

End of Chapter Solutions
Corporate Finance: Principles and Applications
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CHAPTER 1

INTRODUCTION TO CORPORATE FINANCE

Answers to Concept Questions

1. The three basic forms are sole proprietorships, partnerships, and corporations. Some disadvantages of sole proprietorships and partnerships are: unlimited liability, limited life, difficulty in transferring ownership, and hard to raise capital funds. Some advantages are: simpler, less regulation, the owners are also the managers, and sometimes personal tax rates are better than corporate tax rates. The primary disadvantage of the corporate form is the double taxation to shareholders on distributed earnings and dividends. Some advantages include: limited liability, ease of transferability, ability to raise capital, and unlimited life. When a business is started, most take the form of a sole proprietorship or partnership because of the relative simplicity of starting these forms of businesses.
2. To maximize the current market value (share price) of the equity of the firm (whether it's publicly traded or not).
3. 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.
4. 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.
5. 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.
6. 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, unethical 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?"
7. 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.

8. 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.
9. 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. 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.
10. 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 that 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. When stock prices soar, management cleans 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.

CHAPTER 2

FINANCIAL STATEMENTS AND CASH FLOW

Answers to Concept 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 have a large factor of safety in meeting short-term creditor demands. However, since liquidity also has an opportunity cost associated with it - namely that higher returns can generally be found by investing the cash into productive assets - low liquidity levels are also desirable to the firm. 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.** 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 statement of cash flows treats 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/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 operating 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 productively, 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 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.

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:

| <u>Balance Sheet</u> | | | |
|----------------------|-----------------|---------|-----------------|
| CA | \$6,800 | CL | \$5,400 |
| NFA | <u>29,400</u> | LTD | 13,100 |
| | | OE | <u>??</u> |
| TA | <u>\$36,200</u> | TL & OE | <u>\$36,200</u> |

We know that total liabilities and owners' equity (TL & OE) must equal total assets of \$36,200. We also know that TL & OE is equal to current liabilities plus long-term debt plus owners' equity, so owners' equity is:

$$\text{Owners' equity} = \$36,200 - 13,100 - 5,400 = \$17,700$$

$$\text{NWC} = \text{CA} - \text{CL} = \$6,800 - 5,400 = \$1,400$$

2. The income statement for the company is:

| <u>Income Statement</u> | |
|-------------------------|------------------|
| Sales | \$528,600 |
| Costs | 264,400 |
| Depreciation | <u>41,700</u> |
| EBIT | \$222,500 |
| Interest | <u>20,700</u> |
| EBT | \$201,800 |
| Taxes (35%) | <u>70,630</u> |
| Net income | <u>\$131,170</u> |

One equation for net income is:

$$\text{Net income} = \text{Dividends} + \text{Addition to retained earnings}$$

Rearranging, we get:

$$\text{Addition to retained earnings} = \text{Net income} - \text{Dividends}$$

$$\text{Addition to retained earnings} = \$131,170 - 27,000$$

$$\text{Addition to retained earnings} = \$104,170$$

3. To find the book value of current assets, we use the NWC equation, that is:

$$\text{NWC} = \text{CA} - \text{CL}$$

Rearranging to solve for current assets, we get:

$$\text{CA} = \text{NWC} + \text{CL}$$

$$\text{CA} = \$320,000 + 1,075,000$$

$$\text{CA} = \$1,395,000$$

So, the book value balance sheet will be:

| <u>Book Value Balance Sheet</u> | |
|---------------------------------|--------------------|
| Current assets | \$1,395,000 |
| Fixed assets | <u>3,900,000</u> |
| Total assets | <u>\$5,295,000</u> |

The market value of current assets is given, so the market value balance sheet is:

| <u>Market Value Balance Sheet</u> | |
|-----------------------------------|--------------------|
| NWC | \$ 410,000 |
| Fixed assets | <u>5,300,000</u> |
| Total assets | <u>\$5,710,000</u> |

4. Taxes = $.15(\$50,000) + .25(\$25,000) + .34(\$25,000) + .39(\$328,500 - 100,000)$
 Taxes = \$111,365

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

$$\text{Average tax rate} = \$111,365 / \$328,500$$

$$\text{Average tax rate} = .3390, \text{ or } 33.90\%$$

The marginal tax rate is the tax rate on the next \$1 of earnings, so the marginal tax rate is 39 percent.

