Solutions for Corporate Finance 12th Edition by Ross

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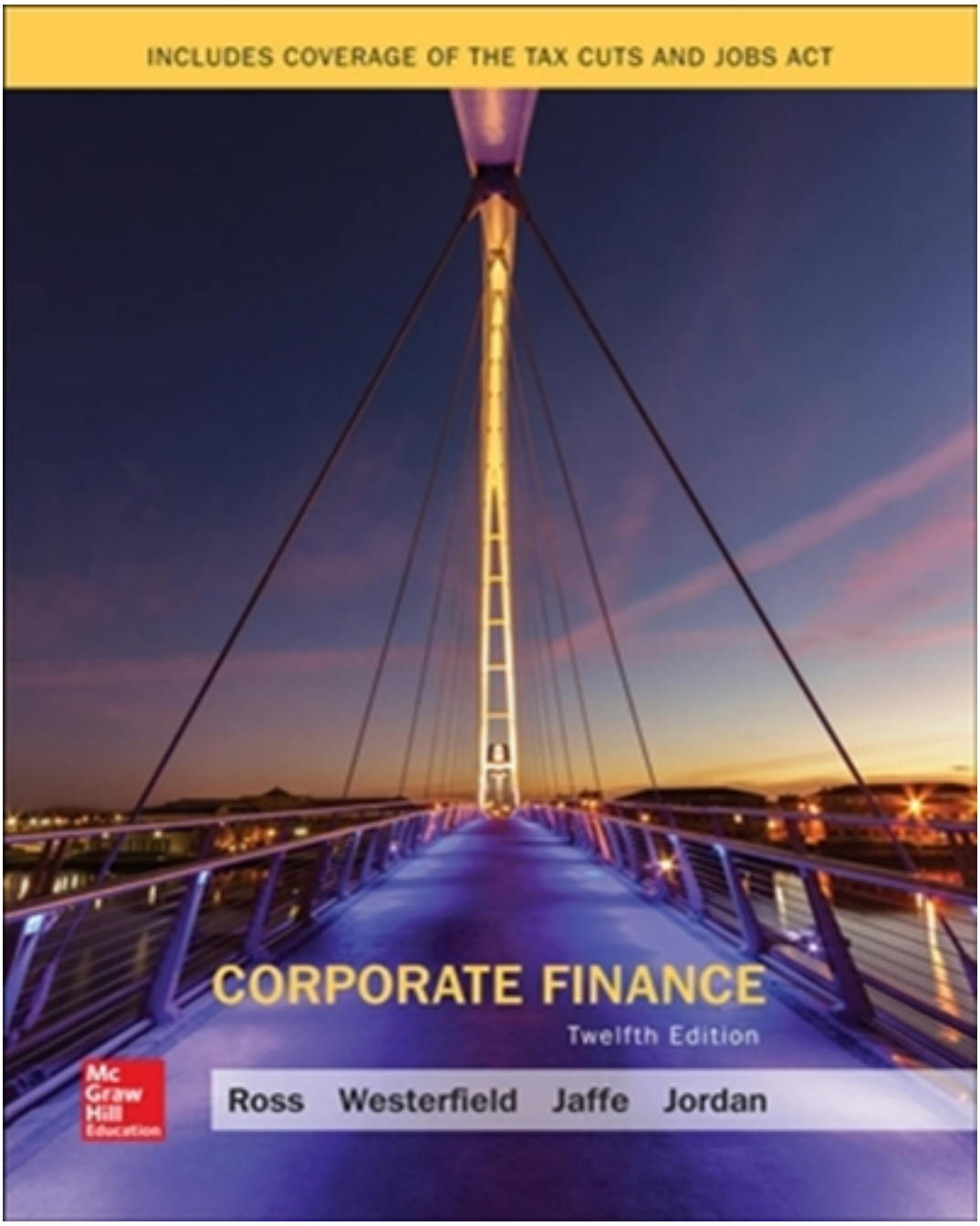

Solutions

Solutions Manual

Corporate Finance

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CHAPTER 1
INTRODUCTION TO CORPORATE FINANCE

Answers to Concept Questions

1. 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.

2. 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.

3. 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.

4. 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?"

5. 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.

6. 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.

7. We would expect agency problems to be less severe in other countries, primarily due to the relatively small percentage of individual ownership. Fewer individual owners should reduce the number of diverse opinions concerning corporate goals. The high percentage of institutional ownership might lead to a higher degree of agreement between owners and managers on decisions concerning risky projects. In addition, institutions may be better able to implement effective monitoring mechanisms on managers than can individual owners, based on the institutions' deeper resources and experiences with their own management.

8. The increase in institutional ownership of stock in the United States and the growing activism of these large shareholder groups may lead to a reduction in agency problems for U.S. corporations and a more efficient market for corporate control. However, this may not always be the case. If the managers of the mutual fund or pension plan are not concerned with the interests of the investors, the agency problem could potentially remain the same, or even increase, since there is the possibility of agency problems between the fund and its investors.

9. How much is too much? Who is worth more, Larry Ellison 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 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.

10. Maximizing the current share price is the same as maximizing the future share price at any future period. The value of a share of stock depends on all of the future cash flows of company. Another way to look at this is that, barring large cash payments to shareholders, the expected price of the stock must be higher in the future than it is today. Who would buy a stock for $100 today when the share price in one year is expected to be $80?

CHAPTER 2
ACCOUNTING STATEMENTS, TAXES, AND CASH FLOW

Answers to Concepts Review and Critical Thinking Questions

1. True. Every asset can be converted to cash at some price. However, when we are referring to a liquid asset, the added assumption that the asset can be quickly converted to cash at or near market value is important.

2. The recognition and matching principles in financial accounting call for revenues, and the costs associated with producing those revenues, to be "booked" when the revenue process is essentially complete, not necessarily when the cash is collected or bills are paid. Note that this way is not necessarily correct; it's the way accountants have chosen to do it.

3. The bottom line number shows the change in the cash balance on the balance sheet. As such, it is not a useful number for analyzing a company.

4. The major difference is the treatment of interest expense. The accounting statement of cash flows treats interest as an operating cash flow, while the financial cash flows treat interest as a financing cash flow. The logic of the accounting statement of cash flows is that since interest appears on the income statement, which shows the operations for the period, it is an operating cash flow. In reality, interest is a financing expense, which results from the company's choice of debt and equity. We will have more to say about this in a later chapter. When comparing the two cash flow statements, the financial statement of cash flows is a more appropriate measure of the company's performance because of its treatment of interest.

5. Market values can never be negative. Imagine a share of stock selling for –$20. This would mean that if you placed an order for 100 shares, you would get the stock along with a check for $2,000. How many shares do you want to buy? More generally, because of corporate and individual bankruptcy laws, net worth for a person or a corporation cannot be negative, implying that liabilities cannot exceed assets in market value.

6. For a successful company that is rapidly expanding, for example, capital outlays will be large, possibly leading to negative cash flow from assets. In general, what matters is whether the money is spent wisely, not whether cash flow from assets is positive or negative.

7. It's probably not a good sign for an established company to have negative cash flow from operations, but it would be fairly ordinary for a start-up, so it depends.

8. For example, if a company were to become more efficient in inventory management, the amount of inventory needed would decline. The same might be true if the company becomes better at collecting its receivables. In general, anything that leads to a decline in ending NWC relative to beginning would have this effect. Negative net capital spending would mean more long-lived assets were liquidated than purchased.

9. If a company raises more money from selling stock than it pays in dividends in a particular period, its cash flow to stockholders will be negative. If a company borrows more than it pays in interest and principal, its cash flow to creditors will be negative.

10. The adjustments discussed were purely accounting changes; they had no cash flow or market value consequences unless the new accounting information caused stockholders to revalue the assets.

Solutions to Questions and Problems

NOTE: All end-of-chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this solutions manual, rounding may appear to have occurred. However, the final answer for each problem is found without rounding during any step in the problem.

Basic

1. To find owners' equity, we must construct a balance sheet as follows:

	Balance Sheet		
CA	$ 4,300	CL	$ 2,900
NFA	24,000	LTD	10,700
		OE	??
TA	$28,300	TL & OE	$28,300

We know that total liabilities and owners' equity (TL & OE) must equal total assets of $28,300. We also know that TL & OE is equal to current liabilities plus long-term debt plus owners' equity, so owners' equity is:

Owners' equity = $28,300 – 10,700 – 2,900
Owners' equity = $14,700

And net working capital is current assets minus current liabilities, so:

NWC = Current assets – Current liabilities
NWC = $4,300 – 2,900
NWC = $1,400

2. The income statement for the company is:

Income Statement	
Sales	$473,000
Costs	275,000
Depreciation	42,000
EBIT	$156,000
Interest	23,000
EBT	$133,000
Taxes	27,930
Net income	$105,070

One equation for net income is:

Net income = Dividends + Addition to retained earnings

Rearranging, we get:

Addition to retained earnings = Net income – Dividends
Addition to retained earnings = $105,070 – 25,000
Addition to retained earnings = $80,070

3. To find the book value of current assets, we use: NWC = CA – CL. Rearranging to solve for current assets, we get:

Current assets = Net working capital + Current liabilities
Current assets = $850,000 + 2,200,000
Current assets = $3,050,000

The market value of current assets and net fixed assets is given, so:

Book value CA	= $3,050,000	Market value CA	= $2,700,000
Book value NFA	= $4,900,000	Market value NFA	= $6,400,000
Book value assets	= $7,950,000	Market value assets	= $9,100,000

4. Taxes = .10($9,525) + .12($38,700 – 9,525) + .22($82,500 – 38,700) + .24($157,500 – 82,500)
+ .32($189,000 – 157,500)
Taxes = $42,169.50

The average tax rate is the total tax paid divided by taxable income, so:

Average tax rate = $42,169.50/$189,000
Average tax rate = .2231, or 22.31%

The marginal tax rate is the tax rate on the next $1 of earnings, so the marginal tax rate is 32 percent.

