200 = $100

22.   Liquidity measures how quickly an asset can be converted to cash at or near market value. High liquidity helps lower the possibility of financial distress, however, liquid assets generally earn lower returns. Cash, for example, earns no return.

CHAPTER 3
WORKING WITH FINANCIAL STATEMENTS

Basic

1. *a.* If inventory is purchased with cash, then there is no change in the current ratio. If inventory is purchased on credit, then there is a decrease in the current ratio if it was initially greater than 1.0.
    b. Reducing accounts payable with cash increases the current ratio if it was initially greater than 1.0.
    c. Reducing short-term debt with cash increases the current ratio if it was initially greater than 1.0.
    d. As long-term debt approaches maturity, the principal repayment and the remaining interest expense become current liabilities. Thus, if debt is paid off with cash, the current ratio increases if it was initially greater than 1.0. If the debt has not yet become a current liability, then paying it off will reduce the current ratio since current liabilities are not affected.
    e. Reduction of accounts receivables and an increase in cash leaves the current ratio unchanged.
    f. Inventory sold at cost reduces inventory and raises cash or accounts receivable, so the current ratio is unchanged.
    g. Inventory sold for a profit raises cash in excess of the inventory recorded at cost, so the current ratio increases, whether it is sold for cash or on credit.

2. A current ratio of 0.50 means that the firm has twice as much in current liabilities as it does in current assets; the firm potentially has poor liquidity. If pressed by its short-term creditors and suppliers for immediate payment, the firm might have a difficult time meeting its obligations. A current ratio of 1.50 means the firm has 50% more current assets than it does current liabilities. This probably represents an improvement in liquidity; short-term obligations can generally be met completely with a safety factor built in. A current ratio of 15.0, however, might be excessive. Any excess funds sitting in current assets generally earn little or no return. These excess funds might be put to better use by investing in productive long-term assets or distributing the funds to shareholders.

3. *a.* Quick ratio provides a measure of the short-term liquidity of the firm, after removing the effects of inventory, generally the least liquid of the firm's current assets.
    b. Cash ratio represents the ability of the firm to completely pay off its current liabilities balance if immediate payment was demanded.
    c. Total asset turnover measures how much in sales are generated by each dollar of firm assets.
    d. Equity multiplier represents the leverage of an equity investor of the firm; it measures the dollars worth of firm assets each equity dollar has a claim to.
    e. Times interest earned ratio provides a relative measure of how well firm operating earnings cover current interest obligations.
    f. Profit margin is the accounting measure of bottom-line profit per dollar of sales.
    g. Return on assets is a measure of bottom-line profit per dollar of assets.
    h. Return on equity is a measure of bottom-line profit per dollar of equity.
    i. Price/earnings ratio reflects how much value the market places on a dollar of accounting earnings for a firm.

4. NWC = $950 = CA – CL;   CA = $950 + $2,500 = $3,450
    Current ratio = CA / CL = $3,450/$2,500 = 1.38 times
    Quick ratio = (CA – inventory) / CL = ($3,450 – $1,100) / $2,500 = 0.94 times

5.   Profit margin = net income / sales;   net income = ($30M)(0.07) = $2.1M
ROA = net income / TA = $2.1M / $42M = 5.00%
ROE = net income / TE = net income / (TA – TD) = $2.1 / ($42M – $12M) = 7.00%

6.   Receivables turnover = sales / receivables = $2,705,132 / $575,358 = 4.70 times
Days' sales in receivables = 365 days / receivables turnover = 365 / 4.70 = 77.66 days
The average collection period for an outstanding accounts receivable balance was 77.66 days.

7.   Inventory turnover = COGS / inventory = $1,375,151 / $325,800 = 4.22 times
Days' sales in inventory = 365 days / inventory turnover = 365 / 4.22 = 86.49 days
On average, a unit of inventory sat on the shelf 86.49 days before it was sold.

8.   Total debt ratio = 0.45 = TD / TA = TD / (TD + TE); 0.55(TD) = 0.45(TE)
Debt/equity ratio = TD / TE = 0.45 / 0.55 = 0.82
Equity multiplier = 1 + D/E = 1.82

9.   NI = Addition to retained earnings + Dividends = $180K + $150K = $330K
EPS = NI / shares = $330K / 125K = $2.64 per share
DPS = Dividends / shares = $150K / 125K = $1.20 per share
BVPS = TE / shares = $5.5M / 125K = $44.00 per share
Market-to-book ratio = Share price / BVPS = $65 / $44 = 1.48 times
P/E ratio = Share price / EPS = $65 / $2.64 = 24.6 times

10.   ROE = (PM)(TAT)(EM) = (.13)(1.20)(1.9) = 29.64%

11.   ROE = .2325 = (.115)(1.80)(EM);   EM = 1.12;   D/E = EM – 1 = 0.12

12.   Payables turnover = COGS / payables = $9,273 / $1,283 = 7.23 times
Days' sales in payables = 365 days / payables turnover = 365 / 7.23 = 50.48 days
The company left its bills to suppliers outstanding for 50.48 days on average. A large value for this ratio could imply that either (1) the company is having liquidity problems, making it difficult to pay off its short-term obligations, or (2) that the company has successfully negotiated lenient credit terms from its suppliers.

13.   EM = 1 + D/E = 2.25
ROE = (ROA)(EM) = .073(2.25) = 16.43%
ROE = NI / TE;   NI = (.1643)($245,000) = $40,253.50

14.

	1997	#14	1998	#14
Assets				
Current assets				
Cash	$ 14,170	2.12%	$ 17,866	2.44%
Accounts receivable	44,818	6.69%	47,710	6.51%
Inventory	91,636	13.69%	120,580	16.45%
Total	$150,624	22.50%	$186,156	25.39%
Fixed assets				
Net plant and equipment	518,864	77.50%	547,016	74.61%
Total assets	$669,488	100%	$733,172	100%
Liabilities and Owners' Equity				
Current liabilities				
Accounts payable	$145,004	21.66%	$132,678	18.10%
Notes payable	70,402	10.52%	83,550	11.40%
Total	$215,406	32.17%	$216,228	29.49%
Long-term debt	100,000	14.94%	50,000	6.82%
Owners' equity				
Common stock and paid-in surplus	$150,000	22.41%	$150,000	20.46%
Accumulated retained earnings	204,082	30.48%	316,944	43.23%
Total	$354,082	52.89%	$466,944	63.69%
Total liabilities and owners' equity	$669,488	100%	$733,172	

Intermediate

22. ROE = 0.17 = (PM)(TAT)(EM) = (PM)(S / TA)(1 + D/E)
PM = [(0.17)($900)] / [(1 + 1)($1,500)] = .051
PM = .051 = NI / S; NI = .051($1,500) = $76.50

23. Child: Profit = $0.50 / $25 = 2%;   Store: Profit margin = NI / S = $4.6M / $460M = 1%
The advertisement is referring to the store's profit margin, but a more appropriate earnings measure for the firm's owners is the return on equity.
ROE = NI / TE = NI / (TA – TD) = $4.6M / ($100M – $70M) = 15.33%

24. Days' sales in receivables = 16.80 days = 365 days / Receivables turnover
Receivables turnover = Sales / Receivables;   Sales = ($91,000)(365) / 16.80 = $1,977,083.33
PM = NI / S = $87,500 / $1,977,083.33 = 4.43%
TAT = S / TA = $1,977,083.33 / $625,000 = 3.16 times
EM = 1 + D/E = 1.65
ROE = (PM)(TAT)(EM) = (.0443)(3.16)(1.65) = 23.10%

25. Net income = (1 – t)EBT; EBT = $18,570 / 0.66 = $28,136.36
EBIT = EBT + Interest paid = $28,136.36 + $4,645 = $32,781.36
EBDIT = EBIT + Depreciation expense = $32,781.36 + $1,975 = $34,756.36
Cash coverage ratio = EBDIT / Interest = $34,756.36 / $4,645 = 7.48 times

26. Sales – COGS = EBDIT = $475K – 195K = $280K
EBIT = EBDIT – Depreciation = $280K – 69K = $211K
DPS = Dividends / Shares;   Dividends = $2.00(20,000) = $40K
Net income = Dividends + Additions to retained earnings = $40K + 54.57K = $94.57K
EBT = NI / (1 – t) = $94.57K / 0.66 = $143,288
EBIT – EBT = Interest paid = $211K – 143,288K = $67,712
Times interest earned ratio = EBIT / Interest = $211K / 67,712K = 3.12 times

27. PM = NI / S = – £12,152 / £147,946 = – 8.21%
As long as both net income and sales are measured in the same currency, there is no problem; in fact, except for some market value ratios like EPS and BVPS, none of the financial ratios discussed in the text are measured in terms of currency. This is one reason why financial ratio analysis is widely used in international finance to compare the business operations of firms and/or divisions across national economic borders.
NI = – 0.0821 ($1,159,305) = – $95,178.84

28.   *Short-term solvency ratios:*
CR97 = $5,722 / $2,226 = 2.57 times
CR98 = $5,921 / $2,563 = 2.31 times
QR97 = ($5,722 – 3,805) / $2,226 = 0.86 times
QR98 = ($5,921 – 3,692) / $2,563 = 0.87 times
Cash ratio97 = $390 / $2,226 = 0.18 times
Cash ratio98 = $219 / $2,563 = 0.09 times
    Asset management ratios:
TAT = $14,500 / $19,145 = 0.76 times
Inventory turnover = $4,700 / $3,692 = 1.27 times
Receivables turnover = $14,500 / $2,010 = 7.21 times

Long-term solvency ratios:
Debt ratio97 = ($2,226 + 3,500) / $17,878 = 0.32
Debt ratio98 = ($2,563 + 3,000) / $19,145 = 0.29
D/E97 = ($2,226 + 3,500) / $12,152 = 0.47
D/E98 = ($2,563 + 3,000) / $13,582 = 0.41
EM97 = 1 + D/E97 = 1.47;   EM98 = 1 + D/E98 = 1.41
TIE ratio = $8,880 / $1,070 = 8.30 times
Cash coverage ratio = ($8,880 + 920) / $1,070 = 9.16 times

Profitability ratios:
PM = $5,155 / $14,500 = 35.55%
ROA = $5,155 / $19,145 = 26.93%
ROE = $5,155 / $13,582 = 37.95%

29. ROE = (PM)(TAT)(EM) = (0.3555)(0.76)(1.41) = 0.3795 (Actually computes to .3810, the difference is due to rounding error. The ROE here should be the same as that calculated in Problem 28.)