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

| Income Statement | |
|----------------------|-----------------|
| Sales | \$30,700 |
| Costs | 11,100 |
| Depreciation expense | <u>2,100</u> |
| EBIT | \$17,500 |
| Interest expense | <u>1,140</u> |
| EBT | \$16,360 |
| Taxes (40%) | <u>6,544</u> |
| Net income | <u>\$ 9,816</u> |

Using the equation for OCF, we get:

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

$$\text{OCF} = \$17,500 + 2,100 - 6,544$$

$$\text{OCF} = \$13,056$$

6. The net capital spending is the increase in fixed assets, plus depreciation, so:

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

$$\text{Net capital spending} = \$4,450,000 - 3,750,000 + 395,000$$

$$\text{Net capital spending} = \$1,095,000$$

7. The long-term debt account will increase by \$9.5 million, the amount of the new long-term debt issue. Since the company sold 4 million new shares of stock with a \$1 par value, the common stock account will increase by \$4 million. The capital surplus account will increase by \$22 million, the value of the new stock sold above its par value. Since the company had a net income of \$15.3 million, and paid \$3.1 million in dividends, the addition to retained earnings was \$12.2 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 | <u>\$ 46,500,000</u> |
| Total long-term debt | \$ 46,500,000 |
| | |
| Shareholders' equity | |
| Preferred stock | \$ 2,100,000 |
| Common stock (\$1 par value) | 12,900,000 |
| Capital surplus | 63,000,000 |
| Accumulated retained earnings | <u>87,500,000</u> |
| Total equity | \$ 165,500,000 |

8. The cash flow to creditors is the interest paid minus the change in long-term debt, so:

$$\begin{aligned} \text{Cash flow to creditors} &= \text{Interest paid} - \text{Net new borrowing} \\ \text{Cash flow to creditors} &= \$187,000 - (\text{LTD}_{\text{end}} - \text{LTD}_{\text{beg}}) \\ \text{Cash flow to creditors} &= \$187,000 - (\$2,530,000 - 2,400,000) \\ \text{Cash flow to creditors} &= \$57,000 \end{aligned}$$

9. The cash flow to stockholders is the dividends paid minus any new equity purchased by shareholders, so:

$$\begin{aligned} \text{Cash flow to stockholders} &= \text{Dividends paid} - \text{Net new equity} \\ \text{Cash flow to stockholders} &= \$270,000 - [(\text{Common}_{\text{end}} + \text{APIS}_{\text{end}}) - (\text{Common}_{\text{beg}} + \text{APIS}_{\text{beg}})] \\ \text{Cash flow to stockholders} &= \$270,000 - [(\$595,000 + 6,180,000) - (\$540,000 + 5,600,000)] \\ \text{Cash flow to stockholders} &= -\$365,000 \end{aligned}$$

Note: APIS is the additional paid-in surplus.

10. We know that the cash flow from assets must be equal to the cash flow to creditors plus the cash flow to stockholders, so:

$$\begin{aligned} \text{Cash flow from assets} &= \text{Cash flow to creditors} + \text{Cash flow to stockholders} \\ \text{Cash flow from assets} &= \$57,000 - 365,000 \\ \text{Cash flow from assets} &= -\$308,000 \end{aligned}$$

Now, we can use the relationship between the cash flow from assets and the operating cash flow, change in net working capital, and capital spending to find the operating cash flow. Doing so, we find:

$$\begin{aligned} \text{Cash flow from assets} &= -\$308,000 = \text{OCF} - \text{Change in NWC} - \text{Net capital spending} \\ -\$308,000 &= \text{OCF} - (-\$65,000) - 640,000 \\ \text{Operating cash flow} &= \$267,000 \end{aligned}$$