5. To calculate OCF, we first need the income statement:

Income Statement	
Sales	$22,400
Costs	11,600
Depreciation	2,200
EBIT	$8,600
Interest	1,370
Taxable income	$7,230
Taxes	1,591
Net income	$5,639

OCF = EBIT + Depreciation – Taxes
OCF = $8,600 + 2,200 – 1,591
OCF = $9,209

6. Net capital spending = $NFA_{end} – NFA_{beg}$ + Depreciation
Net capital spending = $1,430,000 – 1,280,000 + 146,000
Net capital spending = $296,000

7. The long-term debt account will increase by $30 million, the amount of the new long-term debt issue. Since the company sold 4.5 million new shares of stock with a $1 par value, the common stock account will increase by $4.5 million. The capital surplus account will increase by $53.5 million, the value of the new stock sold above its par value. Since the company had a net income of $7.5 million, and paid $1.7 million in dividends, the addition to retained earnings was $5.8 million, which will increase the accumulated retained earnings account. So, the new long-term debt and stockholders' equity portion of the balance sheet will be:

Long-term debt	$ 75,000,000
Total long-term debt	$ 75,000,000
Shareholders' equity	
Preferred stock	$ 2,900,000
Common stock ($1 par value)	15,500,000
Accumulated retained earnings	112,800,000
Capital surplus	102,500,000
Total equity	$ 233,700,000
Total liabilities & equity	$ 308,700,000

8. Cash flow to creditors = Interest paid – Net new borrowing
Cash flow to creditors = $170,000 – ($LTD_{end} – LTD_{beg}$)
Cash flow to creditors = $170,000 – ($1,645,000 – 1,565,000)
Cash flow to creditors = $170,000 – 80,000
Cash flow to creditors = $90,000

9. Cash flow to stockholders = Dividends paid – Net new equity
Cash flow to stockholders = \$335,000 – [($Common_{end}$ + $APIS_{end}$) – ($Common_{beg}$ + $APIS_{beg}$)]
Cash flow to stockholders = \$335,000 – [(\$525,000 + 3,750,000) – (\$490,000 + 3,400,000)]
Cash flow to stockholders = \$335,000 – (\$4,275,000 – 3,890,000)
Cash flow to stockholders = –\$50,000

Note, APIS is the additional paid-in surplus.

10. Cash flow from assets = Cash flow to creditors + Cash flow to stockholders
= \$90,000 – 50,000
= \$40,000

Cash flow from assets = OCF – Change in NWC – Net capital spending
\$40,000 = OCF – (–\$96,000) – 735,000
Operating cash flow = \$40,000 – 96,000 + 735,000
Operating cash flow = \$679,000

Intermediate

11. *a.* The accounting statement of cash flows explains the change in cash during the year. The accounting statement of cash flows will be:

Statement of cash flows

Operations	
Net income	\$129
Depreciation	92
Changes in other current assets	(17)
Change in accounts payable	17
Total cash flow from operations	\$221
Investing activities	
Acquisition of fixed assets	\$(111)
Total cash flow from investing activities	\$(111)
Financing activities	
Proceeds of long-term debt	\$8
Dividends	(97)
Total cash flow from financing activities	(\$89)
Change in cash (on balance sheet)	\$21

b. Change in NWC $= NWC_{end} - NWC_{beg}$
$= (CA_{end} - CL_{end}) - (CA_{beg} - CL_{beg})$
$= [(\$84 + 192) - 146] - [(\$63 + 175) - 129)$
$= \$130 - 109$
$= \$21$

c. To find the cash flow generated by the firm's assets, we need the operating cash flow and the capital spending. So, calculating each of these, we find:

Operating cash flow	
Net income	$129
Depreciation	92
Operating cash flow	$221

Note that we can calculate OCF in this manner since there are no taxes.

Capital spending	
Ending fixed assets	$417
Beginning fixed assets	–398
Depreciation	92
Capital spending	$111

Now we can calculate the cash flow generated by the firm's assets, which is:

Cash flow from assets	
Operating cash flow	$221
Capital spending	–111
Change in NWC	–21
Cash flow from assets	$ 89

12. With the information provided, the cash flows from the firm are the capital spending and the change in net working capital, so:

Cash flows from the firm	
Capital spending	–$29,000
Additions to NWC	–2,400
Capital spending and NWC cash flow	–$31,400

And the cash flows to the investors of the firm are:

Cash flows to investors of the firm	
Sale of long-term debt	–$16,400
Sale of common stock	–4,000
Dividends paid	13,100
Cash flows to investors of the firm	–$7,300

13. *a.* The interest expense for the company is the amount of debt times the interest rate on the debt. So, the income statement for the company is:

Income Statement	
Sales	$865,000
Cost of goods sold	455,000
Selling costs	210,000
Depreciation	105,000
EBIT	$ 95,000
Interest	27,200
Taxable income	$ 67,800
Taxes	14,238
Net income	$ 53,562

b. And the operating cash flow is:

OCF = EBIT + Depreciation – Taxes
OCF = $95,000 + 105,000 – 14,238
OCF = $185,762

14. To find the OCF, we first calculate net income.

Income Statement	
Sales	$246,000
Costs	135,000
Other expenses	7,100
Depreciation	19,100
EBIT	$84,800
Interest	10,000
Taxable income	$74,800
Taxes	18,876
Net income	$55,924
Dividends	$9,800
Additions to RE	$46,124

a. OCF = EBIT + Depreciation – Taxes
OCF = $84,800 + 19,100 – 18,876
OCF = $85,024

b. CFC = Interest – Net new LTD
CFC = $10,000 – (–$6,800)
CFC = $16,800

Note that the net new long-term debt is negative because the company repaid part of its long-term debt.

c. CFS = Dividends – Net new equity
CFS = $9,800 – 7,900
CFS = $1,900

d. We know that CFA = CFC + CFS, so:

CFA = $16,800 + 1,900
CFA = $18,700

CFA is also equal to OCF – Net capital spending – Change in NWC. We already know OCF. Net capital spending is equal to:

Net capital spending = Increase in NFA + Depreciation
Net capital spending = $41,900 + 19,100
Net capital spending = $61,000

Now we can use:

CFA = OCF – Net capital spending – Change in NWC
$18,700 = $85,024 – 61,000 – Change in NWC
Change in NWC = $5,324

This means the company increased its NWC by $5,324.

15. The solution to this question works the income statement backwards. Starting at the bottom:

Net income = Dividends + Addition to retained earnings
Net income = $1,720 + 5,300
Net income = $7,020

Now, looking at the income statement:

EBT – (EBT × Tax rate) = Net income

Recognize that EBT × Tax rate is the calculation for taxes. Solving this for EBT yields:

EBT = Net income/(1 – Tax rate)
EBT = $7,020/(1 – .21)
EBT = $8,886.08

Now we can calculate:

EBIT = EBT + Interest
EBIT = $8,886.08 + 2,050
EBIT = $10,936.08

The last step is to use:

EBIT = Sales – Costs – Depreciation
$10,936.08 = $54,000 – 29,500 – Depreciation
Depreciation = $13,563.92

16. The market value of shareholders' equity cannot be negative. A negative market value in this case would imply that the company would pay you to own the stock. The market value of shareholders' equity can be stated as: Shareholders' equity = Max [(TA – TL), 0]. So, if TA is $11,900, equity is equal to $1,200, and if TA is $9,400, equity is equal to $0. We should note here that while the market value of equity cannot be negative, the book value of shareholders' equity can be negative.

17.

	Income Statement	
	Sales	$630,000
	COGS	465,000
	A&S expenses	85,000
	Depreciation	135,000
	EBIT	–$55,000
	Interest	70,000
	Taxable income	–$125,000
	Taxes (21%)	0
a.	Net income	–$125,000

b. OCF = EBIT + Depreciation – Taxes
OCF = –$55,000 + 135,000 – 0
OCF = $80,000

c. Net income was negative because of the tax deductibility of depreciation and interest expense. However, the actual cash flow from operations was positive because depreciation is a non-cash expense and interest is a financing expense, not an operating expense.

18. 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 capital spending = Net new equity = 0. (Given)

Cash flow from assets = OCF – Change in NWC – Net capital spending
Cash flow from assets = $80,000 – 0 – 0 = $80,000

Cash flow to stockholders = Dividends – Net new equity
Cash flow to stockholders = $34,000 – 0 = $34,000

Cash flow to creditors = Cash flow from assets – Cash flow to stockholders
Cash flow to creditors = $80,000 – 34,000
Cash flow to creditors = $46,000

Cash flow to creditors is also:

Cash flow to creditors = Interest – Net new LTD

So:

Net new LTD = Interest – Cash flow to creditors
Net new LTD = $70,000 – 46,000
Net new LTD = $24,000

19. *a.* The income statement is:

Income Statement	
Sales	$24,360
Cost of goods sold	17,600
Depreciation	3,400
EBIT	$ 3,360
Interest	860
Taxable income	$ 2,500
Taxes	525
Net income	$1,975

b. OCF = EBIT + Depreciation – Taxes
OCF = $3,360 + 3,400 – 525
OCF = $6,235

c. Change in NWC = $NWC_{end} - NWC_{beg}$
= $(CA_{end} - CL_{end}) - (CA_{beg} - CL_{beg})$
= ($6,410 – 3,445) – ($5,560 – 3,040)
= $2,965 – 2,520
= $445

Net capital spending = $NFA_{end} - NFA_{beg}$ + Depreciation
= $21,180 – 18,650 + 3,400
= $5,930

CFA = OCF – Change in NWC – Net capital spending
= $6,235 – 445 – 5,930
= –$140

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 $140 in funds from its stockholders and creditors to make these investments.

d. Cash flow to creditors = Interest – Net new LTD
= $860 – 0
= $860

Cash flow to stockholders = Cash flow from assets – Cash flow to creditors
= –$140 – 860
= –$1,000

We can also calculate the cash flow to stockholders as:

Cash flow to stockholders = Dividends – Net new equity

Solving for net new equity, we get:

Net new equity = $1,000 – (–790)
= $1,790

The firm had positive earnings in an accounting sense (NI > 0) and had positive cash flow from operations. The firm invested $445 in new net working capital and $5,930 in new fixed assets. The firm had to raise $140 from its stakeholders to support this new investment. It accomplished this by raising $1,790 in the form of new equity. After paying out $790 of this in the form of dividends to shareholders and $860 in the form of interest to creditors, $140 was left to meet the firm's cash flow needs for investment.

20. *a.*

Total assets 2018	= $1,157 + 5,261 = $6,418
Total liabilities 2018	= $481 + 2,856 = $3,337
Owners' equity 2018	= $6,418 – 3,337 = $3,081

Total assets 2019	= $1,411 + 6,125 = $7,536
Total liabilities 2019	= $534 + 3,256 = $3,790
Owners' equity 2019	= $7,536 – 3,790 = $3,746

b.