30. EPS = $5,155 / 1000 shares = $5.155 per share
P/E ratio = $73 / $5.155 = 14.16 times
DPS = $1,430 / 1000 shares = $1.43 per share
BVPS = $13,582 / 1000 shares = $13.58 per share
Market-to-book ratio = $73.00 / $13.58 = 5.38 times

31. TDR = 0.70 = TD / TA; 1 / 0.70 = TA / TD = 1 + TE / TD; D/E = 1 / [(1 / 0.70) – 1] = 2.3333
ROE = (PM)(TAT)(EM) = (.075)(1.25)(1 + 2.3333) = .3125
ROA = ROE / EM = .3125 / 3.3333 = 9.38%;
b = 1 – .5 = .5;   sustainable g = [.3125(.50)] / [1 – .3125(.50)] = 18.52%

32. b = 1 – ($24,500 / $35,000) = .3;   ROE = NI / TE = $35,000 / $60,000 = 58.33%
sustainable g = [.30(.5833)] / [1 – .30(.5833)] = 21.21%
new TA = 1.2121($100,000) = $121,210;   D/E = $40,000 / $60,000 = 0.667
new TD = [D / (D+E)] (TA) = (40/100)($121,210) = $48,484
additional borrowing = $48,484 – $40,000 = $8,484
ROA = NI / TA = $35,000 / $100,000 = .3500
internal g = [.3500(.30)] / [1 – .3500(.30)] = 11.73%

CHAPTER 4
INTRODUCTION TO VALUATION: THE TIME VALUE OF MONEY

Basic

1. $\$10,000(1.06)^{10} = \$17,908.48$; $\$7,908.48 - \$600(10) = \$1,908.48$

2. $\text{FV} = \$2,250(1.17)^{30}$ $\qquad = \$249,895$
   $\text{FV} = \$9,310(1.06)^{15}$ $\qquad = \$\ 22,312$
   $\text{FV} = \$76,355(1.12)^{2}$ $\qquad = \$\ 95,780$
   $\text{FV} = \$183,796(1.09)^{7}$ $\qquad = \$335,986$

3. $\text{PV} = \$1,527 / (1.05)^{5}$ $\qquad = \$\ \ 1,196$
   $\text{PV} = \$8,384 / (1.10)^{20}$ $\qquad = \$\ \ 1,246$
   $\text{PV} = \$45,350 / (1.18)^{12}$ $\qquad = \$\ \ 6,223$
   $\text{PV} = \$500,000 / (1.30)^{7}$ $\qquad = \$\ 79,683$

4. $\text{FV} = \$307 = \$209(1 + r)^{3}$; $\qquad r = (307/209)^{1/3} - 1\ =\ 13.67\%$
   $\text{FV} = \$761 = \$413(1 + r)^{9}$; $\qquad r = (761 / 413)^{1/9} - 1\ =\ 7.03\%$
   $\text{FV} = \$136,771 = \$35,786(1 + r)^{15}$; $\quad r = (136,771 / 35,786)^{1/15} - 1\ =\ 9.35\%$
   $\text{FV} = \$255,810 = \$77,295(1 + r)^{30}$; $\quad r = (255,810 / 77,295)^{1/30} - 1\ =\ 4.07\%$

5. $\text{FV} = \$1,284 = \$534(1.04)^{t}$; $\qquad t = \ln(1,284/534) / \ln 1.04 = 22.36\text{ yrs}$
   $\text{FV} = \$4,341 = \$1,908(1.09)^{t}$; $\qquad t = \ln(4,341/1,908) / \ln 1.09\ =\ 9.54\text{ yrs}$
   $\text{FV} = \$402,662 = \$22,754(1.23)^{t}$; $\quad t = \ln(402,662/22,754) / \ln 1.23\ =\ 13.88\text{ yrs}$
   $\text{FV} = \$173,439 = \$86,932(1.34)^{t}$; $\quad t = \ln(173,439/86,932) / \ln 1.34\ =\ 2.36\text{ yrs}$

6. $\text{FV} = \$75,000 = \$7,000(1 + r)^{18}$; $\qquad r = (75,000/7,000)^{1/18} - 1 = 14.08\%$

7. $\text{FV} = \$2 = \$1(1.08)^{t}$; $\qquad t = \ln 2 / \ln 1.08 = 9.01\text{ yrs}$; $t = \ln 3 / \ln 1.08 = 14.27\text{ yrs}$

8. $\text{FV} = \$40,000 = \$13,000(1 + r)^{8}$; $\qquad r = (40,000/13,000)^{1/8} - 1 = 15.08\%$

9. $\text{FV} = \$20,000 = \$15,000(1.05)^{t}$; $\qquad t = \ln (20,000/15,000) / \ln 1.05 = 5.89\text{ years}$

10. $\text{PV} = \$425\text{ M} / (1.075)^{23} = \$80.54\text{ million}$

Intermediate

11. $FV = \$1(1.03)^{12} = \$1.43$; $FV = \$1(1.03)^{24} = \$2.03$

12. $FV = \$500 = \$430(1.005)^{t}$; $t = \ln (500 / 430) / \ln (1.005) = 30.24$ months

13. $FV = \$3 = \$1 (1 + r)^{3}$; $r = 3^{1/3} - 1 = 44.22\%$

14. $FV = \$6,000 (1.09)^{6} = \$10,062.60$

15. $FV = \$12,500 = \$8,500 (1.0825)^{t}$; $t = \ln (12,500 / 8500) / \ln (1.0825) = 4.86$ years

CHAPTER 5
DISCOUNTED CASH FLOW VALUATION

Basic

1. PV@11% = $1,000 / 1.11 + $200 / 1.11^2 + $800 / 1.11^3 + 1,500 / 1.11^4 = $2,636.27
    PV@17% = $1,000 / 1.17 + $200 / 1.17^2 + $800 / 1.17^3 + 1,500 / 1.17^4 = $2,300.78
    PV@22% = $1,000 / 1.22 + $200 / 1.22^2 + $800 / 1.22^3 + 1,500 / 1.22^4 = $2,071.71

2. FV@7% = $500(1.07)^3 + $600(1.07)^2 + $700(1.07) + 800 = $2,848.46
    FV@10% = $500(1.10)^3 + $600(1.10)^2 + $700(1.10) + 800 = $2,961.50
    FV@22% = $500(1.22)^3 + $600(1.22)^2 + $700(1.22) + 800 = $3,454.96

3. PVA@8 yrs: PVA = $2,500{[1 − (1/1.10)^8] / .10 } = $13,337.31
    PVA@30 yrs: PVA = $2,500{[1 − (1/1.10)^{30}] / .10 } = $23,567.29
    PVA@60 yrs: PVA = $2,500{[1 − (1/1.10)^{60}] / .10 } = $24,917.89
    PVA@forever: PVA = $2,500 / .10 = $25,000.00

4. PVA = $83,000 = $C{ [1 − (1/1.08)^{10}] / .08 }; C = $83,000 / 6.710 = $12,369.60

5. PVA = $35,000[(1 − [1/1.075]^9) / .075] = $223,261.05; can afford the system.

6. FVA@15 yrs: FVA = $1,000[(1.085^{15} − 1) / .085] = $28,232.27
    FVA@45 yrs: FVA = $1,000[(1.085^{45} − 1) / .085] = $450,530.40

7. FVA = $18,000 = $C[(1.09^6 − 1) / .09];   C = $18,000 / 7.523 = $2,392.66

8. PVA = $20,000 = $C[(1 − [1/1.11]^7) / .11];   C = $20,000 / 4.712 = $4,244.31

9. X@5%: PVA = $2,000{[1 − (1/1.05)^4] / .05 } = $7,091.90
    Y@5%: PVA = $2,500{[1 − (1/1.05)^3] / .05 } = $6,808.12
    X@25%: PVA = $2,000{[1 − (1/1.25)^4] / .25 } = $4,723.20
    Y@25%: PVA = $2,500{[1 − (1/1.25)^3] / .25 } = $4,880.00

10. PV = $5,000 / .08 = $62,500.00

11. PV = $70,000 = $5,000 / r ; r = $5,000 / $70,000 = 7.14%

12. EAR = [1 + (.07 / 4)]^4 − 1   = 7.19%
    EAR = [1 + (.10 / 12)]^{12} − 1   = 10.47%
    EAR = [1 + (.05 / 365)]^{365} − 1 = 5.13%

13. EAR = .07 = [1 + (APR / 2)]^2 − 1;   APR = 2[(1.07)$^{1/2}$ − 1] = 6.88%
    EAR = .10 = [1 + (APR / 12)]^{12} − 1;   APR = 12[(1.10)$^{1/12}$ − 1]= 9.57%
    EAR = .18 = [1 + (APR / 52)]^{52} − 1;   APR = 52[(1.18)$^{1/52}$ − 1]= 16.58%

14. Last National: EAR $= [1+(.075/4)]^4 - 1 = 7.71\%$
Last United: EAR $= [1+(.010/2)]^2 - 1 = 10.25\%$

15. EAR $= .11 = [1+(APR/12)]^{12} - 1$;   APR $= 12[(1.11)^{1/12} - 1] = 10.48\%$
The borrower is actually paying annualized interest of 11% per year, not the 10.48% reported on the loan contract.

16. FV $= \$2,150[\ 1+(.07/4)\ ]^{64} = \$6,525.91$

17. FV in 5 years $= \$1,000[\ 1 + (.045/365)\ ]^{\ 5(365)}$ $= \$1,252.31$
FV in 10 years $= \$1,000[\ 1 + (.045/365)\ ]^{\ 10(365)}$ $= \$1,568.27$
FV in 20 years $= \$1,000[\ 1 + (.045/365)\ ]^{\ 20(365)}$ $= \$2,459.47$

18. PV $= \$69,000 / (1 + .13/365)^{365(3)}$ $= \$46,720.17$

19. APR $= 12(20) = 240\%$;   EAR $= [1+ (.20)]^{12} - 1 = 791.61\%$

20. PVA $= \$33,950 = \$C[\ (1 - [\ 1\ /\ \{\ 1+(.143/12)\ \}]^{60}\ )\ /\ (.143/12)\ ]$;
$C = \$33,950 / 42.69 = \$795.25$
EAR $= [1+(.143/12)]^{12} - 1 = 15.28\%$

21. PVA $= \$12,000 = \$374[\ (1 - [1/1.014]^t\ )\ /\ .014\ ]$; $1/1.014^t = 1 - [\ (\$12,000)(.014)\ /\ (\$374)\ ]$
$1.014^t = 1/(0.5508) = 1.8155$; $t = \ln 1.8155\ /\ \ln 1.014 = 42.9$ months

22. PVA $= \$2,000[\ (1 - [1/1.01]^{16})\ /\ .01] = \$29,435.75$

23. PV $= \$6,100\ /\ (1 + (.12/4))^4 + \$5,300\ /\ (1+(.12/4))^8 + \$8,500\ /\ (1+(.12/4))^{16} = \$14,900.56$

24. PV $= \$400\ /\ (1 + .088) + \$800\ /\ (1+.088)^3 + \$650\ /\ (1+.088)^4 = \$1,452.68$

25. EAR $= [1 + (.12\ /\ 12)$

31. Option A: FVA = $2,000[(\{1 + .13\}^{10} − 1) / (.13)] = $36,839.50
    FV = $36,839.50 (1 + .13)^{30} = $1,441,010.12
Option B: FVA = $2,000[(\{1 + .13\}^{30} − 1) / (.13)] = $586,398.43
Invest earlier rather than later.

32. PV@0% = $4 million; choose the 2nd payout
PV@10% = $4 / (1.1)^7 = $2,052,632; choose the 2nd payout
PV@20% = $4 / (1.2)^7 = $1,116,327; choose the 1st payout

33. PVA = $250,000 [(1 − [1/1.06]^{40}) / .06] = $3,761,574.22

34. *a*. PVA = $800 [(1 − [1/1.095]^5) / .095] = $3,071.77
    b. PVA$_{due}$ = \{$800 [(1 − [1/1.095]^5) / .095]\} (1 + 0.95) = $3,363.58

35. PVA$_{due}$ = $27,000 = (1 + .105/12)$C[(1 − [1/(1+.105/12)]^{48}) / (.105/12)]; C = $685.29

36. PVA = $24,000 = $C[(1 − [1 / \{ 1 + (.16) \}^3]) / (.16)];
    C = $24,000 / 2.24589 = $10,686.19

Year	Beginning Balance	Total Payment	Interest Paid	Principal Paid	Ending Balance
1	$24,000.00	$10,686.19	$3,840.00	$6,846.19	$17,153.81
2	$17,153.81	$10,686.19	$2,744.61	$7,941.58	$ 9,212.23
3	$ 9,212.23	$10,686.19	$1,473.96	$9,212.23	$ 0.00

37.

