

Essentials of Corporate Finance

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CHAPTER 1

INTRODUCTION TO CORPORATE FINANCE

Answers to Concepts Review and Critical Thinking Questions

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, and unlimited life.
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. 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 functions of the treasurer's office.
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.
7. A primary market transaction.
8. In auction markets like the NYSE, brokers and agents meet at a physical location (the exchange) to buy and sell their assets. Dealer markets like NASDAQ represent dealers operating in dispersed locales who buy and sell assets themselves, usually communicating with other dealers electronically or literally over the counter.
9. Since such organizations frequently pursue social or political missions, many different goals are conceivable. One goal that is often cited is revenue minimization; i.e., providing their goods and services to society at the lowest possible cost. Another approach might be to observe that even a not-

for-profit business has equity. Thus, an appropriate goal would be to maximize the value of the equity.

10. An argument can be made either way. At one extreme, we could argue that in a market economy, all of these things are priced. This implies an optimal level of 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. The following is a classic (and highly relevant) thought question that illustrates this debate: “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?”
11. The goal will be the same, but the best course of action toward that goal may require adjustments due to different social, political, and economic climates.
12. 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.
13. 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 able to implement more effective monitoring mechanisms than can individual owners, given an institutions’ deeper resources and experiences with their own management. 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.
14. How much is too much? Who is worth more, John Hammergren 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.
15. The biggest reason that a company would “go dark” is because of the increased audit costs associated with Sarbanes-Oxley compliance. A company should always do a cost-benefit analysis, and it may be the case that the costs of complying with Sarbox outweigh the benefits. Of course, the company could always be trying to hide financial issues of the company! This is also one of the costs

of going dark: Investors surely believe that some companies are going dark to avoid the increased scrutiny from Sarbox. This taints other companies that go dark just to avoid compliance costs. This is similar to the lemon problem with used automobiles: Buyers tend to underpay because they know a certain percentage of used cars are lemons. So, investors will tend to pay less for the company stock than they otherwise would. It is important to note that even if the company delists, its stock is still likely traded, but on the over-the-counter market pink sheets rather than on an organized exchange. This adds another cost since the stock is likely to be less liquid now. All else the same, investors pay less for an asset with less liquidity. Overall, the cost to the company is likely a reduced market value. Whether delisting is good or bad for investors depends on the individual circumstances of the company. It is also important to remember that there are already many small companies that file only limited financial information.

CHAPTER 2

WORKING WITH FINANCIAL STATEMENTS

Answers to Concepts Review and Critical Thinking Questions

1. Liquidity measures how quickly and easily an asset can be converted to cash without significant loss in value. It's desirable for firms to have high liquidity so that they can more safely meet short-term creditor demands. However, liquidity also has an opportunity cost. Firms generally reap higher returns by investing in illiquid, productive assets. It's up to the firm's financial management staff to find a reasonable compromise between these opposing needs.
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. Historical costs can be objectively and precisely measured, whereas market values can be difficult to estimate, and different analysts would come up with different numbers. Thus, there is a tradeoff between relevance (market values) and objectivity (book values).
4. Depreciation is a non-cash deduction that reflects adjustments made in asset book values in accordance with the matching principle in financial accounting. Interest expense is a cash outlay, but it's a financing cost, not an operating cost.
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, capital outlays would typically 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, 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 it becomes better at collecting its receivables. In general, anything that leads to a decline in ending NWC relative to beginning NWC 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, 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 company.

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. The balance sheet for the company will look like this:

Balance sheet			
Current assets	\$1,970	Current liabilities	\$1,520
Net fixed assets	<u>9,650</u>	Long-term debt	4,370
		Owners' equity	<u>5,730</u>
 Total assets	 <u>\$11,620</u>	 Total liabilities and owners' equity	 <u>\$11,620</u>

The owners' equity is a plug variable. We know that total assets must equal total liabilities and owners' equity. Total liabilities and owners' equity is the sum of all debt and equity, so if we subtract debt from total liabilities and owners' equity, the remainder must be the equity balance, so:

$$\text{Owners' equity} = \text{Total liabilities and owners' equity} - \text{Current liabilities} - \text{Long-term debt}$$

$$\text{Owners' equity} = \$11,620 - 1,520 - 4,370$$

$$\text{Owners' equity} = \$5,730$$

Net working capital is current assets minus current liabilities, so:

$$\text{NWC} = \text{Current assets} - \text{Current liabilities}$$

$$\text{NWC} = \$1,970 - 1,520$$

$$\text{NWC} = \$450$$

- The income statement starts with revenues and subtracts costs to arrive at EBIT. We then subtract out interest to get taxable income, and then subtract taxes to arrive at net income. Doing so, we get:

<u>Income Statement</u>	
Sales	\$795,000
Costs	345,000
Depreciation	<u>76,000</u>
EBIT	\$374,000
Interest	<u>41,000</u>
Taxable income	\$333,000
Taxes	<u>116,550</u>
Net income	<u>\$216,450</u>

- The dividends paid plus the addition to retained earnings must equal net income, so:

$$\begin{aligned} \text{Net income} &= \text{Dividends} + \text{Addition to retained earnings} \\ \text{Addition to retained earnings} &= \$216,450 - 56,000 \\ \text{Addition to retained earnings} &= \$160,450 \end{aligned}$$

- Earnings per share is the net income divided by the shares outstanding, so:

$$\begin{aligned} \text{EPS} &= \text{Net income} / \text{Shares outstanding} \\ \text{EPS} &= \$216,450 / 60,000 \\ \text{EPS} &= \$3.61 \text{ per share} \end{aligned}$$

And dividends per share are the total dividends paid divided by the shares outstanding, so:

$$\begin{aligned} \text{DPS} &= \text{Dividends} / \text{Shares outstanding} \\ \text{DPS} &= \$56,000 / 60,000 \\ \text{DPS} &= \$.93 \text{ per share} \end{aligned}$$

- To find the book value of assets, we first need to find the book value of current assets. We are given the NWC. NWC is the difference between current assets and current liabilities, so we can use this relationship to find the book value of current assets. Doing so, we find:

$$\begin{aligned} \text{NWC} &= \text{Current assets} - \text{Current liabilities} \\ \text{Current assets} &= \$145,000 + 790,000 = \$935,000 \end{aligned}$$

Now we can construct the book value of assets. Doing so, we get:

<u>Book value of assets</u>	
Current assets	\$ 935,000
Fixed assets	<u>3,100,000</u>
Total assets	<u>\$4,035,000</u>

All of the information necessary to calculate the market value of assets is given, so:

<u>Market value of assets</u>	
Current assets	\$ 865,000
Fixed assets	<u>6,700,000</u>
Total assets	<u>\$7,565,000</u>

6. Using Table 2.3, we can see the marginal tax schedule. The first \$50,000 of income is taxed at 15 percent, the next \$25,000 is taxed at 25 percent, the next \$25,000 is taxed at 34 percent, and the next \$115,000 is taxed at 39 percent. So, the total taxes for the company will be:

$$\text{Taxes} = .15(\$50,000) + .25(\$25,000) + .34(\$25,000) + .39(\$215,000 - 100,000)$$

$$\text{Taxes} = \$67,100$$

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

$$\text{Average tax rate} = \text{Total tax} / \text{Net income}$$

$$\text{Average tax rate} = \$67,100 / \$215,000$$

$$\text{Average tax rate} = .3121, \text{ or } 31.21\%$$

The marginal tax rate is the tax rate on the next dollar of income. The company has net income of \$215,000 and the 39 percent tax bracket is applicable to a net income up to \$335,000, so the marginal tax rate is 39 percent.

8. To calculate the OCF, we first need to construct an income statement. The income statement starts with revenues and subtracts costs to arrive at EBIT. We then subtract out interest to get taxable income, and then subtract taxes to arrive at net income. Doing so, we get:

<u>Income Statement</u>	
Sales	\$34,630
Costs	10,340
Depreciation	<u>2,520</u>
EBIT	\$21,770
Interest	<u>1,750</u>
Taxable income	\$20,020
Taxes (35%)	<u>7,007</u>
Net income	<u>\$13,013</u>