NWC 2018	= CA – CL = $1,157 – 481 = $676
NWC 2019	= CA – CL = $1,411 – 534 = $877
Change in NWC	= $NWC_{end} - NWC_{beg}$ = $877 – 676 = $201

c. We can calculate net capital spending as:

Net capital spending = Net fixed $assets_{end}$ – Net fixed $assets_{beg}$ + Depreciation
Net capital spending = $6,125 – 5,261 + 1,478
Net capital spending = $2,342

So, the company had a net capital spending cash flow of $2,342. We also know that net capital spending is:

Net capital spending	= Fixed assets bought – Fixed assets sold
$2,342	= $2,820 – Fixed assets sold
Fixed assets sold	= $2,820 – 2,342
Fixed assets sold	= $478

To calculate the cash flow from assets, we must first calculate the operating cash flow. The operating cash flow is calculated as follows (we could also prepare a traditional income statement):

EBIT = Sales – Costs – Depreciation
EBIT = $17,688 – 7,118 – 1,478
EBIT = $9,092

EBT = EBIT – Interest
EBT = $9,092 – 392
EBT = $8,700

Taxes = EBT × .22
Taxes = $8,700 × .22
Taxes = $1,914

OCF = EBIT + Depreciation – Taxes
OCF = $9,092 + 1,478 – 1,914
OCF = $8,656

Cash flow from assets = OCF – Change in NWC – Net capital spending
Cash flow from assets = $8,656 – 201 – 2,342
Cash flow from assets = $6,113

d. Net new borrowing = $LTD_{end} – LTD_{beg}$
Net new borrowing = $3,256 – 2,856
Net new borrowing = $400

Net new borrowing = $400 = Debt issued – Debt retired
Debt retired = $545 – 400
Debt retired = $145

Cash flow to creditors = Interest – Net new LTD
Cash flow to creditors = $392 – 400
Cash flow to creditors = –$8

21.

Balance sheet as of Dec. 31, 2018

Cash	$4,438	Accounts payable	$4,661
Accounts receivable	4,874	Notes payable	858
Inventory	10,444	Current liabilities	$5,519
Current assets	$19,756		
		Long-term debt	$14,537
Net fixed assets	$37,211	Owners' equity	36,911
Total assets	$56,967	Total liab. & equity	$56,967

Balance sheet as of Dec. 31, 2019

Cash	$5,620	Accounts payable	$4,520
Accounts receivable	6,617	Notes payable	806
Inventory	10,733	Current liabilities	$5,326
Current assets	$22,970		
		Long-term debt	$17,334
Net fixed assets	$39,049	Owners' equity	39,359
Total assets	$62,019	Total liab. & equity	$62,019

2018 Income Statement	
Sales	$8,462.00
COGS	2,912.00
Other expenses	690.00
Depreciation	1,215.00
EBIT	$3,645.00
Interest	567.00
EBT	$3,078.00
Taxes	646.38
Net income	$2,431.62
Dividends	$1,032.00
Additions to RE	1,399.62

2019 Income Statement	
Sales	$9,082.00
COGS	3,305.00
Other expenses	577.00
Depreciation	1,216.00
EBIT	$3,984.00
Interest	652.00
EBT	$3,332.00
Taxes	699.72
Net income	$2,632.28
Dividends	$1,135.00
Additions to RE	1,497.28

22. OCF = EBIT + Depreciation – Taxes
OCF = $3,984 + 1,216 – 699.72
OCF = $4,500.28

Change in NWC = $NWC_{end} - NWC_{beg} = (CA - CL)_{end} - (CA - CL)_{beg}$
Change in NWC = ($22,970 – 5,326) – ($19,756 – 5,519)
Change in NWC = $3,407

Net capital spending = $NFA_{end} - NFA_{beg}$ + Depreciation
Net capital spending = $39,049 – 37,211 + 1,216
Net capital spending = $3,054

Cash flow from assets = OCF – Change in NWC – Net capital spending
Cash flow from assets = $4,500.28 – 3,407 – 3,054
Cash flow from assets = –$1,960.72

Cash flow to creditors = Interest – Net new LTD
Net new LTD = $LTD_{end} - LTD_{beg}$
Cash flow to creditors = $652 – ($17,334 – 14,537)
Cash flow to creditors = –$2,145

Net new equity = Common $stock_{end}$ – Common $stock_{beg}$
Common stock + Retained earnings = Total owners' equity
Net new equity = $(OE - RE)_{end} - (OE - RE)_{beg}$
Net new equity = $OE_{end} - OE_{beg} + RE_{beg} - RE_{end}$
$RE_{end} = RE_{beg}$ + Additions to RE

$\therefore$ Net new equity $= OE_{end} - OE_{beg} + RE_{beg} - (RE_{beg}$ + Additions to RE)
$= OE_{end} - OE_{beg}$ – Additions to RE
Net new equity = $39,359 – 36,911 – 1,497.28 = $950.72

Cash flow to stockholders = Dividends – Net new equity
Cash flow to stockholders = $1,135 – 950.72
Cash flow to stockholders = $184.28

As a check, cash flow from assets is –$1,960.72

Cash flow from assets = Cash flow from creditors + Cash flow to stockholders
Cash flow from assets = –$2,145 + 184.28
Cash flow from assets = –$1,960.72

Challenge

23. We will begin by calculating the operating cash flow. First, we need the EBIT, which can be calculated as:

EBIT = Net income + Current taxes + Deferred taxes + Interest
EBIT = $187 + 81 + 11 + 38
EBIT = $317

Now we can calculate the operating cash flow as:

Operating cash flow	
Earnings before interest and taxes	$317
Depreciation	74
Current taxes	–81
Operating cash flow	$310

The cash flow from assets is found in the investing activities portion of the accounting statement of cash flows, so:

Cash flow from assets	
Acquisition of fixed assets	$194
Sale of fixed assets	–19
Capital spending	$175

The net working capital cash flows are all found in the operations cash flow section of the accounting statement of cash flows. However, instead of calculating the net working capital cash flows as the change in net working capital, we must calculate each item individually. Doing so, we find:

Net working capital cash flow	
Cash	$12
Accounts receivable	12
Inventories	–15
Accounts payable	–11
Accrued expenses	6
Other	–2
NWC cash flow	$2

Except for the interest expense, the cash flow to creditors is found in the financing activities of the accounting statement of cash flows. The interest expense from the income statement is given, so:

Cash flow to creditors	
Interest	$38
Retirement of debt	145
Debt service	$183
Proceeds from sale of long-term debt	–110
Total	$73

And we can find the cash flow to stockholders in the financing section of the accounting statement of cash flows. The cash flow to stockholders was:

Cash flow to stockholders	
Dividends	$67
Repurchase of stock	32
Cash to stockholders	$99
Proceeds from new stock issue	–39
Total	$60

24. Net capital spending $= NFA_{end} - NFA_{beg} + \text{Depreciation}$

$= (NFA_{end} - NFA_{beg}) + (\text{Depreciation} + AD_{beg}) - AD_{beg}$

$= (NFA_{end} - NFA_{beg}) + AD_{end} - AD_{beg}$

$= (NFA_{end} + AD_{end}) - (NFA_{beg} + AD_{beg}) = FA_{end} - FA_{beg}$

CHAPTER 3
LONG-TERM FINANCIAL PLANNING AND GROWTH

Answers to Concepts Review and Critical Thinking Questions

1. Time trend analysis gives a picture of changes in the company's financial situation over time. Comparing a firm to itself over time allows the financial manager to evaluate whether some aspects of the firm's operations, finances, or investment activities have changed. Peer group analysis involves comparing the financial ratios and operating performance of a particular firm to a set of peer group firms in the same industry or line of business. Comparing a firm to its peers allows the financial manager to evaluate whether some aspects of the firm's operations, finances, or investment activities are out of line with the norm, thereby providing some guidance on appropriate actions to take to adjust these ratios if appropriate. Both allow an investigation into what is different about a company from a financial perspective, but neither method gives an indication of whether the difference is positive or negative. For example, suppose a company's current ratio is increasing over time. It could mean that the company had been facing liquidity problems in the past and is rectifying those problems, or it could mean the company has become less efficient in managing its current accounts. Similar arguments could be made for a peer group comparison. A company with a current ratio lower than its peers could be more efficient at managing its current accounts, or it could be facing liquidity problems. Neither analysis method tells us whether a ratio is good or bad; both show that something is different, and tell us where to look.

2. If a company is growing by opening new stores, then presumably total revenues would be rising. Comparing total sales at two different points in time might be misleading. Same-store sales control for this by only looking at revenues of stores open within a specific period.

3. The reason is that, ultimately, sales are the driving force behind a business. A firm's assets, employees, and, in fact, just about every aspect of its operations and financing exist to directly or indirectly support sales. Put differently, a firm's future need for things like capital assets, employees, inventory, and financing are determined by its future sales level.

4. Two assumptions of the sustainable growth formula are that the company does not want to sell new equity, and that financial policy is fixed. If the company raises outside equity, or increases its debt-equity ratio, it can grow at a higher rate than the sustainable growth rate. Of course, the company could also grow at a faster rate if its profit margin increases, if it changes its dividend policy by increasing the retention ratio, or its total asset turnover increases.

5. The sustainable growth rate is greater than 20 percent, because at a 20 percent growth rate the negative EFN indicates that there is excess financing still available. If the firm is 100 percent equity financed, then the sustainable and internal growth rates are equal and the internal growth rate would be greater than 20 percent. However, when the firm has some debt, the internal growth rate is always less than the sustainable growth rate, so it is ambiguous whether the internal growth rate would be greater than or less than 20 percent. If the retention ratio is increased, the firm will have more internal funding sources available, and it will have to take on more debt to keep the debt/equity ratio constant, so the EFN will decline. Conversely, if the retention ratio is decreased, the EFN will rise. If the retention rate is zero, both the internal and sustainable growth rates are zero, and the EFN will rise to the change in total assets.

6. Common-size financial statements provide the financial manager with a ratio analysis of the company. The common-size income statement can show, for example, that cost of goods sold as a percentage of sales is increasing. The common-size balance sheet can show a firm's increasing reliance on debt as a form of financing. Common-size statements of cash flows are not calculated for a simple reason: There is no possible denominator.

7. It would reduce the external funds needed. If the company is not operating at full capacity, it would be able to increase sales without a commensurate increase in fixed assets.

8. ROE is a better measure of the company's performance. ROE shows the percentage return earned on shareholder investment. Since the goal of a company is to maximize shareholder wealth, this ratio shows the company's performance in achieving this goal over the period.

9. The EBITD/Assets ratio shows the company's operating performance before interest, taxes, and depreciation. This ratio would show how a company has controlled costs. While taxes are a cost, and depreciation and amortization can be considered costs, they are not as easily controlled by company management. Conversely, depreciation and amortization can be altered by accounting choices. This ratio only uses costs directly related to operations in the numerator. As such, it gives a better metric to measure management performance over a period than does ROA.

10. Long-term liabilities and equity are investments made by investors in the company, either in the form of a loan or ownership. Return on investment is intended to measure the return the company earned from these investments. Return on investment will be higher than the return on assets for a company with current liabilities. To see this, realize that total assets must equal total debt and equity, and total debt and equity is equal to current liabilities plus long-term liabilities plus equity. So, return on investment could be calculated as net income divided by total assets minus current liabilities.

11. Presumably not, but, of course, if the product had been *much* less popular, then a similar fate would have awaited due to lack of sales.