Year	Beginning Balance	Total Payment	Interest Paid	Principal Paid	Ending Balance
1	$24,000.00	$11,840.00	$3,840.00	$8,000.00	$16,000.00
2	$16,000.00	$10,560.00	$2,560.00	$8,000.00	$ 8,000.00
3	$ 8,000.00	$ 9,280.00	$1,280.00	$8,000.00	$ 0.00

38. Monthly payments
PVA = $120,000 = $C[(1 − [1 / \{ 1 + (.01) \}^{120}]) / (.01)];
C = $120,000 / 69.7005 = $1,721.65

After 3 years, there are 84 payments left, therefore:
PVA = $1,721.65 [(1 − [1 / \{ 1 + (.01) \}^{84}]) / (.01)] = $97,528.81

CHAPTER 6
INTEREST RATES AND BOND VALUATION

Basic

1. The yield to maturity is the required rate of return on a bond expressed as a nominal annual interest rate. For noncallable bonds, the yield to maturity and required rate of return are interchangeable terms. Unlike YTM and required return, the coupon rate is not a return used as the interest rate in bond cash flow valuation, but is a fixed percentage of par over the life of the bond used to set the coupon payment amount. For the example given, the coupon rate on the bond is still 10 percent, and the YTM is 8 percent.

2. Price and yield move in opposite directions; if interest rates rise, the price of the bond will fall. This is because the fixed coupon payments determined by the fixed coupon rate are not as valuable when interest rates rise—hence, the price of the bond decreases.
    $P = \$70(PVIFA_{15\%,20}) + \$1000(PVIF_{15\%,20}) = \$499.25$

3. $P = \$70(PVIFA_{10.5\%,12}) + \$1000(PVIF_{10.5\%,12}) = \$767.25$

4. $P = \$1,145.68 = \$125(PVIFA_{r,8}) + \$1000(PVIF_{r,8})$; $r = YTM = 9.79\%$

5. $P = \$825 = \$C(PVIFA_{7\%,13}) + \$1000(PVIF_{7\%,13})$; $C = \$49.06$; Coupon rate $= 4.91\%$

6. $P = \$41.25(PVIFA_{3.55\%,20}) + \$1000(PVIF_{3.55\%,20}) = \$1081.35$

7. $P = \$927.53 = \$40.00(PVIFA_{r,20}) + \$1000(PVIF_{r,20})$; $r = 4.56\%$; $YTM = 2 \times 4.56 = 9.12\%$

8. $P = \$875 = \$C(PVIFA_{4\%,25}) + \$1000(PVIF_{4\%,25})$; $C = \$32.00$; Coupon rate $= 2 \times 3.2 = 6.40\%$

9. Approximate $= .06 - .04 = .02$; Exact $= (1 + r)(1.04) - 1 = .06$; $r = 1.92\%$

10. $(1 + .015)(1 + .08) - 1 = 9.62\%$

11. $(1 + .12)(1 +$

Intermediate

13. X: $P_0 = \$80(\text{PVIFA}_{7\%,13}) + \$1000(\text{PVIF}_{7\%,13}) = \$1,083.58$
$P_1 = \$80(\text{PVIFA}_{7\%,12}) + \$1000(\text{PVIF}_{7\%,12}) = \$1,079.43$
$P_3 = \$80(\text{PVIFA}_{7\%,10}) + \$1000(\text{PVIF}_{7\%,10}) = \$1,070.24$
$P_8 = \$80(\text{PVIFA}_{7\%,5}) + \$1000(\text{PVIF}_{7\%,5}) = \$1,041.00$
$P_{12} = \$80(\text{PVIFA}_{7\%,1}) + \$1000(\text{PVIF}_{7\%,1}) = \$1,009.35; \ P_{13} = \$1,000$

   Y: $P_0 = \$60(\text{PVIFA}_{7\%,13}) + \$1000(\text{PVIF}_{7\%,13}) = \$916.42$
$P_1 = \$60(\text{PVIFA}_{7\%,12}) + \$1000(\text{PVIF}_{7\%,12}) = \$920.57$
$P_3 = \$60(\text{PVIFA}_{7\%,10}) + \$1000(\text{PVIF}_{7\%,10}) = \$929.76$
$P_8 = \$60(\text{PVIFA}_{7\%,5}) + \$1000(\text{PVIF}_{7\%,5}) = \$959.00$
$P_{12} = \$60(\text{PVIFA}_{7\%,1}) + \$1000(\text{PVIF}_{7\%,1}) = \$990.65; \ P_{13} = \$1,000$

   All else held equal, the premium over par value for a premium bond declines as maturity approaches, and the discount from par value for a discount bond declines as maturity approaches. In both cases, the largest percentage price changes occur at the shortest maturity lengths.

14. If both bonds sell at par, the initial YTM on both bonds is the coupon rate, 8 percent. If the YTM suddenly rises to 10 percent:
$P_A = \$40(\text{PVIFA}_{5\%,4}) + \$1000(\text{PVIF}_{5\%,4}) = \$964.54$
$P_B = \$40(\text{PVIFA}_{5\%,60}) + \$1000(\text{PVIF}_{5\%,60}) = \$810.71$
$\Delta P_A\% = (964.54 - 1000)/1000 = -3.55\%$
$\Delta P_B\% = (810.71 - 1000)/1000 = -18.93\%$
If the YTM suddenly falls to 6 percent:
$P_A = \$40(\text{PVIFA}_{3\%,4}) + \$1000(\text{PVIF}_{3\%,4}) = \$1,037.17$
$P_B = \$40(\text{PVIFA}_{3\%,60}) + \$1000(\text{PVIF}_{3\%,60}) = \$1,276.76$
$\Delta P_A\% = (1,037.17 - 1000)/1000 = +3.72\%$
$\Delta P_B\% = (1,276.76 - 1000)/1000 = +27.68\%$
All else the same, the longer the maturity of a bond, the greater is its price sensitivity to changes in interest rates.

15. Initially, at a YTM of 9 percent, the prices of the two bonds are:
$P_J = \$20(\text{PVIFA}_{4.5\%,24}) + \$1000(\text{PVIF}_{4.5\%,24}) = \$637.61$
$P_K = \$50(\text{PVIFA}_{4.5\%,24}) + \$1000(\text{PVIF}_{4.5\%,24}) = \$1,072.48$
If the YTM rises from 9 percent to 11 percent:
$P_J = \$20(\text{PVIFA}_{5.5\%,24}) + \$1000(\text{PVIF}_{5.5\%,24}) = \$539.69$
$P_K = \$50(\text{PVIFA}_{5.5\%,24}) + \$1000(\text{PVIF}_{5.5\%,24}) = \$934.24$
$\Delta P_J\% = (539.69 - 637.61)/637.61 = -15.36\%$
$\Delta P_K\% = (934.24 - 1,072.48)/1,072.48 = -12.89\%$
If the YTM declines from 9 percent to 7 percent:
$P_J = \$20(\text{PVIFA}_{3.5\%,24}) + \$1000(\text{PVIF}_{3.5\%,24}) = \$759.12$
$P_K = \$50(\text{PVIFA}_{3.5\%,24}) + \$1000(\text{PVIF}_{3.5\%,24}) = \$1,240.88$
$\Delta P_J\% = (759.12 - 637.61)/637.61 = +19.06\%$
$\Delta P_K\% = (1,240.88 - 1,072.48)/1,072.48 = +15.70\%$
All else the same, the lower the coupon rate on a bond, the greater is its price sensitivity to changes in interest rates.

16. The company should set the coupon rate on its new bonds equal to the required return; the required return can be observed in the market by finding the YTM on outstanding bonds of the company.

$P = \$921.69 = \$45(PVIFA_{r,30}) + \$1000(PVIF_{r,30})$; $r = 5.01\%$; YTM $= 2 \times 5.01 = 10.02\%$

17. Current yield $= .081 = \$85.00/P_0$; $P_0 = \$85.00/.081 = \$1,049.38 = 105\%$ of par
Bond closed up 1/2, so yesterday's close $= 104$ 1/2

18. a. Bond price is the present value term when valuing the cash flows from a bond; YTM is the interest rate used in valuing the cash flows from a bond.

b. If the coupon rate is higher than the required return on a bond, the bond will sell at a premium, since it provides periodic income in the form of coupon payments in excess of that required by investors on other similar bonds. If the coupon rate is lower than the required return on a bond, the bond will sell at a discount, since it provides insufficient coupon payments compared to that required by investors on other similar bonds. For premium bonds, the coupon rate exceeds the YTM; for discount bonds, the YTM exceeds the coupon rate, and for bonds selling at par, the YTM is equal to the coupon rate.

c. Current yield is defined as the annual coupon payment divided by the current bond price. For premium bonds, the current yield exceeds the YTM, for discount bonds the current yield is less than the YTM, and for bonds selling at par value, the current yield is equal to the YTM. In all cases, the current yield plus the expected one-period capital gains yield of the bond must be equal to the required return.

19. a. $P_0 = \$1,000/1.09^{10} = \$422.41$

b. $P_1 = \$1,000/1.09^9 = \$460.43$;   year 1 interest deduction $= \$460.43 - \$422.41 = \$38.02$
$P_9 = \$1,000/1.09 = \$917.43$;   year 15 interest deduction $= \$1,000 - \$917.43 = \$82.57$

c. Total interest $= \$1,000 - \$422.41 = \$577.59$
Annual interest deduction $= \$577.59/10 = \$57.76$

d.

CHAPTER 7
EQUITY MARKETS AND STOCK VALUATION

Basic

1. $P_0 = D_0 (1 + g) / (r - g) = \$3.50 (1.06) / (.13 - .06) = \$53.00$
    $P_3 = D_3 (1 + g) / (r - g) = D_0 (1 + g)^4 / (r - g) = \$3.50 (1.06)^4 / (.13 - .06) = \$63.12$
    $P_{15} = D_{15} (1 + g) / (r - g) = D_0 (1 + g)^{16} / (r - g) = \$3.50 (1.06)^{16} / (.13 - .06) = \$127.02$

2. $r = D_1/P_0 + g = \$4.00/\$43.00 + .05 = 14.30\%$

3. Dividend yield $= D_1/P_0 = 9.30\%$;   capital gains yield $= 5\%$

4. $P_0 = D_1/(r - g) = \$2.75 / (.12 - .04) = \$34.38$

5. $r =$ dividend yield + capital gains yield $= .035 + .07 = 10.5\%$

6. Dividend yield $= 1/2(.16) = .08 =$ capital gains yield
    $D_1 = .08(\$50) = \$4.00$; $D_0(1+g) = D_1$; $D_0 = \$4.00 / (1.08) = \$3.70$

7. $P_0 = \$9.00(\text{PVIFA}_{14\%,7}) = \$38.59$

8. $r = D/P_0 = \$12.00/\$150 = 8.00\%$

Intermediate

9. $P_6 = D_7 / (r - g) = \$8.00 / (.24 - .05) = \$42.11$; $P_0 = \$42.11 / 1.24^6 = \$11.58$

10. $P_0 = \$16 / (1.15) + \$18 / (1.15)^2 + \$20/ (1.15)^3 + \$22 / (1.15)^4 = \$53.25$

11. $P_4 = D_4 (1 + g) / (r - g) = \$2.00 (1.06) / (.16 - .06) = \$21.20$
    $P_0 = \$12.00 / (1.16) + \$10.00 / (1.16)^2 + \$6.00 / (1.16)^3 + \$23.20 / (1.16)^4 = \$34.43$

12. $P_3 = D_3 (1 + g)/(r - g) = D_0 (1 + g_1)^3 (1 + g_2) / (r - g) = \$2.25 (1.25)^3 (1.07) / (.11 - .07) = \$117.55$
    $P_0 = \$2.25 (1.25)/(1.11) + \$2.25(1.25)^2/(1.11)^2 + \$2.25(1.25)^3/(1.11)^3 + \$117.55 / (1.11)^3 = \$94.55$

13. $P_0 = D_0 (1 + g) / (r - g) = \$9.00 (0.93) / (.12 + .07) = \$44.05$

14. $P_0 = \$85 = D_0 (1 + g) / (r - g)$; $D_0 = 85(.13 - .05) / (1.05) = \$6.48$

15. $P_4 = \$12.00 / .105 = \$114.29$; $P_0 = \$114.29 / (1.105)^4 = \$76.66$

16. Dividend yield $= .053 = \$2.10 / P_0$; $P_0 = 2.10/.053 = \$39.62 = \$39\ 5/8$
    Stock closed down 3/8, so yesterday's closing price $= 39\ 5/8 + 3/8 = \$40$
    P/E $=$

CHAPTER 8
NET PRESENT VALUE AND OTHER INVESTMENT CRITERIA

Basic

1. Payback = 3 + ($300/$1,200) = 3.25 years

2. Payback = 2 + ($800/$850) = 2.94 years
    = 5 + ($750/$850) = 5.88 years
    7($850) = $5,950; project never pays back if cost is $7,500

3. A: Payback = 2 + ($1,000/$3,000) = 2.33 years
    B: Payback = 3 years
    Using the payback criterion and a cutoff of 2.5 years, accept project A and reject project B.