Now we can calculate the OCF, which is:

$$\text{OCF} = \text{EBIT} + \text{Depreciation} - \text{Taxes}$$

$$\text{OCF} = \$21,770 + 2,520 - 7,007$$

$$\text{OCF} = \$17,283$$

9. Net capital spending is the increase in fixed assets, plus depreciation. Using this relationship, we find:

$$\text{Net capital spending} = \text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}} + \text{Depreciation}$$

$$\text{Net capital spending} = \$1,976,000 - 1,635,000 + 305,000$$

$$\text{Net capital spending} = \$646,000$$

10. The change in net working capital is the end of period net working capital minus the beginning of period net working capital, so:

$$\text{Change in NWC} = \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}}$$

$$\text{Change in NWC} = (\text{CA}_{\text{end}} - \text{CL}_{\text{end}}) - (\text{CA}_{\text{beg}} - \text{CL}_{\text{beg}})$$

$$\text{Change in NWC} = (\$1,310 - 1,090) - (1,045 - 960)$$

$$\text{Change in NWC} = \$135$$

11. The cash flow to creditors is the interest paid, minus any net new borrowing, so:

$$\text{Cash flow to creditors} = \text{Interest paid} - \text{Net new borrowing}$$

$$\text{Cash flow to creditors} = \text{Interest paid} - (\text{LTD}_{\text{end}} - \text{LTD}_{\text{beg}})$$

$$\text{Cash flow to creditors} = \$93,400 - (\$1,410,000 - 1,280,000)$$

$$\text{Cash flow to creditors} = -\$36,600$$

12. The cash flow to stockholders is the dividends paid minus any new equity raised. So, the cash flow to stockholders is: (Note that APIS is the additional paid-in surplus.)

$$\text{Cash flow to stockholders} = \text{Dividends paid} - \text{Net new equity}$$

$$\text{Cash flow to stockholders} = \text{Dividends paid} - (\text{Common}_{\text{end}} + \text{APIS}_{\text{end}}) - (\text{Common}_{\text{beg}} + \text{APIS}_{\text{beg}})$$

$$\text{Cash flow to stockholders} = \$135,000 - [(\$135,000 + 2,380,000) - (\$120,000 + 2,120,000)]$$

$$\text{Cash flow to stockholders} = -\$140,000$$

13. We know that cash flow from assets is equal to cash flow to creditors plus cash flow to stockholders. So, cash flow from assets is:

$$\text{Cash flow from assets} = \text{Cash flow to creditors} + \text{Cash flow to stockholders}$$

$$\text{Cash flow from assets} = -\$36,600 - 140,000$$

$$\text{Cash flow from assets} = -\$176,600$$

We also know that cash flow from assets is equal to the operating cash flow minus the change in net working capital and the net capital spending. We can use this relationship to find the operating cash flow. Doing so, we find:

$$\begin{aligned} \text{Cash flow from assets} &= \text{OCF} - \text{Change in NWC} - \text{Net capital spending} \\ -\$176,600 &= \text{OCF} - (-\$105,000) - (640,000) \\ \text{OCF} &= -\$176,600 - 105,000 + 640,000 \\ \text{OCF} &= \$358,400 \end{aligned}$$

Intermediate

14. a. To calculate the OCF, we first need to construct an income statement. The income statement starts with revenues and subtracts costs to arrive at EBIT. We then subtract out interest to get taxable income, and then subtract taxes to arrive at net income. Doing so, we get:

<u>Income Statement</u>	
Sales	\$167,000
Costs	88,600
Other Expenses	4,900
Depreciation	<u>11,600</u>
EBIT	\$61,900
Interest	<u>8,700</u>
Taxable income	\$53,200
Taxes	<u>18,620</u>
Net income	<u>\$34,580</u>
Dividends	\$9,700
Addition to retained earnings	24,880

Dividends paid plus addition to retained earnings must equal net income, so:

$$\begin{aligned} \text{Net income} &= \text{Dividends} + \text{Addition to retained earnings} \\ \text{Addition to retained earnings} &= \$34,580 - 9,700 \\ \text{Addition to retained earnings} &= \$24,880 \end{aligned}$$

So, the operating cash flow is:

$$\begin{aligned} \text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$61,900 + 11,600 - 18,620 \\ \text{OCF} &= \$54,880 \end{aligned}$$

- b. The cash flow to creditors is the interest paid, minus any new borrowing. Since the company redeemed long-term debt, the net new borrowing is negative. So, the cash flow to creditors is:

$$\begin{aligned} \text{Cash flow to creditors} &= \text{Interest paid} - \text{Net new borrowing} \\ \text{Cash flow to creditors} &= \$8,700 - (-\$4,000) \\ \text{Cash flow to creditors} &= \$12,700 \end{aligned}$$

- c. The cash flow to stockholders is the dividends paid minus any new equity. So, the cash flow to stockholders is:

$$\begin{aligned}\text{Cash flow to stockholders} &= \text{Dividends paid} - \text{Net new equity} \\ \text{Cash flow to stockholders} &= \$9,700 - 2,900 \\ \text{Cash flow to stockholders} &= \$6,800\end{aligned}$$