12. Since customers did not pay until shipment, receivables rose. The firm's NWC, but not its cash, increased. At the same time, costs were rising faster than cash revenues, so operating cash flow declined. The firm's capital spending was also rising. Thus, all three components of cash flow from assets were negatively impacted.

13. Financing possibly could have been arranged if the company had taken quick enough action. Sometimes it becomes apparent that help is needed only when it is too late, again emphasizing the need for planning.

14. All three were important, but the lack of cash or, more generally, financial resources, ultimately spelled doom. An inadequate cash resource is usually cited as the most common cause of small business failure.

15. Demanding cash up front, increasing prices, subcontracting production, and improving financial resources via new owners or new sources of credit are some of the options. When orders exceed capacity, price increases may be especially beneficial.

Solutions to Questions and Problems

NOTE: All end-of-chapter problems were solved using a spreadsheet. Many problems require multiple steps. Due to space and readability constraints, when these intermediate steps are included in this solutions manual, rounding may appear to have occurred. However, the final answer for each problem is found without rounding during any step in the problem.

Basic

1. Using the DuPont identity, the ROE is:

ROE = (Profit margin)(Total asset turnover)(Equity multiplier)
ROE = (.061)(1.87)(1.35)
ROE = .1540, or 15.40%

2. The equity multiplier is:

Equity multiplier = 1 + D/E
Equity multiplier = 1 + .85
Equity multiplier = 1.85

One formula to calculate return on equity is:

ROE = (ROA)(Equity multiplier)
ROE = .073(1.85)
ROE = .1351, or 13.51%

ROE can also be calculated as:

ROE = Net income/Total equity

So, net income is:

Net income = ROE(Total equity)
Net income = .1351($910,000)
Net income = $122,895.50

3. This is a multi-step problem involving several ratios. The ratios given are all part of the DuPont Identity. The only DuPont Identity ratio not given is the profit margin. If we know the profit margin, we can find the net income since sales are given. So, we begin with the DuPont Identity:

ROE = .14 = (Profit margin)(Total asset turnover)(Equity multiplier)
ROE = (Profit margin)(Sales/Total assets)(1 + D/E)

Solving the DuPont Identity for profit margin, we get:

Profit margin = [(ROE)(Total assets)]/[(1 + D/E)(Sales)]
Profit margin = [(.14)($1,520)]/[(1 + 1.35)($3,300)]
Profit margin = .0274

Now that we have the profit margin, we can use this number and the given sales figure to solve for net income:

Profit margin = .0274 = Net income/Sales
Net income = .0274($3,300)
Net income = $90.55

4. An increase of sales to $42,112 is an increase of:

Sales increase = ($42,112 – 37,600)/$37,600
Sales increase = .1200, or 12.00%

Assuming costs and assets increase proportionally, the pro forma financial statements will look like this:

Pro forma income statement			Pro forma balance sheet			
Sales	$42,112.00	Assets	$ 151,200.00	Debt	$ 37,000.00
Costs	29,232.00			Equity	105,151.20
EBIT	12,880.00	Total	$ 151,200.00	Total	$142,151.20
Taxes (21%)	2,704.80				
Net income	$10,175.20				

The payout ratio is constant, so the dividends paid this year is the payout ratio from last year times net income, or:

Dividends = ($2,700/$9,085)($10,175.20)
Dividends = $3,024

The addition to retained earnings is:

Addition to retained earnings = $10,175.20 – 3,024
Addition to retained earnings = $7,151.20

And the new equity balance is:

Equity = $98,000 + 7,151.20
Equity = $105,151.20

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $151,200 – 142,151.20
EFN = $9,048.80

5. The maximum percentage sales increase without issuing new equity is the sustainable growth rate. To calculate the sustainable growth rate, we first need to calculate the ROE, which is:

ROE = NI/TE
ROE = $20,066/$88,000
ROE = .2280, or 22.80%

The plowback ratio, *b*, is one minus the payout ratio, so:

b = 1 – .30
b = .70

Now we can use the sustainable growth rate equation to get:

Sustainable growth rate = (ROE × b)/[1 – (ROE × b)]
Sustainable growth rate = [.2280(.70)]/[1 – .2280(.70)]
Sustainable growth rate = .1899, or 18.99%

So, the maximum dollar increase in sales is:

Maximum increase in sales = $49,000(.1899)
Maximum increase in sales = $9,306.67

6. We need to calculate the retention ratio to calculate the sustainable growth rate. The retention ratio is:

b = 1 – .20
b = .80

Now we can use the sustainable growth rate equation to get:

Sustainable growth rate = (ROE × *b*)/[1 – (ROE × *b*)]
Sustainable growth rate = [.11(.80)]/[1 – .11(.80)]
Sustainable growth rate = .0965, or 9.65%

7. We must first calculate the ROE using the DuPont ratio to calculate the sustainable growth rate. The ROE is:

ROE = (PM)(TAT)(EM)
ROE = (.057)(2.65)(1.60)
ROE = .2417, or 24.17%

The plowback ratio is one minus the dividend payout ratio, so:

b = 1 – .70
b = .30

Now, we can use the sustainable growth rate equation to get:

Sustainable growth rate = (ROE × *b*)/[1 – (ROE × *b*)]
Sustainable growth rate = [.2417(.30)]/[1 – .2417(.30)]
Sustainable growth rate = .0782, or 7.82%

8. An increase of sales to $9,462 is an increase of:

Sales increase = ($9,462 – 8,300)/$8,300
Sales increase = .14, or 14%

Assuming costs and assets increase proportionally, the pro forma financial statements will look like this:

Pro forma income statement			Pro forma balance sheet		
Sales	$ 9,462	Assets	$ 21,774	Debt	$ 8,400
Costs	7,399			Equity	12,763
Net income	$ 2,063	Total	$ 21,774	Total	$ 21,163

If no dividends are paid, the equity account will increase by the net income, so:

Equity = $10,700 + 2,063
Equity = $12,763

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $21,774 – 21,163
EFN = $611

9. *a.* First, we need to calculate the current sales and change in sales. The current sales are next year's sales divided by one plus the growth rate, so:

Current sales = Next year's sales/(1 + *g*)
Current sales = $320,000,000/(1 + .12)
Current sales = $285,714,286

And the change in sales is:

Change in sales = $320,000,000 – 285,714,286
Change in sales = $34,285,714

We can now complete the current balance sheet. The current assets, fixed assets, and short-term debt are calculated as a percentage of current sales. The long-term debt and par value of stock are given. The plug variable is the addition to retained earnings. So:

Assets		Liabilities and equity	
Current assets	$57,142,857	Short-term debt	$42,857,143
		Long-term debt	$110,000,000
Fixed assets	200,000,000	Common stock	$45,000,000
		Accumulated retained earnings	59,285,714
		Total equity	$104,285,714
Total assets	$257,142,857	Total liabilities and equity	$257,142,857

b. We can use the equation from the text to answer this question. The assets/sales and debt/sales are the percentages given in the problem, so:

$$\text{EFN} = \left(\frac{\text{Assets}}{\text{Sales}}\right) \times \Delta\text{Sales} - \left(\frac{\text{Debt}}{\text{Sales}}\right) \times \Delta\text{Sales} - (\text{PM} \times \text{Projected sales}) \times (1 - d)$$

$$\text{EFN} = (.20 + .70) \times \$34,285,714 - (.15 \times \$34,285,714) - [(.09 \times \$320,000,000) \times (1 - .30)]$$

$$\text{EFN} = \$5,554,286$$

c. The current assets, fixed assets, and short-term debt will all increase at the same percentage as sales. The long-term debt and common stock will remain constant. The accumulated retained earnings will increase by the addition to retained earnings for the year. We can calculate the addition to retained earnings for the year as:

Net income = Profit margin × Sales
Net income = .09($320,000,000)
Net income = $28,800,000

The addition to retained earnings for the year will be the net income times one minus the dividend payout ratio, which is:

Addition to retained earnings = Net income(1 – *d*)
Addition to retained earnings = $28,800,000(1 – .30)
Addition to retained earnings = $20,160,000

So, the new accumulated retained earnings will be:

Accumulated retained earnings = $59,285,714 + 20,160,000
Accumulated retained earnings = $79,445,714

The pro forma balance sheet will be:

Assets		Liabilities and equity	
Current assets	$64,000,000	Short-term debt	$48,000,000
		Long-term debt	$110,000,000
Fixed assets	$224,000,000	Common stock	$45,000,000
		Accumulated retained earnings	79,445,714
		Total equity	$124,445,714
Total assets	$288,000,000	Total liabilities and equity	$282,445,714

The EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $288,000,000 – 282,445,714
EFN = $5,554,286

10. *a.* The plowback ratio is one minus the dividend payout ratio, so:

$b = 1 - .25$
$b = .75$

Now, we can use the sustainable growth rate equation to get:

Sustainable growth rate = (ROE × b)/[1 – (ROE × b)]
Sustainable growth rate = [.121(.75)]/[1 – .121(.75)]
Sustainable growth rate = .0998, or 9.98%

b. It is possible for the sustainable growth rate and the actual growth rate to differ. If any of the actual parameters in the sustainable growth rate equation differ from those used to compute the sustainable growth rate, the actual growth rate will differ from the sustainable growth rate. Since the sustainable growth rate includes ROE in the calculation, this also implies that changes in the profit margin, total asset turnover, or equity multiplier will affect the sustainable growth rate.

c. The company can increase its growth rate by doing any of the following:

- Increase the debt-to-equity ratio by selling more debt or repurchasing stock.
- Increase the profit margin, most likely by better controlling costs.
- Decrease its total assets/sales ratio; in other words, utilize its assets more efficiently.
- Reduce the dividend payout ratio.