4. $340,650/$1,000,000 = .3407 or 34.07%

5. $0 = -\$30{,}000 + \$25{,}000/(1+\text{IRR}) + \$10{,}000/(1+\text{IRR})^3$; IRR = 10.59% < r = 11%, so reject the project.

6. NPV = $-\$30{,}000 + \$25{,}000/1.10 + \$10{,}000/1.10^3 = \$240.42$; NPV > 0 so accept the project.
    NPV = $-\$30{,}000 + \$25{,}000/1.14 + \$10{,}000/1.14^3 = -\$1{,}320.46$; NPV < 0 so reject the project.

7. NPV = $-\$1{,}500 + \$400(\text{PVIFA}_{6\%,\,7}) = \$732.95$; accept the project if r = 6%
    NPV = $-\$1{,}500 + \$400(\text{PVIFA}_{22\%,\,7}) = -\$133.80$; reject the project if r = 22%
    $1,500 = $400($\text{PVIFA}_{\text{IRR},\,7}$); IRR = 18.58% ; indifferent about the project if r = 18.58%

8. $0 = -\$1{,}300 + \$400/(1+\text{IRR}) + \$300/(1+\text{IRR})^2 + \$1{,}200/(1+\text{IRR})^3$; IRR = 17.40%

9. NPV = $-\$1{,}300 + \$400 + \$300 + \$1{,}200 = \$600$
    = $-\$1{,}300 + \$400/1.1 + \$300/1.1^2 + \$1{,}200/1.1^3 = \$213.15$
    = $-\$1{,}300 + \$400/1.2 + \$300/1.2^2 + \$1{,}200/1.2^3 = -\$63.89$
    = $-\$1{,}300 + \$400/1.3 + \$300/1.3^2 + \$1{,}200/1.3^3 = -\$268.59$

10. a. S: $\$12{,}500 = \$4{,}000/(1+\text{IRR}) + \$5{,}000/(1+\text{IRR})^2 + \$6{,}000/(1+\text{IRR})^3 + \$1{,}000/(1+\text{IRR})^4$
        IRR = 11.85%
    L: $\$12{,}500 = \$1{,}000/(1+\text{IRR}) + \$6{,}000/(1+\text{IRR})^2 + \$5{,}000/(1+\text{IRR})^3 + \$4{,}000/(1+\text{IRR})^4$
        IRR = 9.53%
    $\text{IRR}_\text{S} > \text{IRR}_\text{L}$, so IRR decision rule implies accept project S. This may not be a correct decision

IRR = 82.06% , – 85.76%
When there are multiple IRRs, the IRR decision rule is ambiguous; in this case, if the correct IRR is 82.06%, then we would accept the project, but if the correct IRR is -85.76%, we would reject the project.

12. PI $= [\$1,000/1.08 + \$800/1.08^2 + \$800/1.08^3] / \$2,000 = 1.123$
   $= [\$1,000/1.12 + \$800/1.12^2 + \$800/1.12^3] / \$2,000 = 1.050$
   $= [\$1,000/1.18 + \$800/1.18^2 + \$800/1.18^3] / \$2,000 = 0.954$

13. a. $PI_X = [\$9,000/1.12 + \$9,000/1.12^2 + \$9,000/1.12^3] / \$20,000 = 1.081$
       $PI_Y = [\$1,700/1.12 + \$1,700/1.12^2 + \$1,700/1.12^3] / \$3,500 = 1.167$
   b. $NPV_X = -\$20,000 + [\$9,000/1.12 + \$9,000/1.12^2 + \$9,000/1.12^3] = \$1,616.48$
       $NPV_Y = -\$3,500 + [\$1,700/1.12 + \$1,700/1.12^2 + \$1,700/1.12^3] = \$583.11$
   c. The profitability index often cannot correctly rank mutually exclusive projects. The best decision is always to maximize NPV.

14. a. $PB_A = 3 + (\$115K/\$375K) = 3.31$ years; PB_B = never
       Payback criterion implies accept project A, because it pays back sooner than project B.
   b.   A: $NPV = - \$175K + \$10K/1.15 + \$25K/1.15^2 + \$25K/1.15^3 + \$375K/1.15^4 =$
          $\$83,444.62$
       B: $NPV = - \$20K + \$10K/1.15 + \$5K/1.15^2 + \$3K/1.15^3 + \$1K/1.15^4 = - \$4,979.33$
          NPV criterion implies accept project A, because project A has a higher NPV than project B.
   c.   A: $\$175K = \$10K/(1+IRR) + \$25K/(1+IRR)^2 + \$25K/(1+IRR)^3 + \$375K/(1+IRR)^4$
          IRR = 27.94%
       B: $\$20K = \$10K/(1+IRR) + \$5K/(1+IRR)^2 + \$3K/(1+IRR)^3 + \$1K/(1+IRR)^4$; IRR $= - 2.89\%$
          IRR decision rule implies accept project A, because IRR for A is greater than IRR for B.
   d.   A: $PI = [\$10K/1.15 + \$25K/1.15^2 + \$25K/1.15^3 + \$375K/1.15^4] / \$175K = 1.477$
       B: $PI = [\$10K/1.15 + \$5K/1.15^2 + \$3K/1.15^3 + \$1K/1.15^4] / \$20K = .751$
          Profitability index criterion implies accept project A, because its PI is greater than project B's.
   e.   In this instance, the NPV criterion happens to be consistent with the other methods.

15. NPV @ r = 0% $= - \$243,715 + \$75,429 + \$153,408 + \$102,389 + \$45,000 = \$132,511$
   NPV @ r = $\infty = - \$243,715$
   NPV = 0 $= -\$243,715 + \$75,429/(1+IRR) + \$153,408/(1+IRR)^2 + \$102,389/(1+IRR)^3$
          $+ \$45,000/(1+IRR)^4$; IRR = 21.5%

16. If a project has a positive NPV and conventional cash flows then the project does pay back, although the decision rule may not agree with NPV analysis. The profitability index must be larger than one and the IRR must be greater than the required return.

Intermediate

17. a. Payback period is the time required for an investment to generate sufficient cash flows to recover its initial cost. The decision rule for the payback period is to accept a project if the calculated payback period is less than the cutoff value.

b. Ignores the time value of money, requires an arbitrary cutoff point, ignores cash flows beyond the cutoff, biased against long-term projects and new projects.

c. Easy to understand, adjusts for uncertainty of later cash flows, biased toward liquidity. The payback period is often used for small, everyday investment decisions and does provide some control over expenditures.

18. a. AAR is calculated as average net income divided by average book value. The decision rule is to accept a project if the average accounting return exceeds a target average accounting return.

b. Problems – Not a true rate of return, ignores the time value of money, uses an arbitrary benchmark cutoff, based on accounting returns, not cash flows, and based on book values, not market values. The most redeeming feature is that the required information is usually available.

19. a. NPV is the present value of all cash inflows minus the present value of all cash outflows. The decision rule is to accept all projects with a positive NPV and reject all projects with a negative NPV.

b. NPV takes into account all cash flows and the time value of money. If a project's NPV is $2,500, the project will increase shareholder wealth by $2,500

20. a. IRR is the discount rate which yields a zero NPV. The IRR is the rate of return on the project. The decision rule is to accept the project if the IRR is greater than the required return.

b. IRR and NPV are calculated in the same method and will always give the same answer when evaluating conventional cash flows. NPV is the preferred method when cash flows are not conventional or when two projects are mutually exclusive.

c. The IRR provides a simpler method of communicating information concerning the project. It also provides a practical advantage since the appropriate discount rate is often not required.

21. a. The profitability index is the present value of future cash flows divided by the initial investment. The decision rule is to accept the project if the profitability index is greater than one.

b. The profitability index and NPV will give identical answers when evaluating an individual project. The profitability index may lead to an erroneous decision when comparing mutually exclusive projects.

22. $-\$252 = \$1,431/(1+\text{IRR}) - \$3,035/(1+\text{IRR})^2 + \$2,850/(1+\text{IRR})^3 - \$1,000/(1+\text{IRR})^4$
IRR $= 25\%, 33.33\%, 42.85\%, 66.67\%$

CHAPTER 9
MAKING CAPITAL INVESTMENT DECISIONS

Basic

1. Financing costs are important to the firm as a whole, however the mix of debt and equity a firm chooses to use is determined by the managers of the firm and determines how the project cash flows are to be divided between owners and creditors. The financing decision needs to be analyzed separately from the project, not as part of the project.

2. The $6 million acquisition cost of the land six years ago is a sunk cost. The $500,000 current appraisal of the land is an opportunity cost if the land is used rather than sold off. The $8 million cash outlay is the initial fixed asset investment needed to get the project going. The $300,000 grading cost is also part of the initial cash outlay. Therefore, the proper year zero cash flow to use in evaluating this project is $500,000 + 8,000,000 + 300,000 = $8.8 million.

3. Sales due solely to the new product line are 15,000($19,000) = $285 million. Increased sales of the compact cars occur because of the new product line introduction; thus 7,000($11,000) = $77 million in new sales is relevant. Erosion of luxury sedan sales is also due to the new mid-size sedans; thus 4,000($29,000) = $116 million loss in sales is relevant. The net sales figure to use in evaluating the new line is thus $285 million + $77 million – $116 million = $246 million.

4.

Sales	$ 975,000
Variable costs	536,250
Fixed costs	180,000
Depreciation	125,000
EBT	$ 133,750
Taxes@35%	46,812
Net income	$ 86,938

5.

Sales	$ 535,200	OCF = EBIT + D – T
Costs	302,000	= 124,200 + 109,000 – 48,438 = $184,762
Depreciation	109,000	
EBT	$ 124,200	
Taxes@39%	48,438	
Net income	$ 75,762	

6.

Sales	$ 69,535.00
Costs	21,757.00
Depreciation	9,853.00
EBT	$ 37,925.00
Taxes@34%	12,894.50
Net income	$ 25,030.50

OCF = EBIT + D – T = 37,925 + 9,853 – 12,894.50 = $34,883.50

7. A/R increased by $3,000, and inventory increased by $4,900, so net current assets increased by $7,900

ΔNWC = Δ(CA – CL) = 7,900 – 1,150 = 6,750

Net cash flow = S – C – ΔNWC = 49,855 – 34,520 – 6,750 = $8,585

8.

Sales	$1,600,000	OCF = EBIT + D – T
Costs	600,000	= 300,000 + 700,000 – 105,000 = $895,000
Depreciation	700,000	
EBT	$ 300,000	
Taxes@39%	105,000	
Net income	$ 195,000	

9. NPV = – $2.1M + $895,000(PVIFA$_{12\%,3}$) = $49,638.99

10.

Year	Cash Flow
0	– 2.1M – 100K = – 2.2M
1	895K
2	895K
3	895K + 100K = $995,000

NPV = – $2.2M + $895K(PVIFA$_{12\%,2}$) + ($995,000 / 1.12^3) = $20,817

11. Worst Case: price = $212.50, variable costs = $155.25, fixed costs = $9.2M, quantity = 85,000

Best Case: price = $287.50, variable costs = $114.75, fixed costs = $6.8M, quantity = 115,000

12. An estimate for the impact of changes in price on the profitability of the project can be found from the sensitivity of the NPV with respect to price; ΔNPV/ΔP. This measure can be calculated by finding the NPV at two different price levels and forming the ratio of the changes in these parameters. Whenever a sensitivity analysis is performed, all other variables are held constant at their base-case values.