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:

| <u>Statement of cash flows</u> | |
|---|------------------|
| <i>Operations</i> | |
| Net income | \$148 |
| Depreciation | 77 |
| Changes in other current assets | -12 |
| Change in accounts payable | <u>6</u> |
| Total cash flow from operations | <u>\$219</u> |
| <i>Investing activities</i> | |
| Acquisition of fixed assets | <u>-\$211</u> |
| Total cash flow from investing activities | <u>-\$211</u> |
| <i>Financing activities</i> | |
| Proceeds of long-term debt | \$44 |
| Dividends | <u>-40</u> |
| Total cash flow from financing activities | <u>\$4</u> |
| Change in cash (on balance sheet) | <u>\$ 12</u> |

- b. The change in net working capital is the ending net working capital minus the beginning net working capital, so:

$$\begin{aligned}
 \text{Change in NWC} &= \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}} \\
 &= (\text{CA}_{\text{end}} - \text{CL}_{\text{end}}) - (\text{CA}_{\text{beg}} - \text{CL}_{\text{beg}}) \\
 &= [(\$93 + 265) - 301] - [(\$81 + 253) - 295] \\
 &= \$57 - 39 \\
 &= \$18
 \end{aligned}$$

- c. To find the cash flow generated by the firm's assets, we need the operating cash flow, and the capital spending. Since there are no interest payments, EBIT is the same as EBT. Calculating each of these, we find:

| | |
|----------------------------|-----------|
| <i>Operating cash flow</i> | |
| EBT | \$246 |
| Depreciation | 77 |
| -Taxes | <u>98</u> |
| Operating cash flow | \$225 |

Next, we will calculate the capital spending, which is:

| | |
|-------------------------|-----------|
| <i>Capital spending</i> | |
| Ending fixed assets | \$824 |
| –Beginning fixed assets | 690 |
| Depreciation | <u>77</u> |
| Capital spending | \$211 |

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

| | |
|------------------------------|-----------|
| <i>Cash flow from assets</i> | |
| Operating cash flow | \$225 |
| –Capital spending | 211 |
| –Change in NWC | <u>18</u> |
| Cash flow from assets | –\$4 |

Notice that the accounting statement of cash flows shows a positive cash flow, but the financial cash flows show a negative cash flow. The financial cash flow is a better number for analyzing the firm's performance.

12. 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:

$$\begin{aligned} \text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$153,769 + 66,513 - 45,671 \\ \text{OCF} &= \$174,611 \end{aligned}$$

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

$$\begin{aligned} \text{Change in NWC} &= \text{NWC}_{\text{end}} - \text{NWC}_{\text{beg}} \\ \text{Change in NWC} &= (\text{CA}_{\text{end}} - \text{CL}_{\text{end}}) - (\text{CA}_{\text{beg}} - \text{CL}_{\text{beg}}) \\ \text{Change in NWC} &= (\$66,284 - 32,978) - (\$57,026 - 29,342) \\ \text{Change in NWC} &= \$5,622 \end{aligned}$$

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

$$\begin{aligned} \text{Net capital spending} &= \text{NFA}_{\text{end}} - \text{NFA}_{\text{beg}} + \text{Depreciation} \\ \text{Net capital spending} &= \$498,312 - 415,289 + 66,513 \\ \text{Net capital spending} &= \$149,536 \end{aligned}$$

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

$$\begin{aligned} \text{Cash flow from assets} &= \text{OCF} - \text{Change in NWC} - \text{Net capital spending} \\ \text{Cash flow from assets} &= \$174,611 - 5,622 - 149,536 \\ \text{Cash flow from assets} &= \$19,453 \end{aligned}$$

The company generated \$19,453 from its assets. The cash flow from operations was \$174,611, and the company spent \$5,622 on net working capital and \$149,536 in fixed assets.