Intermediate

11. The solution requires substituting two ratios into a third ratio. Rearranging D/TA:

Firm A	Firm B
D/TA = .35	D/TA = .45
(TA – E)/TA = .35	(TA – E)/TA = .45
(TA/TA) – (E/TA) = .35	(TA/TA) – (E/TA) = .45
1 – (E/TA) = .35	1 – (E/TA) = .45
E/TA = .65	E/TA = .55
E = .65(TA)	E = .55(TA)

Rearranging ROA, we find:

NI/TA = .08	NI/TA = .07
NI = .08(TA)	NI = .07(TA)

Since ROE = NI/E, we can substitute the above equations into the ROE formula, which yields:

ROE = .08(TA)/.65(TA)	ROE = .07(TA)/.55 (TA)
ROE = .08/.65	ROE = .07/.55
ROE = .1231, or 12.31%	ROE = .1273, or 12.73%

12. Profit margin = Net income/Sales
Profit margin = –£18,137/£279,386
Profit margin = –.0649, or 6.49%

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. The net income in dollars is:

Net income = Profit margin × Sales
Net income = –.0649($359,815)
Net income = –$23,358.24

13. *a.* The equation for external funds needed is:

$$\text{EFN} = \left(\frac{\text{Assets}}{\text{Sales}}\right) \times \Delta\text{Sales} - \left(\frac{\text{Debt}}{\text{Sales}}\right) \times \Delta\text{Sales} - (\text{PM} \times \text{Projected sales}) \times (1 - d)$$

where:

Assets/Sales = $24,200,000/$21,860,000 = 1.11
ΔSales = Current sales × Sales growth rate = $21,860,000(.15) = $3,279,000
Short-term debt/Sales = $5,100,000/$21,860,000 = .2333
Profit margin = Net income/Sales = $1,807,500/$21,860,000 = .0827
Projected sales = Current sales × (1 + Sales growth rate) = $21,860,000(1 + .15) = $25,139,000
d = Dividends/Net income = $361,500/$1,807,500 = .20

so:

EFN = (1.11 × $3,279,000) – (.2333 × $3,279,000) – (.0827 × $25,139,000) × (1 – .20)
EFN = $1,202,100

b. The current assets, fixed assets, and short-term debt will all increase at the same percentage as sales. The long-term debt and common stock will remain constant. The accumulated retained earnings will increase by the addition to retained earnings for the year. We can calculate the addition to retained earnings for the year as:

Net income = Profit margin × Sales
Net income = .0827($25,139,000)
Net income = $2,078,625

The addition to retained earnings for the year will be the net income times one minus the dividend payout ratio, which is:

Addition to retained earnings = Net income(1 – *d*)
Addition to retained earnings = $2,078,625(1 – .20)
Addition to retained earnings = $1,662,900

So, the new accumulated retained earnings will be:

Accumulated retained earnings = $10,200,000 + 1,622,900
Accumulated retained earnings = $11,862,900

The pro forma balance sheet will be:

Assets		Liabilities and equity	
Current assets	$7,935,000	Short-term debt	$5,865,000
		Long-term debt	$5,800,000
Fixed assets	19,895,000	Common stock	$3,100,000
		Accumulated retained earnings	11,862,900
		Total equity	$14,962,900
Total assets	$27,830,000	Total liabilities and equity	$26,627,900

The EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $27,830,000 – 26,627,900
EFN = $1,202,100

c. The ROE is:

ROE = Net income/Total equity
ROE = $1,807,500/$13,300,000
ROE = .1359, or 13.59%

And the retention ratio is:

b = Retention ratio = Retained earnings/Net income
b = $1,446,000/$1,807,500
b = .80

Now, we can use the sustainable growth rate equation to get:

Sustainable growth rate = (ROE × b)/[1 – (ROE × b)]
Sustainable growth rate = [.1359(.80)]/[1 – .1359(.80)]
Sustainable growth rate = .1220, or 12.20%

d. The company cannot just cut its dividends to achieve the forecast growth rate. As shown below, even with a zero dividend policy, the EFN will still be $786,375.

Assets		Liabilities and equity	
Current assets	$7,935,000	Short-term debt	$5,865,000
		Long-term debt	$5,800,000
Fixed assets	19,895,000	Common stock	$3,100,000
		Accumulated retained earnings	12,278,625
		Total equity	$15,378,625
Total assets	$27,830,000	Total liabilities and equity	$27,043,625

The EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $27,830,000 – 27,043,625
EFN = $786,375

The company does have several alternatives. It can increase its asset utilization and/or its profit margin. The company could also increase the debt in its capital structure. This will decrease the equity account, thereby increasing ROE.

14. This is a multi-step problem involving several ratios. It is often easier to look backward to determine where to start. We need receivables turnover to find days' sales in receivables. To calculate receivables turnover, we need credit sales, and to find credit sales, we need total sales. Since we are given the profit margin and net income, we can use these to calculate total sales as:

Profit margin = Net income/Sales
.0860 = $386,000/Sales
Sales = $4,488,372

Credit sales are 80 percent of total sales, so:

Credit sales = $4,488,372(.80)
Credit sales = $3,590,698

Now we can find receivables turnover by:

Receivables turnover = Credit sales/Accounts receivable
Receivables turnover = $3,590,698/$191,300
Receivables turnover = 18.77 times

Days' sales in receivables = 365 days/Receivables turnover
Days' sales in receivables = 365/18.77
Days' sales in receivables = 19.45 days

15. The solution to this problem requires a number of steps. First, remember that:

Current assets + Net fixed assets = Total assets

So, if we find the current assets and the total assets, we can solve for net fixed assets. Using the numbers given for the current ratio and the current liabilities, we solve for current assets:

Current ratio = Current assets/Current liabilities
Current assets = Current ratio(Current liabilities)
Current assets = 1.29($1,450)
Current assets = $1,870.50

To find the total assets, we must first find the total debt and equity from the information given. So, we find the net income using the profit margin:

Profit margin = Net income/Sales
Net income = Profit margin × Sales
Net income = .081($7,380)
Net income = $597.78

We now use the net income figure as an input into ROE to find the total equity:

ROE = Net income/Total equity
Total equity = Net income/ROE
Total equity = $597.78/.143
Total equity = $4,180.28

Next, we need to find the long-term debt. The long-term debt ratio is:

Long-term debt ratio = .34 = Long-term debt/(Long-term debt + Total equity)

Inverting both sides gives:

1/.34 = (Long-term debt + Total equity)/Long-term debt = 1 + (Total equity/Long-term debt)

Substituting the total equity into the equation and solving for long-term debt gives the following:

1 + ($4,180.28/Long-term debt) = 2.94
Long-term debt = $4,180.28/1.94
Long-term debt = $2,153.48

Now, we can find the total debt of the company:

Total debt = Current liabilities + Long-term debt
Total debt = $1,450 + 2,153.48
Total debt = $3,603.48

And, with the total debt, we can find the total debt & equity, which is equal to total assets:

Total assets = Total debt + Total equity
Total assets = $3,603.48 + 4,180.28
Total assets = $7,783.76

And finally, we are ready to solve the balance sheet identity as:

Net fixed assets = Total assets – Current assets
Net fixed assets = $7,783.76 – 1,870.50
Net fixed assets = $5,913.26

16. This problem requires you to work backward through the income statement. First, recognize that Net income = $(1 - T_C)$EBT. Plugging in the numbers given and solving for EBT, we get:

EBT = $13,150/(1 – .24)
EBT = $17,302.63

Now, we can add interest to EBT to get EBIT as follows:

EBIT = EBT + Interest paid
EBIT = $17,302.63 + 3,460
EBIT = $20,762.63

To get EBITD (earnings before interest, taxes, and depreciation), the numerator in the cash coverage ratio, add depreciation to EBIT. Note, since there is no amortization in this problem, EBITDA equals EBITD.

EBITD = EBIT + Depreciation
EBITD = $20,762.63 + 4,380
EBITD = $25,142.63

Now, plug the numbers into the cash coverage ratio and calculate:

Cash coverage ratio = EBITD/Interest
Cash coverage ratio = $25,142.63/$3,460
Cash coverage ratio = 7.27 times

17. We can start by multiplying ROE by Total assets/Total assets

$$\text{ROE} = \frac{\text{Net income}}{\text{Equity}} = \frac{\text{Net income}}{\text{Equity}} \times \frac{\text{Total assets}}{\text{Total assets}}$$

Rearranging, we get:

$$\text{ROE} = \frac{\text{Net income}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}}$$

Next, we can multiply by Sales/Sales, which yields:

$$\text{ROE} = \frac{\text{Net income}}{\text{Total assets}} \times \frac{\text{Equity}}{\text{Total assets}} \times \frac{\text{Sales}}{\text{Sales}}$$

Rearranging, we get:

$$\text{ROE} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}}$$

Next, we can multiply the preceding three factor DuPont equation by EBT/EBT, which yields:

$$\text{ROE} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}} \times \frac{\text{EBT}}{\text{EBT}}$$

We can rearrange as:

$$\text{ROE} = \frac{\text{Net income}}{\text{EBT}} \times \frac{\text{EBT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}}$$

Finally, multiplying this equation EBIT/EBIT and rearranging yields:

$$\text{ROE} = \frac{\text{Net income}}{\text{EBT}} \times \frac{\text{EBT}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}} \times \frac{\text{EBIT}}{\text{EBIT}}$$

$$\text{ROE} = \underset{(1)}{\frac{\text{Net income}}{\text{EBT}}} \times \underset{(2)}{\frac{\text{EBT}}{\text{EBIT}}} \times \underset{(3)}{\frac{\text{EBIT}}{\text{Sales}}} \times \underset{(4)}{\frac{\text{Sales}}{\text{Total assets}}} \times \underset{(5)}{\frac{\text{Total assets}}{\text{Equity}}}$$

The interpretation of each term is as follows:

(1) This is the company's tax burden. This is the proportion of the company's profits retained after paying income taxes.
(2) This is the company's interest burden. It will be 1.00 for a company with no debt or financial leverage.
(3) This is the company's operating profit margin. It is the operating profit before interest and taxes per dollar of sales.
(4) This is the company's operating efficiency as measured by dollar of sales per dollar of total assets.
(5) This is the company's financial leverage as measured by the equity multiplier.

18.	**2018**	**Common size**	**2019**	**Common size**	**Common base year**
Assets					
Current assets					
Cash	$11,459	2.90%	$14,453	3.13%	1.2613
Accounts receivable	29,247	7.40%	33,304	7.21%	1.1387
Inventory	52,655	13.32%	60,689	13.14%	1.1526
Total	$93,361	23.62%	$108,446	23.48%	1.1616
Fixed assets					
Net plant and equipment	301,978	76.38%	353,330	76.52%	1.1701
Total assets	$395,339	100%	$461,776	100%	1.1681
Liabilities and Owners' Equity					
Current liabilities					
Accounts payable	$58,483	14.79%	$66,623	14.43%	1.1392
Notes payable	24,973	6.32%	24,735	5.36%	.9905
Total	$83,456	21.11%	$91,358	19.78%	1.0947
Long-term debt	34,500	8.73%	44,700	9.68%	1.2957
Owners' equity					
Common stock and paid-in surplus	$54,000	13.66%	$56,500	12.24%	1.0463
Accumulated retained earnings	223,383	56.50%	269,218	58.30%	1.2052
Total	$277,383	70.16%	$325,718	70.54%	1.1743
Total liabilities and owners' equity	$395,339	100%	$461,776	100%	1.1681

The common-size balance sheet answers are found by dividing each category by total assets. For example, the cash percentage for 2018 is:

$11,459/$395,339 = .0290, or 2.90%

This means that cash is 2.90 percent of total assets.

The common-base year answers are found by dividing each category value for 2019 by the same category value for 2018. For example, the cash common-base year number is found by:

$14,453/$11,459 = 1.2613

This means the cash balance in 2019 is 1.2613 times as large as the cash balance in 2018.