13. Forecasting risk is the risk that a poor decision is made because of errors in projected cash flows. The danger is greatest with a new project because the cash flows are probably harder to predict.

14. The option to abandon reflects our ability to reallocate assets if we find our initial estimates were too optimistic. The option to expand reflects our ability to increase cash flows from a project if we find our initial estimates were too pessimistic. Since the option to expand can increase cash flows and the option to abandon reduces losses, failing to consider these two options will generally lead us to underestimate a project's NPV.

15. The marketing survey is a sunk cost and should be ignored.

Sales	$300,000
Variable costs	90,000
Fixed costs	125,000
Depreciation	50,000
EBT	$ 35,000
Taxes@40%	14,000
Net income	$ 21,000

OCF = EBIT + D – T = $35,000 + 50,000 – 14,000 = $71,000

Payback Period = $200,000 / $71,000 = 2.82 years

$$NPV = -\$200,000 + \$71,000(PVIFA_{9\%,4}) = \$30,020.11$$
$$IRR = 15.67\%$$

Intermediate

16.   Base case

Sales	$3,992,000
Variable costs	2,880,000
Fixed costs	750,000
Depreciation	160,000
EBT	$ 202,000
Taxes@35%	70,700
Net income	$ 131,300

$$OCF = EBIT + D - T = \$202,000 + 160,000 - 70,700 = \$291,300$$
$$NPV = -\$960,000 + \$291,300(PVIFA_{12\%,6}) = \$237,652.95$$

1,000 unit decrease in sales

Sales	$3,967,050
Variable costs	2,862,000
Fixed costs	750,000
Depreciation	160,000
EBT	$ 195,050
Taxes@35%	68,268
Net income	$ 126,782

$$OCF = EBIT + D - T = \$195,050 + 160,000 - 68,268 = \$286,782$$
$$NPV = -\$960,000 + \$286,782(PVIFA_{12\%,6}) = \$219,077.62$$

If sales decrease by 1,000 units the NPV decreases by $18,575.33

17.   Best case

Sales	$4,830,320
Variable costs	2,851,200
Fixed costs	675,000
Depreciation	160,000
EBT	$1,144,120
Taxes@35%	400,442
Net income	$ 743,678

$$OCF = EBIT + D - T = \$1,144,120 + 160,000 - 400,442 = \$903,678$$
$$NPV = -\$960,000 + \$903,678(PVIFA_{12\%,6}) = \$2,755,388.35$$

Worst case

Sales	$3,233,520	
Variable costs	2,851,200	
Fixed costs	825,000	
Depreciation	160,000	
EBT	$ (602,680)	
Taxes@35%	210,938	(assume tax credit)
Net income	$ (391,742)	

$OCF = EBIT + D - T = (-\$602,680) + 160,000 + 210,938 = -\$231,742$
$NPV = -\$960,000 + (-\$231,742)(PVIFA_{12\%,6}) = -\$1,912,785.76$

18. a.

	Upper	Lower
Sales	112 units	88 units
Variable cost	$16,800	$13,200
Fixed costs	$224,000	$176,000

Base case

Sales	$2,200,000
Variable costs	1,500,000
Fixed costs	200,000
Depreciation	180,000
EBT	$ 320,000
Taxes@35%	112,000
Net income	$ 208,000

$OCF = EBIT + D - T = \$320,000 + 180,000 - 112,000 = \$388,000$
$NPV = -\$720,000 + \$388,000(PVIFA_{8\%,4}) = \$565,105.21$

Best case

Sales	$2,464,000
Variable costs	1,478,400
Fixed costs	176,000
Depreciation	180,000
EBT	$ 629,600
Taxes@35%	220,360
Net income	$ 409,240

$OCF = EBIT + D - T = \$629,600 + 180,000 - 220,360 = \$589,240$
$NPV = -\$720,000 + \$589,240(PVIFA_{8\%,4}) = \$1,231,637.62$

Worst case

Sales	$1,936,000
Variable costs	1,478,400
Fixed costs	224,000
Depreciation	180,000
EBT	$ 53,600
Taxes@35%	18,760
Net income	$ 34,840

$OCF = EBIT + D - T = \$53,600 + 180,000 - 18,760 = \$214,840$
$NPV = -\$720,000 + \$214,840(PVIFA_{8\%,4}) = -\$8,422.67$

b.   <u>Fixed costs at maximum</u>
           Sales $2,200,000
           Variable costs   1,500,000
           Fixed costs   224,000
           Depreciation   <u>180,000</u>
           EBT $ 296,000
           Taxes@35%   <u>103,600</u>
           Net income   <u>$ 192,400</u>

           OCF = EBIT + D – T = $296,000 + 180,000 – 103,600 = $372,400
           NPV = –$720,000 + $372,400(PVIFA$_{8\%,4}$) = $513,436.04
           ΔNPV/ΔCost = ($565,105.21 – 513,436.04) / ($200,000 – 224,000) = –$2.15

CHAPTER 10
SOME LESSONS FROM CAPITAL MARKET HISTORY

Basic

1. R = [$1.95 + ($53 – $69)] / $69 = – 20.36%

2. Dividend yield = $1.95 / $69 = 2.83%; Capital gains yield = ($53 – $69) / $69 = – 23.19%

3. R = [$1.95 + ($78 – $69)] / $69 = 15.87%
Dividend yield = $1.95 / $69 = 2.83% ;   Capital gains yield = ($78 – $69) / $69 = 13.04%

4. a. Dollar return = $100 – $30 = $70
b. Nominal return = [$100 + ($935 – $965)] / $965 = 7.25%
c. r = [(1+.0725) / (1+.05)] – 1; r = 2.14%

5. a. 13.0 %
b. r = [(1 + .13) / (1 + .032)] – 1; r = 9.50%

6. Long-term government bonds: r = [(1 + .056) / (1 + .032)] – 1; r = 2.33%
Long-term corporate bonds: r = [(1 + .061) / (1 + .032)] – 1; r = 2.81%

7. $\overline{X} = \left[\sum_{i=1}^{N} x_i\right]\bigg/ N = \dfrac{[.16 + .04 - .08 + .10 + .06]}{5} = 5.6\%$

$\overline{Y} = \left[\sum_{i=1}^{N} y_i\right]\bigg/ N = \dfrac{[.32 - .08 - .17 + .30 + .18]}{5} = 11.00\%$

$s_X{}^2 = \left[\sum_{i=1}^{N} (x_i - \overline{x})^2\right]\bigg/ (N-1)$

$= \dfrac{1}{5-1}\left\{(.16-.056)^2 + (.04-.056)^2 + (-.08-.056)^2 + (.10-.056)^2 + (.06-.056)^2\right\} = .00788$

$s_Y{}^2 = \dfrac{1}{5-1}\left\{(.32-.11)^2 + (-.08-.11)^2 + (-.17-.11)^2 + (.30-.11)^2 + (.18-.11)^2\right\} = .0499$

$s_X = \sqrt{.00788} = 0.08877 = 8.877\% \quad ; \quad s_Y = \sqrt{.0499} = 0.2234 = 22.34\%$

8.

Year	Small co. stock return	T-bill return	Risk premium
1990	–21.56%	7.81%	–29.37%
1991	44.63	5.60	39.03
1992	23.35	3.51	19.84

1993	20.98	2.90	18.08
1994	3.11	3.90	–0.79
1995			

17.7% + 3(33.9) = 119.4%. Since we are only interested in the upper tail of the interval, the probability is greater than .5% and less than 2.5%, thus ≈ 1%.

16. Ignoring trading costs, on average, investors merely earn what the market offers; the trades all have a zero NPV. If trading costs exist, then these investors lose by the amount of the costs.

17. The EMH only says, within the bounds of increasingly strong assumptions about the information processing of investors, that assets are fairly priced. An implication of this is that, on average, the typical market participant cannot earn excessive profits from a particular trading strategy. However, that does not mean that a few particular investors cannot outperform the market over a particular investment horizon. Certain investors who do well for a period of time get a lot of attention from the financial press, but the scores of investors who do not do well over the same period generally get considerably less attention from the financial press.

18. a.   If the market is not weak form efficient, a trading pattern may be developing for technical analysts. For (2), (3) and (4), no information about the future price of the stock can be determined.

b. Profit opportunities exist for (1) and (2) since the market has not fully absorbed all public information. No opportunities exist in (3) and (4) since the market has already priced the anomaly you believe you have found.

c. Profit opportunities may exist for (1), (2) and (3). Since senior management has been buying stock, you may assume it is based on private information which is not priced in the stock. No opportunities exist for (4).

CHAPTER 11
RISK AND RETURN

Basic

1. total value $= 50(\$45) + 30(\$65) = \$4,200$
    $\text{weight}_1 = 50(\$45)/\$4,200 = .5357$; $\text{weight}_2 = 30(\$65)/\$4,200 = .4643$

2. $E[R_p] = (\$1,000/\$3,000)(0.18) + (\$2,000/\$3,000)(0.12) = .14$

3. $E[R_p] = .40(.10) + .35(.16) + .25(.23) = .1535$

4. $E[R_p] = .17 = .20w_H + .12(1 - w_H)$; $w_H = 0.625$
    investment in H $= 0.625(\$100,000) = \$62,500$;   investment in L $= (1 - 0.625)(\$100,000) = \$37,500$

5. $E[R] = .3(.08) + .7(.26) = 20.6\%$

6. $E[R] = .1(-.09) + .7(.11) + .2(.28) = 12.4\%$

7. $E[R_A] = .20(.04) + .60(.08) + .20(.16) = 8.8\%$
    $E[R_B] = .20(-.2) + .60(.20) + .20(.60) = 20.0\%$
    $\sigma^2_A = .2(.04 - .088)^2 + .6(.08 - .088)^2 + .2(.16 - .088)^2 = .001536$; $\sigma_A = [.001536]^{1/2} = .03919$
    $\sigma^2_B = .2(-.20 - .20)^2 + .6(.20 - .20)^2 + .2(.60 - .20)^2 = .064$; $\sigma_B = [.064]^{1/2} = .2530$

8. $E[R_p] = .4(.12) + .4(.18) + .2(.34) = 18.8\%$

9. *a.* boom: $E[R_p] = (.14 + .18 + .26)/3 = .1933$;   bust: $E[R_p] = (.08 + .02 - .02)/3 = .0267$
        $E[R_p] = .65(.1933) + .35(.0267) = .135$
    b. boom: $E[R_p] = .25(.14) + .25(.18) + .5(.26) = .21$; bust: $E[R_p] = .25(.08) + .25(.02) +$
        $.5(-.02) = .015$
        $E[R_p] = .65(.21) + .35(.015) = .1418$
        $\sigma^2_p = .65(.21 - .1418)^2 + .35(.015 - .1418)^2 = .00865$

10. *a.* boom: $E[R_p] = .4(.11) + .3(.35) + .3(.18) = .203$
        good: $E[R_p] = .4(.06) + .3(.15) + .3(.11) = .102$
        poor: $E[R_p] = .4(.04) + .3(-.05) + .3(.02) = .007$
        bust: $E[R_p] = .4(.00) + .3(-.40) + .30(-.06) = -.138$
        $E[R_p] = .20(.203) + .50(.102) + .25(.007) + .05(-.138) = .0865$
    b. $\sigma^2_p = .20(.203 - .0865)^2 + .50(.102 - .0865)^2 + .25(.007 - .0865)^2 + .05(-.138 - .0865)^2$
        $\sigma^2_p = .00693$; $\sigma_p = [.00693]^{1/2} = .0832$

11. Unsystematic risk is diversifiable since such events are random in nature. Systematic risk cannot be eliminated since it represents risks of the market and economy in general, thus an investor can control unsystematic risk, but not systematic risk.

12. Unable to determine. Stock prices would most likely decrease if the decrease in the growth rate was not anticipated by the market. If the growth rate was anticipated by the market, there would be no change in the stock prices.