- d. In this case, to find the addition to NWC, we need to find the cash flow from assets. We can then use the cash flow from assets equation to find the change in NWC. We know that cash flow from assets is equal to cash flow to creditors plus cash flow to stockholders. So, cash flow from assets is:

$$\begin{aligned}\text{Cash flow from assets} &= \text{Cash flow to creditors} + \text{Cash flow to stockholders} \\ \text{Cash flow from assets} &= \$12,700 + 6,800 \\ \text{Cash flow from assets} &= \$19,500\end{aligned}$$

Net capital spending is equal to depreciation plus the increase in fixed assets, so:

$$\begin{aligned}\text{Net capital spending} &= \text{Depreciation} + \text{Increase in fixed assets} \\ \text{Net capital spending} &= \$11,600 + 23,140 \\ \text{Net capital spending} &= \$34,740\end{aligned}$$

Now we can use the cash flow from assets equation to find the change in NWC. Doing so, we find:

$$\begin{aligned}\text{Cash flow from assets} &= \text{OCF} - \text{Change in NWC} - \text{Net capital spending} \\ \$19,500 &= \$54,880 - \text{Change in NWC} - \$34,740 \\ \text{Change in NWC} &= \$640\end{aligned}$$

15. Here we need to work the income statement backward. Starting with net income, we know that net income is:

$$\begin{aligned}\text{Net income} &= \text{Dividends} + \text{Addition to retained earnings} \\ \text{Net income} &= \$1,150 + 2,600 \\ \text{Net income} &= \$3,750\end{aligned}$$

Net income is also the taxable income, minus the taxable income times the tax rate, or:

$$\begin{aligned}\text{Net income} &= \text{Taxable income} - (\text{Taxable income})(\text{Tax rate}) \\ \text{Net income} &= \text{Taxable income}(1 - \text{Tax rate})\end{aligned}$$

We can rearrange this equation and solve for the taxable income as:

$$\begin{aligned}\text{Taxable income} &= \text{Net income} / (1 - \text{Tax rate}) \\ \text{Taxable income} &= \$3,750 / (1 - .40) \\ \text{Taxable income} &= \$6,250\end{aligned}$$

EBIT minus interest equals taxable income, so rearranging this relationship, we find:

$$\text{EBIT} = \text{Taxable income} + \text{Interest}$$

$$\text{EBIT} = \$6,250 + 1,670$$

$$\text{EBIT} = \$7,920$$

Now that we have the EBIT, we know that sales minus costs minus depreciation equals EBIT. Solving this equation for EBIT, we find:

$$\text{EBIT} = \text{Sales} - \text{Costs} - \text{Depreciation}$$

$$\$7,920 = \$55,000 - 43,200 - \text{Depreciation}$$

$$\text{Depreciation} = \$3,880$$

16. We can fill in the balance sheet with the numbers we are given. The balance sheet will be:

<u>Balance Sheet</u>			
Cash	\$197,000	Accounts payable	\$288,000
Accounts receivable	265,000	Notes payable	<u>194,000</u>
Inventory	<u>563,000</u>	Current liabilities	\$482,000
Current assets	\$1,025,000	Long-term debt	<u>1,450,000</u>
		Total liabilities	\$1,932,000
Tangible net fixed assets	\$5,300,000	Common stock	??
Intangible net fixed assets	<u>863,000</u>	Accumulated retained earnings	<u>4,586,000</u>
Total assets	<u>\$7,188,000</u>	Total liabilities & owners' equity	<u>\$7,188,000</u>

Total liabilities and owners' equity is:

$$\text{TL \& OE} = \text{CL} + \text{LTD} + \text{Common stock} + \text{Retained earnings}$$