19. To determine full capacity sales, we divide the current sales by the capacity the company is currently using, so:

Full capacity sales = $530,000/.90
Full capacity sales = $588,889

So, the dollar growth rate in sales is:

Sales growth = $588,889 – 530,000
Sales growth = $58,889

20. To find the new level of fixed assets, we need to find the current percentage of fixed assets to full capacity sales. Doing so, we find:

Fixed assets/Full capacity sales = $620,000/$588,889
Fixed assets/Full capacity sales = 1.0528

Next, we calculate the total dollar amount of fixed assets needed at the new sales figure.

Total fixed assets = 1.0528($605,000)
Total fixed assets = $636,962

The new fixed assets necessary is the total fixed assets at the new sales figure minus the current level of fixed assets.

New fixed assets = $636,962 – 620,000
New fixed assets = $16,962

21. Assuming costs vary with sales and a 20 percent increase in sales, the pro forma income statement will look like this:

Pro Forma Income Statement	
Sales	$ 1,069,920
Costs	873,480
Other expenses	21,888
EBIT	$ 174,552
Interest	13,400
Taxable income	$ 161,152
Taxes (22%)	35,453
Net income	$ 125,699

The payout ratio is constant, so the dividends paid this year is the payout ratio from last year times net income, or:

Dividends = ($36,224/$103,007)($125,699)
Dividends = $44,204

And the addition to retained earnings will be:

Addition to retained earnings = $125,699 – 44,204
Addition to retained earnings = $81,495

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $174,730 + 81,495
New retained earnings = $256,225

The pro forma balance sheet will look like this:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 29,136	Accounts payable	$ 78,240
Accounts receivable	44,484	Notes payable	16,320
Inventory	100,080	Total	$ 94,560
Total	$ 173,700	Long-term debt	155,000
Fixed assets			
Net plant and equipment	475,800	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	256,225
		Total	$ 386,225
		Total liabilities and owners' equity	
Total assets	$ 649,500		$ 635,785

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $649,500 – 635,785
EFN = $13,715

22. First, we need to calculate full capacity sales, which is:

Full capacity sales = $891,600/.80
Full capacity sales = $1,114,500

The full capacity ratio at full capacity sales is:

Full capacity ratio = Fixed assets/Full capacity sales
Full capacity ratio = $396,500/$1,114,500
Full capacity ratio = .35576

The fixed assets required at the projected sales figure is the full capacity ratio times the projected sales level:

Total fixed assets = .35576($1,069,920) = $380,640

So, EFN is:

EFN = ($173,700 + 380,640) – $635,785 = –$81,445

Note that this solution assumes that fixed assets are decreased (sold) so the company has a 100 percent fixed asset utilization. If we assume fixed assets are not sold, the answer becomes:

EFN = ($173,700 + 396,500) – $635,785 = –$65,585

23. The D/E ratio of the company is:

D/E = ($81,520 + 155,000)/$304,730
D/E = .7762

So the new total debt amount will be:

New total debt = .7762($386,225)
New total debt = $299,773

This is the new total debt for the company. Given that our calculation for EFN is the amount that must be raised externally and does not increase spontaneously with sales, we need to subtract the spontaneous increase in accounts payable. The new level of accounts payable, which is the current accounts payable times the sales growth, will be:

Spontaneous increase in accounts payable = $65,200(.20)
Spontaneous increase in accounts payable = $13,040

This means that $13,040 of the new total debt is not raised externally. So, the debt raised externally, which will be the EFN, is:

EFN = New total debt – (Beginning LTD + Beginning CL + Spontaneous increase in AP)
EFN = $299,773 – ($155,000 + 81,520 + 13,040) = $50,213

The pro forma balance sheet with the new long-term debt will be:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 29,136	Accounts payable	$ 78,240
Accounts receivable	44,484	Notes payable	16,320
Inventory	100,080	Total	$ 94,560
Total	$ 173,700	Long-term debt	205,213
Fixed assets			
Net plant and equipment	475,800	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	256,225
		Total	$ 386,225
		Total liabilities and owners'	
Total assets	$ 649,500	equity	$ 685,998

The funds raised by the debt issue can be put into an excess cash account to make the balance sheet balance. The excess debt will be:

Excess debt = $685,998 – 649,500 = $36,498

To make the balance sheet balance, the company will have to increase its assets. We will put this amount in an account called excess cash, which will give us the following balance sheet:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 29,136	Accounts payable	$ 78,240
Excess cash	36,498	Notes payable	16,320
Accounts receivable	44,484	Total	$ 94,560
Inventory	100,080		
Total	$ 210,198	Long-term debt	205,213
Fixed assets			
Net plant and equipment	475,800	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	256,225
		Total	$ 386,225
Total assets	$ 685,998	Total liabilities and owners' equity	$ 685,998

The excess cash has an opportunity cost that we discussed earlier. Increasing fixed assets would also not be a good idea since the company already has enough fixed assets. A likely scenario would be the repurchase of debt and equity in its current capital structure weights. The company's debt-assets and equity-assets are:

Debt-assets = .7762/(1 + .7762) = .44
Equity-assets = 1/(1 + .7762) = .56

So, the amount of debt and equity needed will be:

Total debt needed = .44($649,500) = $283,824
Equity needed = .56($649,500) = $365,676

So, the repurchases of debt and equity will be:

Debt repurchase = ($94,560 + 205,213) – 283,824 = $15,949
Equity repurchase = $386,225 – 365,676 = $20,549

Assuming all of the debt repurchase is from long-term debt, and the equity repurchase is entirely from the retained earnings, the final pro forma balance sheet will be:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 29,136	Accounts payable	$ 78,240
Accounts receivable	44,484	Notes payable	16,320
Inventory	100,080	Total	$ 94,560
Total	$ 173,700	Long-term debt	189,264
Fixed assets			
Net plant and equipment	475,800	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	235,676
		Total	$ 365,676
Total assets	$ 649,500	Total liabilities and owners' equity	$ 649,500

Challenge

24. The pro forma income statements for all three growth rates will be:

Pro Forma Income Statement

	15 % Sales Growth	*20% Sales Growth*	*25% Sales Growth*
Sales	$1,025,340	$1,069,920	$1,114,500
Costs	837,085	873,480	909,875
Other expenses	20,976	21,888	22,800
EBIT	$167,279	$174,552	$181,825
Interest	13,400	13,400	13,400
Taxable income	$153,879	$161,152	$168,425
Taxes (22%)	33,853	35,453	37,054
Net income	$120,026	$125,699	$131,372
Dividends	$42,209	$44,204	$46,199
Add to RE	77,817	81,495	85,173

We will calculate the EFN for the 15 percent growth rate first. Assuming the payout ratio is constant, the dividends paid will be:

Dividends = ($36,224/$103,007)($120,026)
Dividends = $42,209

And the addition to retained earnings will be:

Addition to retained earnings = $120,026 – 42,209
Addition to retained earnings = $77,817

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $174,730 + 77,817
New retained earnings = $252,547

The pro forma balance sheet will look like this:

15% Sales Growth:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 27,922	Accounts payable	$ 74,980
Accounts receivable	42,631	Notes payable	16,320
Inventory	95,910	Total	$ 91,300
Total	$ 166,463	Long-term debt	$ 155,000
Fixed assets			
Net plant and equipment	455,975	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	252,547
		Total	$ 382,547
		Total liabilities and owners'	
Total assets	$ 622,438	equity	$ 628,847

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $622,438 – 628,847
EFN = –$6,409

At a 20 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

Dividends = ($36,224/$103,007)($125,699)
Dividends = $44,204

And the addition to retained earnings will be:

Addition to retained earnings = $125,699 – 44,204
Addition to retained earnings = $81,495

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $174,730 + 81,495
New retained earnings = $256,225

The pro forma balance sheet will look like this:

20% Sales Growth:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 29,136	Accounts payable	$ 78,240
Accounts receivable	44,484	Notes payable	16,320
Inventory	100,080	Total	$ 94,560
Total	$ 173,700	Long-term debt	155,000
Fixed assets			
Net plant and equipment	475,800	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	256,225
		Total	$ 386,225
		Total liabilities and owners' equity	
Total assets	$ 649,500		$ 635,785

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $649,500 – 635,785
EFN = $13,715

At a 25 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

Dividends = ($36,224/$103,007)($131,372)
Dividends = $46,199

And the addition to retained earnings will be:

Addition to retained earnings = $131,372 – 46,199
Addition to retained earnings = $85,173

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $174,730 + 85,173
New retained earnings = $259,903

The pro forma balance sheet will look like this:

25% Sales Growth:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 30,350	Accounts payable	$ 81,500
Accounts receivable	46,338	Notes payable	16,320
Inventory	104,250	Total	$ 97,820
Total	$ 180,938	Long-term debt	$ 155,000
Fixed assets			
Net plant and equipment	495,625	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	259,903
		Total	$ 389,903
		Total liabilities and owners'	
Total assets	$ 676,563	equity	$ 642,723

So the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $676,563 – 642,723
EFN = $33,840

25. The pro forma income statements for all three growth rates will be:

Pro Forma Income Statement

	20% Sales Growth	*30% Sales Growth*	*35% Sales Growth*
Sales	$1,069,920	$1,159,080	$1,203,660
Costs	873,480	946,270	982,665
Other expenses	21,888	23,712	24,624
EBIT	$174,552	$189,098	$196,371
Interest	13,400	13,400	13,400
Taxable income	$161,152	$175,698	$182,971
Taxes (22%)	35,453	38,654	40,254
Net income	$125,699	$137,044	$142,717
Dividends	$44,204	$48,194	$50,189
Add to RE	81,495	88,851	92,529

At a 30 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

Dividends = ($36,224/$103,007)($137,044)
Dividends = $48,194

And the addition to retained earnings will be:

Addition to retained earnings = $137,044 – 48,194
Addition to retained earnings = $88,851

The new retained earnings on the pro forma balance sheet will be:

New addition to retained earnings = $174,730 + 88,851
New addition to retained earnings = $263,581

The new total debt will be:

New total debt = .7762($393,581)
New total debt = $305,482

So, the new long-term debt will be the new total debt minus the new short-term debt, or:

New long-term debt = $305,482 – 101,080
New long-term debt = $204,402

The pro forma balance sheet will look like this:

Sales growth rate = 30% and debt/equity ratio = .7762:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 31,564	Accounts payable	$ 84,760
Accounts receivable	48,191	Notes payable	16,320
Inventory	108,420	Total	$ 101,080
Total	$ 188,175	Long-term debt	204,402
Fixed assets			
Net plant and equipment	515,450	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	263,581
		Total	$ 393,581
		Total liabilities and owners'	
Total assets	$ 703,625	equity	$ 699,063