13. a. Mostly systematic, unsystematic to stocks such as banks
   b. Unsystematic
   c. Mostly systematic, unsystematic to stocks such as oil companies
   d. Unsystematic
   e. Unsystematic
   f. Mostly systematic

14. a. Stock prices in general.
   b. Big Widget's stock specifically; however there should be no change in stock price.
   c. Should cause no change as the information is already impounded in stock prices.
   d. Big Widget's stock specifically.
   e. Stock prices in general if the bill passing was uncertain.

15. $ß_p = .3(1.4) + .2(.95) + .25(1.2) + .25(.8) = 1.11$

16. $ß_p = 1.0 = {}^1/_3(0) + {}^1/_3(1.4) + {}^1/_3(ß_X) ;$ $ß_X = 1.60$

17. $E[R_i] = .08 + (.17 - .08)(1.2) = .188$

18. $E[R_i] = .14 = .04 + .06ß_i ;$ $ß_i = 1.67$

19. $E[R_i] = .15 = .06 + (E[R_{mkt}] - .06)(.9) ;$ $E[R_{mkt}] = .16$

20. $E[R_i] = .22 = R_f + (.16 - R_f)(1.6) ;$ $R_f = .06$

21. *a.* $E[R_p] = (.13 + .07)/2 = .10$
   b. $ß_p = 0.6 = w_S(0.9) + (1 - w_S)(0) ;$ $w_S = 0.6/0.9 = .6666 ;$ $w_{Rf} = 1 - .6666 = .3333$
   c. $E[R_p] = .11 = .13w_S + .07(1 - w_S) ;$ $w_S = {}^2/_3 ;$ $ß_p = {}^2/_3(0.9) + {}^1/_3(0) = 0.6$
   d. $ß_p = 1.8 = w_S(0.9) + (1 - w_S)(0) ;$ $w_S = 1.8/0.9 = 2 ;$ $w_{Rf} = 1 - 2 = -1$
       The portfolio is invested 200% in the stock and –100% in the risk-free asset. This represents borrowing at the risk-free rate to buy more of the stock.

22. $ß_p = w_W(1.4) + (1 - w_W)(0) = 1.4w_W$
   $E[R_W] = .18 = .08 + MRP(1.40) ;$ $MRP = .10/1.4 = .0714$; slope of line $= MRP = .0714$

x_W	$E[R_p]$	$ß_p$	x_W	$E[R_p]$	$ß_p$
0%	.08	0	100%	.180	1.4
25	.105	0.35	125	.205	1.75
50	.130	0.7	150	.230	2.1
75	.155	1.05			

23. $E[R_i] = .06 + .103ß_i$
   $.25 > E[R_M] = .06 + .103(1.40) = .2042$;

Although stock B has more total risk than A, it has much less systematic risk, since its beta is much smaller than A's. Thus A has more systematic risk, and B has more unsystematic and more total risk. Since unsystematic risk can be diversified away, A is actually the "riskier" stock despite the lack of volatility in its returns. Stock A will have a higher risk premium and a greater expected return.

CHAPTER 12
COST OF CAPITAL

Basic

1. $R_E = [\$3.50(1.07)/\$74] + .07 = 12.06\%$

2. $R_E = .04 + 1.10(.14 - .04) = 15.00\%$

3. $R_{E1} = .05 + 1.25(.09) = .1625;$ $R_{E2} = [\$3.75(1.05)/\$39.25] + .05 = .1503$
    $R_E = (.1625 + .1503)/2 = 15.64\%$

4. $g_1 = (1.19 - 1.05)/1.05 = .1333;$ $g_2 = (1.28 - 1.19)/1.19 = .0756$
    $g_3 = (1.40 - 1.28)/1.28 = .0938;$ $g_4 = (1.57 - 1.40)/1.40 = .1214$
    $g = (.1333 + .0756 + .0938 + .1214)/4 = .1060$
    $R_E = [\$1.57(1.1060)/\$62.00] + .1060 = 13.40\%$

5. $R_P = \$7/\$80 = 8.75\%$

6. $P_0 = \$900 = \$30.00(PVIFA_{R,20}) + \$1,000(PVIF_{R,20});$ $R = 3.7175\%$
    pretax cost of debt $= YTM = 2 \times 3.7175 = 7.435\%$
    $R_D = .07435(1 - .35) = 4.833\%$

7. *a.* $P_0 = \$1,150 = \$50(PVIFA_{R,46}) + \$1,000(PVIF_{R,46});$ $R = 4.252\%$
         pretax cost of debt $= YTM = 2 \times 4.252 = 8.504\%$
    b. $R_D = .08504(1 - .38) = 5.272\%$
    c.   The after-tax rate is more relevant because that is the actual cost to the company.

8. $BV_D = \$70M + \$30M = \$100M$
    $MV_D = 1.15(\$70M) + 0.43(\$30M) = \$93.4M$
    $P_Z = \$430 = \$1,000(PVIF_{R,9});$ $R = 9.831\%;$ $R_Z = .09831(1 - .38) = 6.095\%$
    $R_D = 0.05272(80.5/93.4) + 0.06095(12.9/93.4) = 5.386\%$

9. *a.* $WACC = .35(.19) + .10(.08) + .55(.11)(1 - .38) = 11.20\%$
    b.   Since interest is tax deductible and dividends are not, we must look at the after-tax cost of debt, which is $.11(1 - .38) = 6.82\%$. Hence, on an after-tax basis, debt is cheaper than the preferred stock.

10. $WACC = .24(.625) + .15(.375)(1 - .34) = 18.71\%$

11. $WACC = .1075 = .15(E/V) + .0875(D/V)(1 - .38)$
    $.1075(V/E) = .15 + .0875(.62)(D/E)$
    $.1075(D/E + 1) = .15 + .0543(D/E);$ $.0532(D/E) = .0425;$ $D/E = 0.7988$

12. *a.* $BV_E = 9.8M(\$12) = \$117.6M$; $BV_D = \$100M + \$50M = \$150M$
$V = 117.6 + 150 = \$267.6M$: $E/V = 117.6/267.6 = 0.4395$; $D/V = 1 - E/V = 0.5605$

b. $MV_E = 9.8M(\$35) = \$343M$; $MV_D = 0.94(\$100M) + 0.96(\$50M) = \$142M$
$V = 343 + 142 = \$485M$: $E/V = 343/485 = 0.7072$; $D/V = 1 - E/V = 0.2928$

c.   The market value weights are more relevant.

13. $R_E = [\$2.75(1.08)/\$35] + .08 = .1649$
$P_1 = \$940 = \$40(PVIFA_{R,26}) + \$1,000(PVIF_{R,26})$; $R = 4.3916\%$, $YTM = 8.7832\%$
$P_2 = \$960 = \$35(PVIFA_{R,16}) + \$1,000(PVIF_{R,16})$; $R = 3.8392\%$, $YTM = 7.6784\%$
$R_D = (1 - .35)[(.6620)(.087832) + (.3380)(.076784)] = .054664$
$WACC = .2928(.054664) + .7072(.1649) = 13.26\%$

14. *a.* $WACC = .13 = (.25)(.18) + (.75)(1 - .35)R_D$; $R_D = 17.44\%$

b. $WACC = .13 = (.25)R_E + (.75)(.07)$; $R_E = 31.00\%$

15. $MV_D = 3,000(\$1,000)(1.02) = \$3.06M$; $MV_E = 75,000(\$55) = \$4.125M$
$MV_P = 10,000(\$63) = \$0.630M$; $V = 3.060 + 4.125 + 0.630 = \$7.815M$
$R_E = .05 + .95(.08) = 12.60\%$
$P_0 = \$1,020 = \$75(PVIFA_{R,8}) + \$1,000(PVIF_{R,8})$; $YTM = 7.163\%$
$R_D = (1 - .35)(.07163) = 4.656\%$
$R_P = \$6/\$63 = 9.524\%$
$WACC = .04656(3.060/7.815) + .1260(4.125/7.815) + .09524(0.630/7.815) = 9.242\%$

16. *a.* $MV_D = 300,000(\$1,000)(1.03) = \$309M$; $MV_E = 6M(\$43) = \$258M$
$MV_P = 750,000(\$75) = \$56.25M$; $V = 309 + 258 + 56.25 = \$623.25M$
$D/V = 309/623.25 = .496$; $P/V = 56.25/623.25 = .090$; $E/V = 258/623.25 = .414$

b.   For projects equally as risky as the firm

19. The SML approach explicitly considers risk and can be applied to non-dividend paying companies. The disadvantages are the two estimations, the market risk premium and beta. It also depends on the past to predict the future.

20. The cost of debt for a particular company is found by the YTM of current debt in the market. If the firm has only private debt, its' cost of debt is simply the rate that lenders demand. If the debt held by institutional investors is rated, we could use the YTM from bonds with the same rating and maturity.

21. a. Shareholders return is the dividend yield and capital gains yield. He is neglecting the capital gains yield.
b. The cost of debt is based on the YTM the market requires on new debt, not payments on outstanding debt.
c. Since equity is riskier than debt, equity will have a higher expected return, thus, he has failed to accurately assess the reasonableness of his estimates. In addition, he is not accounting for the fact that interest expense is tax deductible and the cost of debt should be evaluated on an aftertax basis.

22. The divisional cost of capital should be used when a company has different divisions which have different levels of risk. The riskier division would get more money since they would have greater returns, however this ignores the greater risk. A major problem which occurs is that it becomes difficult to separate the needed factors to estimate the cost of capital. For example, while it is possible to obtain a beta estimate for the firm as a whole, there is no beta for the various divisions of the firm. Two methods that are often used are the pure play approach and the subjective approach. The pure play approach uses the WACC based on companies in similar lines of business. The subjective approach adjusts the WACC based on the risk of the project.

CHAPTER 13
LEVERAGE AND CAPITAL STRUCTURE

Basic

1. *a.*

EBIT:	$6,000	$10,000	$13,000
Interest:	0	0	0
NI:	$6,000	$10,000	$13,000
EPS:	$ 6.00	$ 10.00	$ 13.00
ΔEPS%:	–40	—	+30

b. MV $75,000/1,000 shares = $75 per share; $36,000/$75 = 480 shares bought back

EBIT:	$6,000	$10,000	$13,000
Interest:	3,600	3,600	3,600
NI:	$2,400	$ 6,400	$ 9,400
EPS:	$ 4.62	$ 12.31	$ 18.08
ΔEPS%:	–62.47	—	+46.87

2. *a.*

Plan I: NI = $600K ; EPS = $600K/200K shares = $3.00
Plan II: NI = $600K – .10($4M) = $200K ; EPS = $200K/100K shares = $2.00
Plan I has the higher EPS when EBIT is $600,000.

b. Plan I: NI = $3.4M ; EPS = $3.4M/200K shares = $17.00
Plan II: NI = $3.4M – .10($4M) = $3M ; EPS = $3.0M/100K shares = $30.00
Plan II has the higher EPS when EBIT is $3,400,000.

c. EBIT/200K = [EBIT – .10($4M)]/100K ;   EBIT = $800,000; EPS = $4.00

3. P = $4M/100K shares bought with debt = $40 per share
V_1 = $40(200K shares) = $8M; V_2 = $40(100K shares) + $4M debt = $8M

4. *a.*

	I	*II*	*all-equity*
EBIT:	$5,000	$5,000	$5,000
Interest:	700	280	0
NI:	$4,300	$4,720	$5,000
EPS:	$ 6.62	$ 5.49	$ 5.00

The all-equity plan has the lowest EPS; Plan I has the highest EPS.

b. Plan I vs. all-equity: EBIT/1,000 = [EBIT – .08($8,750)]/650;   EBIT = $2,000
Plan II vs. all-equity: EBIT/1,000 = [EBIT – .08($3,500)]/860;   EBIT = $2,000
The break-even levels of EBIT are the same because of M&M Proposition I.

c. [EBIT – .08($8,750)]/650 = [EBIT – .08($3,500)]/860 ;   EBIT = $2,000
This break-even level of EBIT is the same as in part (b) again because of M&M Proposition I.