The cash flow to creditors is:

$$\begin{aligned} \text{Cash flow to creditors} &= \text{Interest paid} - \text{New long-term debt} \\ \text{Cash flow to creditors} &= \text{Interest paid} - (\text{Long-term debt}_{\text{end}} - \text{Long-term debt}_{\text{beg}}) \\ \text{Cash flow to creditors} &= \$23,280 - (\$179,400 - 165,300) \\ \text{Cash flow to creditors} &= \$9,180 \end{aligned}$$

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:

$$\begin{aligned} \text{New equity} &= \text{Ending equity} - \text{Beginning equity} - \text{Addition to retained earnings} \\ \text{New equity} &= \$352,218 - 277,673 - 69,618 \\ \text{New equity} &= \$4,927 \end{aligned}$$

What happened was the equity account increased by \$74,545. Of this increase, \$69,618 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:

$$\begin{aligned} \text{Cash flow to stockholders} &= \text{Dividends paid} - \text{Net new equity} \\ \text{Cash flow to stockholders} &= \$15,200 - 4,927 \\ \text{Cash flow to stockholders} &= \$10,273 \end{aligned}$$

The company paid \$9,180 to creditors and \$10,273 to its stockholders.

Finally, the cash flow identity is:

$$\begin{array}{rcl} \text{Cash flow from assets} &= & \text{Cash flow to creditors} & + & \text{Cash flow to stockholders} \\ \$19,453 &= & \$4,927 & + & \$10,273 \end{array}$$

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

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

| | |
|---------------------------------|---------------|
| <i>Cash flows from the firm</i> | |
| Capital spending | -\$19,200 |
| Additions to NWC | <u>-2,700</u> |
| Cash flows from the firm | -\$21,900 |

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

| <i>Cash flows to investors of the firm</i> | |
|--|--------------|
| Sale of long-term debt | -\$16,500 |
| Sale of common stock | -2,700 |
| Dividends paid | <u>7,100</u> |
| Cash flows to investors of the firm | -\$12,100 |

14. 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:

| <u>Income Statement</u> | |
|-------------------------|-------------------------|
| Sales | \$757,000 |
| Cost of goods sold | 249,800 |
| Selling expenses | 146,000 |
| Depreciation expense | <u>87,000</u> |
| EBIT | \$274,200 |
| Interest expense | <u>40,500</u> |
| EBT | \$233,700 |
| Taxes | <u>81,795</u> |
| Net income | <u><u>\$151,905</u></u> |

- b. And the operating cash flow is:

$$\begin{aligned} \text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$274,200 + 87,000 - 81,795 \\ \text{OCF} &= \$279,405 \end{aligned}$$

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

| <u>Income Statement</u> | |
|-------------------------------|------------------------|
| Sales | \$225,000 |
| Costs | 103,200 |
| Other expenses | 6,100 |
| Depreciation expense | <u>15,300</u> |
| EBIT | \$100,400 |
| Interest expense | <u>11,200</u> |
| EBT | \$89,200 |
| Taxes | <u>31,227</u> |
| Net income | <u><u>\$57,973</u></u> |
| Dividends | \$18,100 |
| Addition to retained earnings | \$39,873 |

- a. The operating cash flow was:

$$\begin{aligned}\text{OCF} &= \text{EBIT} + \text{Depreciation} - \text{Taxes} \\ \text{OCF} &= \$100,400 + 15,300 - 31,227 \\ \text{OCF} &= \$84,473\end{aligned}$$

- b. The cash flow to creditors is the interest paid minus any net new long-term debt, so:

$$\begin{aligned}\text{CFC} &= \text{Interest} - \text{Net new LTD} \\ \text{CFC} &= \$11,200 - (-\$8,500) \\ \text{CFC} &= \$19,700\end{aligned}$$

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

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

$$\begin{aligned}\text{CFS} &= \text{Dividends} - \text{Net new equity} \\ \text{CFS} &= \$18,100 - 6,000 \\ \text{CFS} &= \$12,100\end{aligned}$$