So the excess debt raised is:

Excess debt = $699,063 – 703,625
Excess debt = –$4,562

At a 30 percent growth rate, the firm will need funds in the amount of $4,562 in addition to the external debt already raised. So, the EFN will be:

EFN = $49,402 + 4,562
EFN = $53,964

At a 35 percent growth rate, and assuming the payout ratio is constant, the dividends paid will be:

Dividends = ($36,224/$103,007)($142,717)
Dividends = $50,189

And the addition to retained earnings will be:

Addition to retained earnings = $142,717 – 50,189
Addition to retained earnings = $92,529

The new retained earnings on the pro forma balance sheet will be:

New retained earnings = $174,730 + 92,529
New retained earnings = $267,259

The new total debt will be:

New total debt = .7762($397,259)
New total debt = $308,337

So, the new long-term debt will be the new total debt minus the new short-term debt, or:

New long-term debt = $308,337 – 104,340
New long-term debt = $203,997

Sales growth rate = 35% and debt/equity ratio = .7762:

Pro Forma Balance Sheet

Assets		Liabilities and Owners' Equity	
Current assets		Current liabilities	
Cash	$ 32,778	Accounts payable	$ 88,020
Accounts receivable	50,045	Notes payable	16,320
Inventory	112,590	Total	$ 104,340
Total	$ 195,413	Long-term debt	$ 203,997
Fixed assets			
Net plant and equipment	535,275	Owners' equity	
		Common stock and paid-in surplus	$ 130,000
		Retained earnings	267,259
		Total	$ 397,259
		Total liabilities and owners' equity	
Total assets	$ 730,688		$ 705,596

So the excess debt raised is:

Excess debt = $705,596 – 730,688
Excess debt = –$25,092

At a 35 percent growth rate, the firm will need funds in the amount of $25,092 in addition to the external debt already raised. So, the EFN will be:

EFN = $48,997 + 25,092
EFN = $74,089

26. We need the ROE to calculate the sustainable growth rate. The ROE is:

ROE = (Profit margin)(Total asset turnover)(Equity multiplier)
ROE = (.042)(1/.80)(1 + .37)
ROE = .0719, or 7.19%

Now, we can use the sustainable growth rate equation to find the retention ratio as:

Sustainable growth rate = (ROE × b)/[1 – (ROE × b)]
Sustainable growth rate = .11 = [.0719b]/[1 – .0719b]
b = 1.38

This implies the payout ratio is:

Payout ratio = 1 – b
Payout ratio = 1 – 1.38
Payout ratio = –.38, or –38%

This answer indicates a dividend payout ratio of negative 38 percent, which is impossible. So, the growth rate is inconsistent with the other constraints. The lowest possible payout rate is 0 (without

issuing stock), which corresponds to a retention ratio of 1, or total earnings retention. This problem illustrates a key point we made in the chapter: Sustainable growth analysis forces the user to make internally consistent assumptions.

As an aside, we should note that it is possible to have a retention ration greater than 1 if the company issues new stock. However, since the growth rate we are evaluating is perpetual, the company would have to issue stock every year, forever. But, doing so violates our underlying assumption that the sustainable growth rate requires no new equity.

In this case, the maximum sustainable growth rate for this company is:

Maximum sustainable growth rate = (ROE × b)/[1 – (ROE × b)]
Maximum sustainable growth rate = [.0719(1)]/[1 – .0719(1)]
Maximum sustainable growth rate = .0775, or 7.75%

27. We know that EFN is:

EFN = Increase in assets – Addition to retained earnings

The increase in assets is the beginning assets times the growth rate, so:

Increase in assets = A × g

The addition to retained earnings next year is the current net income times the retention ratio, times one plus the growth rate, so:

Addition to retained earnings = (NI × b)(1 + g)

And rearranging the profit margin to solve for net income, we get:

NI = PM(S)

Substituting the last three equations into the EFN equation we started with and rearranging, we get:

EFN = A(g) – PM(S)b(1 + g)
EFN = A(g) – PM(S)b – [PM(S)b]g
EFN = –PM(S)b + [A – PM(S)b]g

28. We start with the EFN equation we derived in Problem 27 and set it equal to zero:

EFN = 0 = –PM(S)b + [A – PM(S)b]g

Substituting the rearranged profit margin equation into the internal growth rate equation, we have:

Internal growth rate = [PM(S)b]/[A – PM(S)b]

Since:

ROA = NI/A
ROA = PM(S)/A

We can substitute this into the internal growth rate equation and divide both the numerator and denominator by A. This gives:

Internal growth rate = {[PM(S)*b*]/A}/{[A – PM(S)*b*]/A}
Internal growth rate = *b*(ROA)/[1 – *b*(ROA)]

To derive the sustainable growth rate, we must realize that to maintain a constant D/E ratio with no external equity financing, EFN must equal the addition to retained earnings times the D/E ratio:

EFN = (D/E)[PM(S)*b*(1 + *g*)]
EFN = A(*g*) – PM(S)*b*(1 + *g*)

Solving for g and then dividing both the numerator and denominator by A:

Sustainable growth rate = PM(S)*b*(1 + D/E)/[A – PM(S)*b*(1 + D/E)]
Sustainable growth rate = [ROA(1 + D/E)*b*]/[1 – ROA(1 + D/E)*b*]
Sustainable growth rate = *b*(ROE)/[1 – *b*(ROE)]

29. In the following derivations, the subscript "E" refers to end of period numbers, and the subscript "B" refers to beginning of period numbers. TE is total equity and TA is total assets.

For the sustainable growth rate*:*

Sustainable growth rate = ($ROE_E \times b$)/(1 – $ROE_E \times b$)
Sustainable growth rate = ($NI/TE_E \times b$)/(1 – $NI/TE_E \times b$)

We multiply this equation by:

(TE_E/TE_E)

Sustainable growth rate = ($NI/TE_E \times b$)/(1 – $NI/TE_E \times b$) × (TE_E/TE_E)
Sustainable growth rate = ($NI \times b$)/(TE_E – $NI \times b$)

Recognize that the denominator is equal to beginning of period equity, that is:

(TE_E – $NI \times b$) = TE_B

Substituting this into the previous equation, we get:

Sustainable rate = ($NI \times b$)/TE_B

Which is equivalent to:

Sustainable rate = (NI/TE_B) × *b*

Since $ROE_B = NI/TE_B$

The sustainable growth rate equation is:

Sustainable growth rate = $ROE_B \times b$

For the internal growth rate:

Internal growth rate = $(ROA_E \times b)/(1 - ROA_E \times b)$
Internal growth rate = $(NI/TA_E \times b)/(1 - NI/TA_E \times b)$

We multiply this equation by:

(TA_E/TA_E)

Internal growth rate = $(NI/TA_E \times b)/[(1 - NI/TA_E \times b) \times (TA_E/TA_E)]$
Internal growth rate = $(NI \times b)/(TA_E - NI \times b)$

Recognize that the denominator is equal to beginning of period assets, that is:

$(TA_E - NI \times b) = TA_B$

Substituting this into the previous equation, we get:

Internal growth rate = $(NI \times b)/TA_B$

Which is equivalent to:

Internal growth rate = $(NI/TA_B) \times b$

Since $ROA_B = NI/TA_B$

The internal growth rate equation is:

Internal growth rate = $ROA_B \times b$

30. Since the company issued no new equity, shareholders' equity increased by retained earnings. Retained earnings for the year were:

Retained earnings = NI – Dividends
Retained earnings = $80,000 – 44,000
Retained earnings = $36,000

So, the equity at the end of the year was:

Ending equity = $260,000 + 36,000
Ending equity = $296,000

The ROE based on the end of period equity is:

ROE = $80,000/$296,000
ROE = .2703, or 27.03%

The plowback ratio is:

Plowback ratio = Addition to retained earnings/NI
Plowback ratio = $36,000/$80,000

Plowback ratio = .45, or 45%

Using the equation presented in the text for the sustainable growth rate, we get:

Sustainable growth rate = (ROE × *b*)/[1 – (ROE × *b*)]
Sustainable growth rate = [.2703(.45)]/[1 – .2703(.45)]
Sustainable growth rate = .1385, or 13.85%

The ROE based on the beginning of period equity is

ROE = $80,000/$260,000
ROE = .3077, or 30.77%

Using the shortened equation for the sustainable growth rate and the beginning of period ROE, we get:

Sustainable growth rate = ROE × *b*
Sustainable growth rate = .3077 × .45
Sustainable growth rate = .1385, or 13.85%

Using the shortened equation for the sustainable growth rate and the end of period ROE, we get:

Sustainable growth rate = ROE × *b*
Sustainable growth rate = .2703 × .45
Sustainable growth rate = .1216, or 12.16%

Using the end of period ROE in the shortened sustainable growth rate results in a growth rate that is too low. This will always occur whenever the equity increases. If equity increases, the ROE based on end of period equity is lower than the ROE based on the beginning of period equity. The ROE (and sustainable growth rate) in the abbreviated equation is based on equity that did not exist when the net income was earned.

Case Solutions

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CHAPTER 2
CASH FLOWS AT WARF COMPUTERS

The operating cash flow for the company is: (NOTE: All numbers are in thousands of dollars)

OCF = EBIT + Depreciation – Current taxes
OCF = $2,665 + 298 – 559
OCF = $2,404

To calculate the cash flow from assets, we need to find the capital spending and change in net working capital. The capital spending for the year was:

Capital spending	
Ending net fixed assets	$4,322
– Beginning net fixed assets	3,356
+ Depreciation	298
Net capital spending	$1,264

And the change in net working capital was:

Change in net working capital	
Ending NWC	$1,361
– Beginning NWC	1,097
Change in NWC	$264

So, the cash flow from assets was:

Cash flow from assets	
Operating cash flow	$2,404
– Net capital spending	1,264
– Change in NWC	264
Cash flow from assets	$876

The cash flow to creditors was:

Cash flow to creditors	
Interest paid	$164
– Net New Borrowing	36
Cash flow to Creditors	$128

The cash flow to stockholders was:

Cash flow to stockholders	
Dividends paid	$688
– Net new equity raised	– 60
Cash flow to Stockholders	$748

The accounting cash flow statement of cash flows for the year was:

Statement of Cash Flows

Operations	
Net income	$1,876
Depreciation	298
Deferred taxes	66
Changes in assets and liabilities	
Accounts receivable	–57
Inventories	26
Accounts payable	41
Accrued expenses	–185
Other	–16
Total cash flow from operations	$2,049
Investing activities	
Acquisition of fixed assets	–$1,778
Sale of fixed assets	514
Total cash flow from investing activities	–$1,264
Financing activities	
Retirement of debt	–$238
Proceeds of long-term debt	274
Dividends	–688
Repurchase of stock	–79
Proceeds from new stock issues	19
Total cash flow from financing activities	–$712
Change in cash (on balance sheet)	$73

C-3 CASE SOLUTIONS

Answers to questions

1. The firm had positive earnings in an accounting sense (NI > 0) and had positive cash flow from operations and a positive cash flow from assets. The firm invested $264 in new net working capital and $1,264 in new fixed assets. The firm was able to return $748 to its stockholders and $128 to creditors.