5. I: P = $8,750/350 shares bought with debt = $25 per share; II: P = $3,500/140 shares = $25
This shows that when there are no corporate taxes, the

6.   *a.*   EPS = $2,000/800 shares = $2.50; Smith's cash flow = $2.50(120 shares) = $300

      b.   V = $65(800) = $52,000;   D = 0.30($52,000) = $15,600
          $15,600/$65 = 240 shares are bought;   NI = $2,000 – .11($15,600) = $284
          EPS = $284/560 shares = $0.507;   Smith's cash flow = $0.507(120 shares) = $60.84

      c.   Sell 36 shares of stock and lend the proceeds at 11%

CHAPTER 14
DIVIDENDS AND DIVIDEND POLICY

Basic

1. It would not be irrational to find low-dividend, high-growth stocks. The university should be indifferent between receiving dividends or capital gains since it does not pay taxes on either one (ignoring possible restrictions on invasion of principal, etc.). It would be irrational to hold municipal bonds. Since the university does not pay taxes on interest income it receives, it does not need the tax break associated with municipal bonds. Therefore, it should prefer to hold higher yielding, taxable bonds.

2. *a.* $60(4/5) = $48.00
   b. $60(1/1.10) = $54.55
   c. $60(1/1.425) = $42.11
   d. $60(5/3) = $100.00
   e. *a:* 500,000(5/4) = 625,000   *b:* 500,000(1.10) = 550,000
       c: 500,000(1.425) = 712,500   *d:* 500,000(3/5) = 300,000

3. The ex-dividend date is Friday, January 8. A shareholder purchasing stock before this date receives the dividend.

4. P_0 = $245,000 / 7,000 = $35 per share
   P_X = $35.00 – $1.25 = $33.75

Assets		Liabilities and equity	
Cash	$ 26,250	Equity	$ 236,250
Fixed Assets	210,000		

5. Repurchasing the shares will reduce shareholders' equity by $8,750.
   Shares bought = $8,750/$35 = 250; New shares outstanding = 6,750.
   After repurchase, share price = $236,250 equity/6,750 shares = $35. The repurchase is effectively the same as the cash dividend because you either hold a share worth $35 or a share worth $33.75 and $1.25 in cash. Therefore you participate in the repurchase according to the dividend payout percentage; you are unaffected.

6. P_O = $4,500,000 equity/100,000 shares = $45.   New shares outstanding = 100,000(1.10) = 110,000
   P_X = $4,500,000/110,000 shares = $40.91

7. *a.* Cash dividend: DPS = $6,000/500 shares = $12.00; P_X = $52 – $12 = $40 per share.
                       wealth of a shareholder = a share worth $40 plus $12 cash = $52.
       Repurchase: $6,000/$52 = 115.38 shares will be repurchased. If you choose to let your shares
                       be repurchased, you have $52 in cash; if you keep your shares, they're still worth $52.
   b. Dividends: EPS = $6.00;   P/E = $40/$6.00 = 6.67
       Repurchase: EPS = $6(500)/384.62 = $7.80;   P/E = $52/$7.80 = 6.67
   c. A share repurchase would seem to be the preferred course of action. Only those shareholders who wish to sell will do so, giving the shareholder a tax timing option that he or she doesn't get with a dividend payment.

8.   No. Mutual fund shareholders who cannot participate in such alternative dividends will have their stock value reduced by other shareholders who can participate in such dividends. The mutual funds would be better off investing in stocks which pay a cash dividend which will benefit the fundholders directly.

9.   Dividends are a cash outflow for corporations. IPOs are undertaken by new companies which are unlikely to have cash available to pay dividends to shareholders.

10.   The biggest drawback to a residual dividend policy is that the dividend is unstable. This is a problem because investors often to want a somewhat predictable cash flow. Also, if there is information content to dividend announcements, then the firm may be inadvertently telling the market that it is expecting a downturn in earnings prospects when it cuts a dividend, when in reality its prospects are very good. In a compromise dividend policy, the firm maintains a relatively constant dividend. It increases dividends when it expects earnings to remain at a sufficiently high level to pay the larger dividend, and it lowers the dividend only if it absolutely has to.

CHAPTER 15
RAISING CAPITAL

Basic

1. He could have done worse since his access to oversubscribed and, presumably, underpriced issues was restricted while the bulk of his funds were allocated to stocks from the undersubscribed and, quite possibly, overpriced issues.

2. IPOs are not always underpriced. Your ability to make money is directly related to your ability to purchase only the IPOs that are underpriced.

3. They are riskier and harder to market from the investment bank's perspective.

4. Yields on comparable bonds can usually be readily observed, so pricing a bond accurately is much less difficult.

5. It is clear that the stock was sold too cheaply, so Netscape had reason to be unhappy.

6. No, but in fairness, pricing the stock in such a situation is difficult.

7. It's an important factor. Only 5 million shares were underpriced. The other 33 million were, in effect, priced completely correctly.

8. If you receive 1,000 shares of each, the profit is 1,000($4) – 1,000($2) = $2,000
    Expected profit = 500($4) – 1,000($2) = $0. This is an example of the winner's curse.

9. X(1 – .06) = $25M; X = $26,595,744.68 required total funds from the sale.
    number of shares offered = $26,595,744.68/$40 = 664,894

10. X(1 – .06) = $25.350M; X = $26,968,085.11 required total funds from the sale.
    number of shares offered = $26,968,085.11/$40 = 674,202

11. *a.* The price will probably go up because IPOs are generally underpriced. This is especially true for smaller issues such as this one.
    b. It is probably safe to assume that they are having trouble moving the issue, and it is likely that the issue is not substantially underpriced.

CHAPTER 16
SHORT-TERM FINANCIAL PLANNING

Basic

1. Cash = $1,400 + $4,500 – $1,600 – $2,300 = $2,000
   Current assets = $1,600 + $2,000 + $1,175 = $4,775

2. Carrying cost will decrease because they are not holding goods in inventory. Shortage costs will probably increase depending on how close the suppliers are and how well they can estimate need. The operating cycle will decrease because the inventory period is decreased.

3. *a.* D   *b.* D   *c.* I
      d. N   *e.* I   *f.* N

4. Since the cash cycle equals the operating cycle minus the accounts payable period, it is not possible for the cash cycle to be longer than the operating cycle if the accounts payable period is positive. Moreover, it is unlikely that the accounts payable period would ever be negative since that implies the firm pays its bills before they are incurred.

5. First letter is cash cycle,   *a.* I; I   *b.* D; N   *c.* D; D
   Second is operating cycle.   *d.* D; D   *e.* D; N   *f.* I; I

6. *a.* 45-day collection period implies all receivables outstanding from previous quarter are collected in the current quarter, and (90-45)/90 = 1/2 of current sales are collected.

	Q1	Q2	Q3	Q4
Beginning receivables	$ 800	$ 600	$ 675	$ 650
Sales	1,200	1,350	1,300	1,800
Cash collections	(1,400)	(1,275)	(1,325)	(1,550)
Ending receivables	$ 600	$ 675	$ 650	$ 900

b. 60-day collection period implies all receivables outstanding from previous quarter are collected in the current quarter, and (90-60)/90 = 1/3 of current sales are collected.

	Q1	Q2	Q3	Q4
Beginning receivables	$ 800	$ 800	$ 900	$ 867
Sales	1,200	1,350	1,300	1,800
Cash collections	(1,200)	(1,250)	(1,333)	(1,467)
Ending receivables	$ 800	$ 900	$ 867	$1,200

c. 30-day collection period implies all receivables outstanding from previous quarter are collected in the current quarter, and (90-30)/90 = 2/3 of current sales are collected.

	Q1	Q2	Q3	Q4
Beginning receivables	$ 800	$ 400	$ 450	$ 433
Sales	1,200	1,350	1,300	1,800
Cash collections	(1,600)	(1,300)	(1,317)	(1,633)
Ending receivables	$ 400	$ 450	$ 433	$ 600

7. Inventory turnover $= \$46,152/\{[\$8,152+\$10,300]/2\} = 5.002$ times
Inventory period $= 365$ days$/5.002 = 72.971$ days
Receivables turnover $= \$93,125/\{[\$6,537+\$7,147]/2\} = 13.611$ times
Receivables period $= 365$ days$/13.611 = 26.817$ days
Operating cycle $= 72.971 + 26.817 = 99.788$ days
Payables turnover $= \$46,152/\{[\$10,128+\$10,573]/2\} = 4.459$ times
Payables period $= 365$ days$/4.459 = 81.857$ days
Cash cycle $= 99.788 - 81.857 = 17.931$ days
The firm is receiving cash on average 17.931 days after it pays its bills.

8. Number of periods $= 365/45 = 8.11$;   EAR $= (1 + .02/.98)^{8.11} - 1 = 17.80\%$

9. *a.*   The payables period is zero since Van Meter pays immediately.
Payment in each period $= 0.40$ times next period sales.

	Q1	Q2	Q3	Q4
Payment of accounts	$220.00	$180.00	$240.00	$310.00

   b.   Since the payables period is 90 days, payment in each period $= 0.40$ times current period sales.

	Q1	Q2	Q3	Q4
Payment of accounts	$248.00	$220.00	$180.00	$240.00

   c.   Since the payables period is 60 days, payment in each period $= 2/3$ of last quarter's orders, and $1/3$ of this quarter's orders, or $2/3(.40)$ times current sales $+ 1/3(.40)$ next period sales.

	Q1	Q2	Q3	Q4
Payment of accounts	$238.67	$206.67	$200.00	$263.33

10. Since the payables period is 60 days, payment in each period $= 2/3$ of last quarter's orders, and $1/3$ of this quarter's orders, or $2/3(.60)$ times current sales $+ 1/3(.60)$ next period sales.

	Q1	Q2	Q3	Q4
Payment of accounts	$360.00	$452.00	$404.00	$410.00
Wages, taxes, other expenses	100.00	160.00	132.00	140.00
Long-term financing expenses (interest and dividends)	60.00	60.00	60.00	60.00
Total	$520.00	$672.00	$596.00	$610.00

11. *a.*   November sales = ($93,000 – $72,000)/0.35 = $60,000
   b.   December sales = $72,000/0.80 = $90,000
   c.   January collections = .20($90,000) + .45($90,000) + .35($60,000) = $79,500
        February collections = .20($110,000) + .45($90,000) + .35($90,000) = $94,000
        March collections = .20($155,000) + .45($110,000) + .35($90,000) = $112,000

12. Sales collections = .35 times current month sales + .60 times previous month sales.

	April	*May*	*June*
Beginning cash balances	$300,000	$299,000	$257,250
Cash receipts			
Cash collections from	234,000	222,750	231,600
credit sales			
Total cash available	$534,000	$521,750	$488,850
Cash disbursements			
Purchases	125,000	100,000	94,000
Wages, taxes, and expenses	15,000	14,500	17,200
Interest	5,000	5,000	5,000
Equipment purchases	90,000	145,000	10,000
Total cash disbursements	$235,000	$264,500	$126,200
Ending cash balance	$299,000	$257,250	$362,650

CHAPTER 17
WORKING CAPITAL MANAGEMENT

Basic

1. Disbursement float; Available balance = $200,000; Book balance = $115,000

2. Collection float: Available balance = $175,000; Book balance = $325,000

3. Disbursement float = $6,000; Collection float = -$15,000; Net float = -$9,000

4. Net disbursement float is more desirable because the bank thinks the firm has more money than it actually does, and the firm is therefore receiving interest on funds it has already spent.

5. The firm has a net disbursement float of $500,000. If this is an ongoing situation, the firm may be tempted to write checks for more than it actually has in its account.