Solving for this equation for common stock gives us:

$$\text{Common stock} = \$7,188,000 - 4,586,000 - 1,932,000$$

$$\text{Common stock} = \$670,000$$

17. Owners' equity is the maximum of total assets minus total liabilities, or zero. Although the book value of owners' equity can be negative, the market value of owners' equity cannot be negative, so:

$$\text{Owners' equity} = \text{Max} [(\text{TA} - \text{TL}), 0]$$

- a. If total assets are \$9,300, the owners' equity is:

$$\text{Owners' equity} = \text{Max} [(\$9,300 - 7,800), 0]$$

$$\text{Owners' equity} = \$1,500$$

- b. If total assets are \$6,900, the owners' equity is:

$$\text{Owners' equity} = \text{Max} [(\$6,900 - 7,800), 0]$$

$$\text{Owners' equity} = \$0$$

18. a. Using Table 2.3, we can see the marginal tax schedule. For Corporation Growth, the first \$50,000 of income is taxed at 15 percent, the next \$25,000 is taxed at 25 percent, and the next \$8,000 is taxed at 34 percent. So, the total taxes for the company will be:

$$\begin{aligned} \text{Taxes}_{\text{Growth}} &= .15(\$50,000) + .25(\$25,000) + .34(\$8,000) \\ \text{Taxes}_{\text{Growth}} &= \$16,470 \end{aligned}$$

For Corporation Income, the first \$50,000 of income is taxed at 15 percent, the next \$25,000 is taxed at 25 percent, the next \$25,000 is taxed at 34 percent, the next \$235,000 is taxed at 39 percent, and the next \$7,965,000 is taxed at 34 percent. So, the total taxes for the company will be:

$$\begin{aligned} \text{Taxes}_{\text{Income}} &= .15(\$50,000) + .25(\$25,000) + .34(\$25,000) + .39(\$235,000) \\ &\quad + .34(\$7,965,000) \\ \text{Taxes}_{\text{Income}} &= \$2,822,000 \end{aligned}$$

b. The marginal tax rate is the tax rate on the next \$1 of earnings. 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.

19. a. The income statement starts with revenues and subtracts costs to arrive at EBIT. We then subtract interest to get taxable income, and then subtract taxes to arrive at net income. Doing so, we get:

<u>Income Statement</u>	
Sales	\$2,600,000
Cost of goods sold	1,535,000
Other expenses	465,000
Depreciation	<u>520,000</u>
EBIT	\$ 80,000
Interest	<u>245,000</u>
Taxable income	-\$165,000
Taxes (35%)	<u>0</u>
Net income	<u>-\$165,000</u>

The taxes are zero since we are ignoring any carryback or carryforward provisions.

b. The operating cash flow for the year was:

$$\begin{aligned} \text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$80,000 + 520,000 - 0 \\ \text{OCF} &= \$600,000 \end{aligned}$$

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, not an operating, expense.

20. 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. The assumptions made in the question are:

$$\text{Change in NWC} = \text{Net capital spending} = \text{Net new equity} = 0$$

To find the new long-term debt, we first need to find the cash flow from assets. The cash flow from assets is:

$$\begin{aligned}\text{Cash flow from assets} &= \text{OCF} - \text{Change in NWC} - \text{Net capital spending} \\ \text{Cash flow from assets} &= \$600,000 - 0 - 0 \\ \text{Cash flow from assets} &= \$600,000\end{aligned}$$

We can also find the cash flow to stockholders, which is:

$$\begin{aligned}\text{Cash flow to stockholders} &= \text{Dividends} - \text{Net new equity} \\ \text{Cash flow to stockholders} &= \$420,000 - 0 \\ \text{Cash flow to stockholders} &= \$420,000\end{aligned}$$

Now we can use the cash flow from assets equation to find the cash flow to creditors. Doing so, we get:

$$\begin{aligned}\text{Cash flow from assets} &= \text{Cash flow to creditors} + \text{Cash flow to stockholders} \\ \$600,000 &= \text{Cash flow to creditors} + \$420,000 \\ \text{Cash flow to creditors} &= \$180,000\end{aligned}$$

Now we can use the cash flow to creditors equation to find:

$$\begin{aligned}\text{Cash flow to creditors} &= \text{Interest} - \text{Net new long-term debt} \\ \$180,000 &= \$245,000 - \text{Net new long-term debt} \\ \text{Net new long-term debt} &= \$65,000\end{aligned}$$

21. a. To calculate the OCF, we first need to construct an income statement. The income statement starts with revenues and subtracts costs to arrive at EBIT. We then subtract out interest to get taxable income, and then subtract taxes to arrive at net income. Doing so, we get:

<u>Income Statement</u>	
Sales	\$23,730
Cost of goods sold	16,780
Depreciation	<u>2,840</u>
EBIT	\$ 4,110
Interest	<u>414</u>
Taxable income	\$ 3,696
Taxes (35%)	<u>1,294</u>
Net income	<u>\$ 2,402</u>

b. The operating cash flow for the year was:

$$\begin{aligned}\text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$4,110 + 2,840 - 1,294 = \$5,656\end{aligned}$$

c. To calculate the cash flow from assets, we also need the change in net working capital and net capital spending. The change in net working capital was:

$$\begin{aligned}\text{Change in NWC} &= \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}} \\ \text{Change in NWC} &= (\text{CA}_{\text{end}} - \text{CL}_{\text{end}}) - (\text{CA}_{\text{beg}} - \text{CL}_{\text{beg}}) \\ \text{Change in NWC} &= (\$3,528 - 2,484) - (\$2,940 - 2,592) \\ \text{Change in NWC} &= \$696\end{aligned}$$

And the net capital spending was:

$$\begin{aligned}\text{Net capital spending} &= \text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}} + \text{Depreciation} \\ \text{Net capital spending} &= \$18,840 - 16,560 + 2,840 \\ \text{Net capital spending} &= \$5,120\end{aligned}$$

So, the cash flow from assets was:

$$\begin{aligned}\text{Cash flow from assets} &= \text{OCF} - \text{Change in NWC} - \text{Net capital spending} \\ \text{Cash flow from assets} &= \$5,656 - 696 - 5,120 \\ \text{Cash flow from assets} &= -\$160\end{aligned}$$

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 fixed assets and net working capital; it had to raise a net \$160 in funds from its stockholders and creditors to make these investments.

d. The cash flow to creditors was:

$$\begin{aligned}\text{Cash flow to creditors} &= \text{Interest} - \text{Net new LTD} \\ \text{Cash flow to creditors} &= \$414 - 0 \\ \text{Cash flow to creditors} &= \$414\end{aligned}$$

Rearranging the cash flow from assets equation, we can calculate the cash flow to stockholders as:

$$\begin{aligned}\text{Cash flow from assets} &= \text{Cash flow to stockholders} + \text{Cash flow to creditors} \\ -\$160 &= \text{Cash flow to stockholders} + \$414 \\ \text{Cash flow to stockholders} &= -\$574\end{aligned}$$

Now we can use the cash flow to stockholders equation to find the net new equity as:

$$\begin{aligned}\text{Cash flow to stockholders} &= \text{Dividends} - \text{Net new equity} \\ -\$574 &= \$616 - \text{Net new equity} \\ \text{Net new equity} &= \$1,190\end{aligned}$$

The firm had positive earnings in an accounting sense ($NI > 0$) and had positive cash flow from operations. The firm invested \$696 in new net working capital and \$5,120 in new fixed assets. The firm had to raise \$160 from its stakeholders to support this new investment. It accomplished this by raising \$1,190 in the form of new equity. After paying out \$616 in the form of dividends to shareholders and \$414 in the form of interest to creditors, \$160 was left to just meet the firm's cash flow needs for investment.

22. a. To calculate owners' equity, we first need total liabilities and owners' equity. From the balance sheet relationship we know that this is equal to total assets. We are given the necessary information to calculate total assets. Total assets are current assets plus fixed assets, so:

$$\text{Total assets} = \text{Current assets} + \text{Fixed assets} = \text{Total liabilities and owners' equity}$$

For 2013, we get:

$$\text{Total assets} = \$3,198 + 14,826$$

$$\text{Total assets} = \$18,024$$

Now, we can solve for owners' equity as:

$$\text{Total liabilities and owners' equity} = \text{Current liabilities} + \text{Long-term debt} + \text{Owners' equity}$$

$$\$18,024 = \$1,381 + 8,086 + \text{Owners' equity}$$

$$\text{Owners' equity} = \$8,557$$

For 2014, we get:

$$\text{Total assets} = \$3,389 + 15,500$$

$$\text{Total assets} = \$18,889$$

Now we can solve for owners' equity as:

$$\text{Total liabilities and owners' equity} = \text{Current liabilities} + \text{Long-term debt} + \text{Owners' equity}$$

$$\$18,889 = \$2,030 + 9,434 + \text{Owners' equity}$$

$$\text{Owners' equity} = \$7,425$$

- b. The change in net working capital was:

$$\text{Change in NWC} = \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}}$$

$$\text{Change in NWC} = (\text{CA}_{\text{end}} - \text{CL}_{\text{end}}) - (\text{CA}_{\text{beg}} - \text{CL}_{\text{beg}})$$