2. The financial cash flows present a more accurate picture of the company since it accurately reflects interest cash flows as a financing decision rather than an operating decision.

3. The expansion plans look like they are probably a good idea. The company was able to return a significant amount of cash to its shareholders during the year, but a better use of these cash flows may have been to retain them for the expansion. This decision will be discussed in more detail later in the book.

CHAPTER 3
RATIOS AND FINANCIAL PLANNING AT EAST COAST YACHTS

1. The calculations for the ratios listed are:

Current ratio = $17,406,200/$22,754,600
Current ratio = .76 times

Quick ratio = ($17,406,200 – 7,290,100)/$22,754,600
Quick ratio = .44 times

Total asset turnover = $231,900,000/$129,035,500
Total asset turnover = 1.80 times

Inventory turnover = $170,157,000/$7,290,100
Inventory turnover = 23.34 times

Receivables turnover = $231,900,000/$6,501,900
Receivables turnover = 35.67 times

Total debt ratio = ($129,035,500 – 66,180,900)/$129,035,500
Total debt ratio = .49 times

Debt-equity ratio = ($22,754,600 + 40,100,000)/$66,180,900
Debt-equity ratio = .95 times

Equity multiplier = $129,035,500/$66,180,900
Equity multiplier = 1.95 times

Interest coverage = $26,464,900/$4,170,100
Interest coverage = 6.35 times

Profit margin = $17,612,892/$231,900,000
Profit margin = .0760, or 7.60%

Return on assets = $17,612,892/$129,035,500
Return on assets = .1365, or 13.65%

Return on equity = $17,612,892/$66,180,900
Return on equity = .2661, or 26.61%

2. Regarding the liquidity ratios, East Coast Yachts' current ratio is below the median industry ratio. This implies the company has less liquidity than the industry in general. However, the current ratio is above the lower quartile, so there are companies in the industry with lower liquidity than East Coast Yachts. The company may have more predictable cash flows, or more access to short-term borrowing.

The turnover ratios are all higher than the industry median; in fact, all three turnover ratios are above the upper quartile. This may mean that East Coast Yachts is more efficient than the industry in using its assets to generate sales.

The financial leverage ratios are all below the industry median but above the lower quartile. East Coast Yachts generally has less debt than comparable companies but is still within the normal range.

The profit margin for the company is about the same as the industry median, the ROA is slightly higher than the industry median, and the ROE is well above the industry median. East Coast Yachts seems to be performing well in the profitability area.

Overall, East Coast Yachts' performance seems good, although the liquidity ratios indicate that a closer look may be needed in this area.

Below is a list of possible reasons it may be good or bad that each ratio is higher or lower than the industry. Note that the list is not exhaustive, but merely one possible explanation for each ratio.

Ratio	Good	Bad
Current ratio	Better at managing current accounts.	May be having liquidity problems.
Quick ratio	Better at managing current accounts.	May be having liquidity problems.
Total asset turnover	Better at utilizing assets.	Assets may be older and depreciated, requiring extensive investment soon.
Inventory turnover	Better at inventory management, possibly due to better procedures.	Could be experiencing inventory shortages.
Receivables turnover	Better at collecting receivables.	May have credit terms that are too strict. Decreasing receivables turnover may increase sales.
Total debt ratio	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Debt-equity ratio	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Equity multiplier	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Interest coverage	Less debt than industry median means the company is less likely to experience credit problems.	Increasing the amount of debt can increase shareholder returns. Especially notice that it will increase ROE.
Profit margin	The PM is slightly above the industry median, so it is performing better than many peers.	May be able to better control costs.
ROA	Company is performing above many of its peers.	Assets may be old and depreciated relative to industry.
ROE	Company is performing above many of its peers.	Profit margin and EM could still be increased, which would further increase ROE.

If you created an Inventory/Current liabilities ratio, East Coast Yachts would have a ratio that is lower than the industry median. The current ratio is below the industry median, while the quick ratio is above the industry median. This implies that East Coast Yachts has less inventory to current liabilities than the industry median. Because the cash ratio is lower than the industry median, East Coast Yachts has less inventory than the industry median, but more accounts receivable.

3. To calculate the sustainable growth rate, we first need to find the ROE and the retention ratio, so:

ROE = Net income/Total equity
ROE = $17,612,892/$66,180,900
ROE = .2661, or 26.61%

b = Addition to RE/Net income
b = $9,687,892/$17,612,892
b = .55, or 55%

So, the sustainable growth rate is:

Sustainable growth rate = (ROE × *b*)/[1 – (ROE × *b*)]
Sustainable growth rate = [.2661(.55)]/[1 – .2661(.55)]
Sustainable growth rate = .1715, or 17.15%

The sustainable growth rate is the growth rate the company can achieve with no external financing while maintaining a constant debt-equity ratio.

At the sustainable growth rate, the pro forma statements next year will be:

Income statement	
Sales	$271,668,145
COGS	199,336,941
Other expenses	32,463,348
Depreciation	7,566,900
EBIT	$32,300,957
Interest	4,170,100
Taxable income	$28,130,857
Taxes (21%)	5,907,480
Net income	$22,223,377
Dividends	$9,999,508
Add to RE	12,223,868

Balance sheet

Assets		Liabilities & Equity	
Current Assets		Current Liabilities	
Cash	$4,233,993	Accounts Payable	$8,174,294
Accounts rec.	7,616,900	Notes Payable	18,482,454
Inventory	8,540,267	Total CL	$26,656,749
Total CA	$20,391,160		
		Long-term debt	$40,100,000
		Shareholder Equity	
		Common stock	$6,140,000
Fixed assets		Retained earnings	72,264,768
Net PP&E	$130,772,423	Total Equity	$78,404,768
Total Assets	$151,163,583	Total L&E	$145,161,517

So, the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $151,163,583 – 145,161,517
EFN = $6,002,066

The ratios with these pro forma statements are:

Current ratio = $20,391,160/$26,656,749
Current ratio = .76 times

Quick ratio = ($20,391,160 – 8,540,267)/$26,656,749
Quick ratio = .44 times

Total asset turnover = $271,668,145/$151,163,583
Total asset turnover = 1.80 times

Inventory turnover = $199,336,941/$8,540,267
Inventory turnover = 23.34 times

Receivables turnover = $271,668,145/$7,616,900
Receivables turnover = 35.67 times

Total debt ratio = ($151,163,583 – 78,404,768)/$151,163,583
Total debt ratio = .48 times

Debt-equity ratio = ($26,656,749 + 40,100,000)/$78,404,768
Debt-equity ratio = .85 times

Equity multiplier = $151,163,583/$78,404,768
Equity multiplier = 1.93 times

Interest coverage = $32,300,957/$4,170,100
Interest coverage = 7.75 times

Profit margin = $22,223,377/$271,668,145
Profit margin = .0818, or 8.18%

Return on assets = $22,223,377/$151,163,583
Return on assets = .1470, or 14.70%

Return on equity = $22,223,377/$78,404,768
Return on equity = .2834, or 28.34%

The only ratios that changed are the debt ratio, the interest coverage ratio, profit margin, return on assets, and return on equity. The debt ratio changes because long-term debt is assumed to remain fixed in the pro forma statements. The other ratios change slightly because interest and depreciation are also assumed to remain constant.

4. Pro forma financial statements for next year at a 20 percent growth rate are:

Income statement	
Sales	$278,280,000
COGS	204,188,400
Other expenses	33,253,440
Depreciation	7,566,900
EBIT	$33,271,260
Interest	4,170,100
Taxable income	$29,101,160
Taxes (21%)	6,111,244
Net income	$22,989,916
Dividends	$10,344,416
Add to RE	12,645,500

Balance sheet

Assets		Liabilities & Equity	
Current Assets		Current Liabilities	
Cash	$4,337,040	Accounts Payable	$8,373,240
Accounts rec.	7,802,280	Notes Payable	18,932,280
Inventory	8,748,120	Total CL	$27,305,520
Total CA	$20,887,440		
		Long-term debt	$40,100,000
		Shareholder Equity	
		Common stock	$6,140,000
Fixed assets		Retained earnings	72,686,400
Net PP&E	$133,955,160	Total Equity	$78,826,400
Total Assets	$154,842,600	Total L&E	$146,231,920

So, the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $154,842,600 – 146,231,920
EFN = $8,610,680

5. Now we are assuming the company can only build in amounts of $30 million. We will assume that the company will go ahead with the fixed asset acquisition. In this case, the pro forma financial statement calculation will change slightly. To estimate the new depreciation charge, we will find the current depreciation as a percentage of fixed assets, then apply this percentage to the new fixed assets. The depreciation as a percentage of assets this year was:

Depreciation percentage = $7,566,900/$111,629,300
Depreciation percentage = .0678, or 6.78%

The new level of fixed assets with the $30 million purchase will be:

New fixed assets = $111,629,300 + 30,000,000 = $141,629,300

So, the pro forma depreciation as a percentage of sales will be:

Pro forma depreciation = .0678($141,629,300)
Pro forma depreciation = $9,600,479

We will use this amount in the pro forma income statement. So, the pro forma income statement will be:

Income statement	
Sales	$278,280,000
COGS	204,188,400
Other expenses	33,253,440
Depreciation	9,600,479
EBIT	$31,237,681
Interest	4,170,100
Taxable income	$27,067,581
Taxes (21%)	5,684,192
Net income	$21,383,389
Dividends	$9,621,552
Add to RE	11,761,837

The pro forma balance sheet will remain the same except for the fixed asset and equity accounts. The fixed asset account will increase by $30 million, rather than the growth rate of sales.

Balance sheet			
Assets		Liabilities & Equity	
Current Assets		Current Liabilities	
Cash	$4,337,040	Accounts Payable	$8,373,240
Accounts rec.	7,802,280	Notes Payable	18,932,280
Inventory	8,748,120	Total CL	$27,305,520
Total CA	$20,887,440		
		Long-term debt	$40,100,000
		Shareholder Equity	
		Common stock	$6,140,000
Fixed assets		Retained earnings	71,802,737
Net PP&E	$141,629,300	Total Equity	$77,942,737
Total Assets	$162,516,740	Total L&E	$145,348,257

So, the EFN is:

EFN = Total assets – Total liabilities and equity
EFN = $162,516,740 – 145,348,257
EFN = $17,168,483

Since the fixed assets have increased at a faster percentage than sales, the capacity utilization for next year will decrease.