6. *a.* About the only disadvantage to holding T-bills are the generally lower yields compared to other money market instruments.
    b. Some ordinary preferred stock issues pose both credit and price risks that are not consistent with most short-term cash management plans.
    c. The primary disadvantage of NCD's is the normally large transaction sizes, which may not be feasible for short-term investment plans of many smaller to medium-sized companies.
    d. The primary disadvantages of the commercial paper market are the higher default risks associated with the securities, and the lack of an active secondary market which may excessively restrict the flexibility of corporations to meet their liquidity adjustment needs.

7. Terms of sale, credit analysis and collection policy.

8. The credit period, the type of credit instrument, the cash discount and the discount period.

9. *a.* 90 days until the account is overdue; remittance: 600($50) = $30,000
    b. 3% discount; 30 day discount period; remittance: .97($30,000) = $29,100
    c. Implicit interest: $30,000 – $29,100 = $900; 90 – 30 = 60 days credit

10. *1.* Perishability and collateral value
    2. Consumer demand
    3. Cost, profitability and standardization
    4. Credit size
    5. The size of the account
    6. Competition
    7. Customer type
    If the credit period exceeds the customer's operating cycle, then the firm is financing the receivables and other aspects of the customer's business that go beyond the purchase of the selling firm's merchandise.

11. *a.* B: A is likely to sell for cash only, unless the product really works. If it does, they might grant longer credit periods to entice buyers.
     b. A: Landlords have significantly greater collateral, and that collateral is not mobile.
     c. A: Since A's customer's turn over inventory less frequently, they have a longer inventory period and will most likely have a longer credit period as well.
     d. B: Since A's merchandise is perishable and B's is not, B will probably have a longer credit period.
     e. A: Rugs are fairly standardized and they are transportable, while carpets are custom fit and not particularly transportable.

12. *a.* A sight draft is a commercial draft that is payable immediately.
     b. A time draft is a commercial draft that does not require immediate payment.
     c. A bankers acceptance is when a bank guarantees the future payment of a commercial draft.
     d. A promissory note is an IOU that a customer signs.
     e. A trade acceptance is created when the buyer accepts the commercial draft and promises to pay it in the future.

13. Trade credit is usually granted on an open account. The invoice is the credit instrument.

14. Credit costs: required return on receivables, losses from bad debt, costs of managing credit and credit collections.
No-credit costs: lost sales.
The sum of these are the total costs of granting credit.

15. *1.* Character: Determines if a customer is willing to pay his debt.
     2. Capacity: Determines if a customer is able to pay debts out of operating cash flow.
     3. Capital: Determines the customer's financial reserves in case problems occur with operating cash flow.
     4. Collateral: Assets that can be liquidated to pay off debt in case of default.
     5. Conditions: Customer's ability to weather an economic downturn and whether such a dowturn is likely.

16. Nominal interest = .02/.98 = .0204 for 60 – 15 = 45 days
$EAR = (1.0204)^{365/45} - 1 = 17.80\%$
     a. .03/.97 = .0309; $EAR = (1.0309)^{365/45} - 1 = 28.00\%$
     b. $EAR = (1.0204)^{365/15} - 1 = 63.46\%$
     c. $EAR = (1.0204)^{365/50} - 1 = 15.88\%$

17. The three main categories of inventory are: raw material (input to the firm's production in process), work-in-progress (partially completed products) and finished goods (products ready for sale). From the firm's perspective, the demand for finished goods is not dependent on the demand for other types of inventory. The demand for raw material and work-in-progress is derived from, or dependent on, the firm's needs for these inventory types in order to achieve the desired levels of finished goods.

18. JIT systems reduce inventory amounts. Assuming no adverse effects on sales, inventory turnover will increase. Since assets will decrease, total asset turnover will increase. Recalling the DuPont identity, an increase in total asset turnover, all else being equal, has a positive effect on ROE.

19. Carrying costs should be equal to order costs. Since carrying costs are low relative to the order costs, the firm should increase the inventory level.

20. Carrying costs = (8,000/2)($24) = $96,000
Ordering costs = (52)($1,600) = $83,200
EOQ = $[2(52)(8,000)($1,600)/$24]^{1/2}$ = 7,448
The firm's policy is not optimal, since the costs are not equal. Brooks should decrease the order size and increase the number of orders.

21. Carrying costs = (250/2)($13) = $1,625
Ordering costs = (52)($800) = $41,600
EOQ = $[2(52)(250)($800)/$13]^{1/2}$ = 1,265
Number of orders per year = 52(250)/1,265 = 10.28 times
The firm's policy is not optimal, since the costs are not equal. Hall should increase the order size and decrease the number of orders.

CHAPTER 18
INTERNATIONAL ASPECTS OF FINANCIAL MANAGEMENT

Basic

1. *a.* $100(Lit 1,783/$1) = Lit 178,300
  b. ¢ .05609
  c. Lit 3M($.0005609/Lit 1) = $1,682.70
  d. Singapore dollar
  e. Mexican peso
  f. (SFr 1.5033/$1)($0.02681/BF 1) = SFr .04030/BF 1 ;   this is a cross rate.
  g. Most valuable: Kuwait Dinar = $3.2765
  Least valuable: Turkish Lira = $0.00000407

2. *a.* £100, since (£100)($1.6913/£1) = $169.13
  b. £100, since (£100)($1.6913/£1)(FF 6.0495/$1) = FF 1,023.15
  c. (FF 6.0495/$1)($1.6913/£1) = FF 10.2315/£1 ;   1/10.2315 = £0.09774/FF 1

3. *a.* $F_{6 \text{ month}}$ = ¥128.44 (per $). The yen is selling at a premium because it is more expensive in the forward market than in the spot market ($0.007587 versus $0.007786).
  b. $F_{3 \text{ month}}$ = $0.5569/DM 1. The dollar is selling at a discount because it is less expensive in the forward market than in the spot market (DM 1.8045 versus DM 1.7956).
  c. The value of the dollar will fall relative to the yen, since it takes more dollars to buy one yen in the future than it does today. The value of the dollar will also fall relative to the deutsche mark, because it will take more dollars to buy one deutsche mark in the future than it does today.

4. *a.* The U.S. dollar, since (Can$1)/(Can$1.40/$1) = $0.7143
  b. (Can$1.95)/(Can$1.40/$1) = $1.39. Among the reasons that absolute PPP doesn't hold are tariffs and other barriers to trade, transactions costs, taxes, and differential tastes.
  c. The U.S. dollar is selling at a discount, because it is less expensive in the forward market than in the spot market (Can$1.35 versus Can$1.40).
  d. The Canadian dollar is expected to appreciate in value relative to the dollar, because it takes fewer Canadian dollars to buy one U.S. dollar in the future than it does today.
  e. Interest rates in the United States are probably higher than they are in Canada.

5. *a.* The dollar is selling at a premium because it is more expensive in the forward market than in the spot market (SF 1.62 versus SF 1.60).
  b. The franc is expected to depreciate relative to the dollar because it will take more francs to buy one dollar in the future than it does today.
  c. Inflation in Switzerland is higher than in the United States, as are interest rates.

6. *a.* (¥115/$1)($1.67/£1) = ¥192.05/£1
  b. The yen is quoted too low relative to the pound. Take out a loan for $1 and buy ¥115. Use the ¥115 to purchase pounds at the cross-rate - ¥115/£180 = £0.6389. Use the pounds to buy back dollars and repay the loan—£0.6389(1.67) = $1.0668; arbitrage profit is 6.696¢ per dollar used.

7. The exchange rate will increase as it takes progressively more deutsche marks to purchase a dollar. This is the relative PPP relationship.

8. *a.* The Australian dollar is expected to weaken relative to the dollar, because it will take more A$ in the future to buy one dollar more than it does today.
    b. The inflation rate is higher in Australia.
    c. Nominal interest rates in Australia are higher; relative real rates in the two countries are the same.

9. A Yankee bond is most accurately described by d.

10. France: $R_{FC} = (FF\ 5.9917 - FF\ 6.0495)/FF\ 6.0495 + .04 = 3.04\%$
    Japan: $R_{FC} = (¥128.44 - ¥131.80)/¥131.80 + .04 = 1.45\%$
    Switzerland: $R_{FC} = (SFr\ 1.4730 - SFr\ 1.5033)/SFr\ 1.5033 + .04 = 1.98\%$

11. US: $\$12M(1.0050)^3 = \$12,180,902$
    Great Britain: $(\$12M)(£0.59/\$1)(1.0075)^3/(£0.61/\$1) = \$11,869,668$; invest in U.S.

12. Relative PPP: $FF\ 4.5 = (FF\ 5)(1 + \{h_{FC} - h_{US}\})^3$; $(4.5/5)^{1/3} - 1 = -.0345$
    Inflation in U.S. is expected to exceed that in the France by 3.45% over this period.

13. No change in exchange rate: profit $= 60,000(\$170 - [(W207,300)(W.0007236/\$1)]) = \$1,199,863.20$
    If exchange rate rises: profit $= 60,000(\$170 - [(W207,300)(W.0007236(1.1)/\$1)]) = \$299,849.52$
    If exchange rate falls: profit $= 60,000(\$170 - [(W207,300)(W.0007236(.9)/\$1)]) = \$2,099,876.88$
    Breakeven: $\$170 = W207,300/S_T$; $S_T = W.0008201/\$1 = 13.34\%$ increase

14. *a.* $R_{US} \approx 1.06^{1/2} - 1 = 2.96\%$; $R_G \approx 1.08^{1/2} - 1 = 3.92\%$
       If IRP holds, then $F_{6\ month} = (DM\ 1.70)(1 + \{.0392 - .0296\}) = DM\ 1.7163$
       Since $F_{6\ month} = DM\ 1.75$, an arbitrage exists, the forward premium is too high.
       Borrow DM 1 today at 3.92% interest. Agree to a 6 month forward contract at DM 1.75.
       Convert the loan proceeds into $1/DM 1.70 = \$0.5882$ today. Invest these dollars at 2.96%,
       ending up with \$0.6056. Convert the dollars back to deutsche marks as $\$0.6056(DM\ 1.75/\$1) =$
       DM 1.0598. Repay the DM 1 loan, ending with a profit of $1.0598 - 1.0392 = DM\ 0.0206$.
    b. $F_{6\ month} = (DM\ 1.70)(1 + \{.0392 - .0296\}) = DM\ 1.7163$

15. *a.* The yen is expected to get stronger since it will take less yen to buy one dollar in the future than it does today.
    b. $h_{US} - h_{JAP} \approx (¥103\ /\ ¥105) - 1\ = -.019; (1 - .019)^4 - 1 = .0740$
       The approximate inflation differential between the U.S. and Japan is 7.40% annually

    Intermediate

16. *a.* False. If goods are rising faster in Great Britain, it will take more pounds to buy the same amount of goods one dollar can buy; pound will depreciate relative to the dollar.
    b. False. The forward market will already reflect the projected deterioration of the deutchse mark relative to other currencies. Only if you feel that there might be additional, unanticipated weakening of the deutchse mark that isn't reflected in the forward rates today will the forward hedge protect you against additional declines.
    c. True. The market will only be correct on average, you would be correct all of the time.

17. *a.*   American exporters: their situation in general improves because a sale of the exported goods for a fixed number of DM's will be worth more dollars.
American importers: their situation in general worsens because the purchase of the imported goods for a fixed number of DM's will cost more in dollars.

b.   American exporters: they would generally be better off if the British government's intentions result in a strengthened pound.
American importers: they would be generally worse off if the pound strengthens.

c.   American exporters: they would be generally worse off because their goods would be more expensive in Ireland, reducing sales. If the sale price were kept at a fixed number of punts, Irish sales would be worth less in dollars.
American importers: would be generally better off since Irish goods would cost less in dollars to pay for.

d.   American exporters: would generally be much worse off because in an extreme case of fiscal expansion like this one would make American goods prohibitively expensive to buy, or lease. Brazilian sales, if fixed in cruzeiros would become worth an unacceptably low number of dollars.
American importers: would be generally be much better off because Brazilian goods will become much cheaper to purchase in dollars