$$\text{Change in NWC} = (\$3,389 - 2,030) - (\$3,198 - 1,381)$$

$$\text{Change in NWC} = -\$458$$

- c. To find the amount of fixed assets the company sold, we need to find the net capital spending. The net capital spending was:

$$\text{Net capital spending} = \text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}} + \text{Depreciation}$$

$$\text{Net capital spending} = \$15,500 - 14,826 + 4,040$$

$$\text{Net capital spending} = \$4,714$$

To find the fixed assets sold, we can also calculate net capital spending as:

$$\begin{aligned}\text{Net capital spending} &= \text{Fixed assets bought} - \text{Fixed assets sold} \\ \$4,714 &= \$8,424 - \text{Fixed assets sold} \\ \text{Fixed assets sold} &= \$3,710\end{aligned}$$

To calculate the cash flow from assets, we first need to calculate the operating cash flow. For the operating cash flow, we need the income statement. So, the income statement for the year is:

<u>Income Statement</u>	
Sales	\$47,842
Costs	23,992
Depreciation	<u>4,040</u>
EBIT	\$19,810
Interest	<u>750</u>
Taxable income	\$19,060
Taxes (40%)	<u>7,624</u>
Net income	<u>\$ 11,436</u>

Now we can calculate the operating cash flow which is:

$$\begin{aligned}\text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$19,810 + 4,040 - 7,624 = \$16,226\end{aligned}$$

And the cash flow from assets is:

$$\begin{aligned}\text{Cash flow from assets} &= \text{OCF} - \text{Change in NWC} - \text{Net capital spending.} \\ \text{Cash flow from assets} &= \$16,226 - (-\$458) - 4,714 \\ \text{Cash flow from assets} &= \$11,970\end{aligned}$$

- d. To find the cash flow to creditors, we first need to find the net new borrowing. The net new borrowing is the difference between the ending long-term debt and the beginning long-term debt, so:

$$\begin{aligned}\text{Net new borrowing} &= \text{LTD}_{\text{Ending}} - \text{LTD}_{\text{Beginning}} \\ \text{Net new borrowing} &= \$9,434 - 8,086 \\ \text{Net new borrowing} &= \$1,348\end{aligned}$$

So, the cash flow to creditors is:

$$\begin{aligned}\text{Cash flow to creditors} &= \text{Interest} - \text{Net new borrowing} \\ \text{Cash flow to creditors} &= \$750 - 1,348 = -\$598\end{aligned}$$

The net new borrowing is also the difference between the debt issued and the debt retired. We know the amount the company issued during the year, so we can find the amount the company retired. The amount of debt retired was:

$$\begin{aligned}\text{Net new borrowing} &= \text{Debt issued} - \text{Debt retired} \\ \$1,348 &= \$2,535 - \text{Debt retired} \\ \text{Debt retired} &= \$1,187\end{aligned}$$

23. To construct the cash flow identity, we will begin cash flow from assets. Cash flow from assets is:

$$\text{Cash flow from assets} = \text{OCF} - \text{Change in NWC} - \text{Net capital spending}$$

So, the operating cash flow is:

$$\begin{aligned}\text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$90,054 + 60,033 - 27,531 \\ \text{OCF} &= \$122,556\end{aligned}$$

Next, we will calculate the change in net working capital which is:

$$\begin{aligned}\text{Change in NWC} &= \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}} \\ \text{Change in NWC} &= (\text{CA}_{\text{end}} - \text{CL}_{\text{end}}) - (\text{CA}_{\text{beg}} - \text{CL}_{\text{beg}}) \\ \text{Change in NWC} &= (\$63,975 - 29,676) - (\$50,718 - 26,393) \\ \text{Change in NWC} &= \$9,974\end{aligned}$$

Now, we can calculate the capital spending. The capital spending is:

$$\begin{aligned}\text{Net capital spending} &= \text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}} + \text{Depreciation} \\ \text{Net capital spending} &= \$446,942 - 378,869 + 60,033 \\ \text{Net capital spending} &= \$128,106\end{aligned}$$

Now, we have the cash flow from assets, which is:

$$\begin{aligned}\text{Cash flow from assets} &= \text{OCF} - \text{Change in NWC} - \text{Net capital spending} \\ \text{Cash flow from assets} &= \$122,556 - 9,974 - 128,106 \\ \text{Cash flow from assets} &= -\$15,524\end{aligned}$$

The company's assets generated an outflow of \$15,524. The cash flow from operations was \$122,556, and the company spent \$9,974 on net working capital and \$128,106 on fixed assets.

The cash flow to creditors is:

$$\begin{aligned}\text{Cash flow to creditors} &= \text{Interest paid} - \text{New long-term debt} \\ \text{Cash flow to creditors} &= \text{Interest paid} - (\text{Long-term debt}_{\text{end}} - \text{Long-term debt}_{\text{beg}}) \\ \text{Cash flow to creditors} &= \$21,226 - (\$167,200 - 150,500) \\ \text{Cash flow to creditors} &= \$4,526\end{aligned}$$

The cash flow to stockholders is a little trickier in this problem. First, we need to calculate the new equity sold. The equity balance increased during the year. The only way to increase the equity balance is to add addition to retained earnings or sell equity. To calculate the new equity sold, we can use the following equation:

$$\begin{aligned} \text{New equity} &= \text{Ending equity} - \text{Beginning equity} - \text{Addition to retained earnings} \\ \text{New equity} &= \$314,041 - 252,694 - 25,697 \\ \text{New equity} &= \$35,650 \end{aligned}$$

What happened was the equity account increased by \$55,770. Of this increase, \$34,833 came from addition to retained earnings, so the remainder must have been the sale of new equity. Now we can calculate the cash flow to stockholders as:

$$\begin{aligned} \text{Cash flow to stockholders} &= \text{Dividends paid} - \text{Net new equity} \\ \text{Cash flow to stockholders} &= \$15,600 - 35,650 \\ \text{Cash flow to stockholders} &= -\$20,050 \end{aligned}$$

The company paid \$4,526 to creditors and raised \$20,050 from stockholders.

Finally, the cash flow identity is:

$$\begin{aligned} \text{Cash flow from assets} &= \text{Cash flow to creditors} + \text{Cash flow to stockholders} \\ -\$15,524 &= \quad \$4,526 \quad + \quad -\$20,050 \end{aligned}$$

The cash flow identity balances, which is what we expect.

Challenge

$$\begin{aligned} 24. \text{ Net capital spending} &= \text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}} + \text{Depreciation} \\ &= (\text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}}) + (\text{Depreciation} + \text{AD}_{\text{beg}}) - \text{AD}_{\text{beg}} \\ &= (\text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}}) + \text{AD}_{\text{end}} - \text{AD}_{\text{beg}} \\ &= (\text{NFA}_{\text{end}} + \text{AD}_{\text{end}}) - (\text{NFA}_{\text{beg}} + \text{AD}_{\text{beg}}) \\ &= \text{FA}_{\text{end}} - \text{FA}_{\text{beg}} \end{aligned}$$

25. a. The tax bubble causes average tax rates to catch up to marginal tax rates, thus eliminating the tax advantage of low marginal rates for high income corporations.

$$b. \text{ Taxes} = .15(\$50\text{K}) + .25(\$25\text{K}) + .34(\$25\text{K}) + .39(\$235\text{K}) = \$113.9\text{K}$$

$$\text{Average tax rate} = \$113.9\text{K} / \$335\text{K} = 34\%$$

The marginal tax rate on the next dollar of income is 34 percent.

For corporate taxable income levels of \$335K to \$10M, average tax rates are equal to marginal tax rates.

$$\text{Taxes} = .34(\$10\text{M}) + .35(\$5\text{M}) + .38(\$3.333\text{M}) = \$6,416,667$$

$$\text{Average tax rate} = \$6,416,667 / \$18,333,334 = 35\%$$

The marginal tax rate on the next dollar of income is 35 percent. For corporate taxable income levels over \$18,333,334, average tax rates are again equal to marginal tax rates.

- c. At the end of the “tax bubble”, the marginal tax rate on the next dollar should equal the average tax rate on all preceding dollars. Since the upper threshold of the bubble bracket is now \$200,000, the marginal tax rate on dollar \$200,001 should be 34 percent, and the total tax paid on the first \$200,000 should be \$200,000(.34). So, we get:

$$\begin{aligned} \text{Taxes} &= .34(\$200\text{K}) = \$68\text{K} = .15(\$50\text{K}) + .25(\$25\text{K}) + .34(\$25\text{K}) + X(\$100\text{K}) \\ X(\$100\text{K}) &= \$68\text{K} - 22.25\text{K} = \$45.75\text{K} \\ X &= \$45.75\text{K} / \$100\text{K} \\ X &= 45.75\% \end{aligned}$$