- d. We know that $\text{CFA} = \text{CFC} + \text{CFS}$, so:

$$\begin{aligned}\text{CFA} &= \$19,700 + 12,100 \\ \text{CFA} &= \$31,800\end{aligned}$$

CFA is also equal to $(\text{OCF} - \text{Net capital spending} - \text{Change in NWC})$. We already know OCF. Net capital spending is equal to:

$$\begin{aligned}\text{Net capital spending} &= \text{Increase in NFA} + \text{Depreciation} \\ \text{Net capital spending} &= \$33,000 + 15,300 \\ \text{Net capital spending} &= \$48,300\end{aligned}$$

Now we can use:

$$\begin{aligned}\text{CFA} &= \text{OCF} - \text{Net capital spending} - \text{Change in NWC} \\ \$31,800 &= \$84,473 - 48,300 - \text{Change in NWC}\end{aligned}$$

Solving for the change in NWC yields \$4,373, meaning the company increased its NWC by \$4,373.

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

$$\begin{aligned}\text{Net income} &= \text{Dividends} + \text{Addition to retained earnings} \\ \text{Net income} &= \$5,200 + 8,100 \\ \text{Net income} &= \$13,300\end{aligned}$$

Now, looking at the income statement:

$$\text{EBT} - (\text{EBT} \times \text{Tax rate}) = \text{Net income}$$

Recognize that $EBT \times \text{Tax rate}$ is the calculation for taxes. Solving this for EBT yields:

$$\begin{aligned} EBT &= NI / (1 - \text{Tax rate}) \\ EBT &= \$13,300 / (1 - .35) \\ EBT &= \$20,462 \end{aligned}$$

Now we can calculate:

$$\begin{aligned} EBIT &= EBT + \text{Interest} \\ EBIT &= \$20,462 + 2,050 \\ EBIT &= \$22,512 \end{aligned}$$

The last step is to use:

$$\begin{aligned} EBIT &= \text{Sales} - \text{Costs} - \text{Depreciation} \\ \$22,512 &= \$57,900 - 28,600 - \text{Depreciation} \\ \text{Depreciation} &= \$6,788 \end{aligned}$$

17. The balance sheet for the company looks like this:

| <u>Balance Sheet</u> | | | |
|-----------------------------|--------------------|------------------------------|--------------------|
| Cash | \$168,000 | Accounts payable | \$429,000 |
| Accounts receivable | 237,000 | Notes payable | <u>171,000</u> |
| Inventory | <u>385,000</u> | Current liabilities | \$600,000 |
| Current assets | \$790,000 | Long-term debt | <u>1,985,000</u> |
| | | Total liabilities | \$2,585,000 |
| Tangible net fixed assets | 3,410,000 | Common stock | ?? |
| Intangible net fixed assets | <u>827,000</u> | Accumulated ret. earnings | <u>2,084,000</u> |
| Total assets | <u>\$5,027,000</u> | Total liab. & owners' equity | <u>\$5,027,000</u> |

Total liabilities and owners' equity is:

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

Solving this equation for equity gives us:

$$\begin{aligned} \text{Common stock} &= \$5,027,000 - 2,084,000 - 2,585,000 \\ \text{Common stock} &= \$358,000 \end{aligned}$$

18. 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: $\text{Shareholders' equity} = \text{Max} [(TA - TL), 0]$. So, if TA is \$15,100, equity is equal to \$3,500, and if TA is \$9,900, equity is equal to \$0. We should note here that the book value of shareholders' equity can be negative.
19. a. $\begin{aligned} \text{Taxes Growth} &= .15(\$50,000) + .25(\$25,000) + .34(\$4,500) = \$15,280 \\ \text{Taxes Income} &= .15(\$50,000) + .25(\$25,000) + .34(\$25,000) + .39(\$235,000) \\ &\quad + .34(\$7,950,000 - 335,000) \\ &= \$2,703,000 \end{aligned}$

- b. Each firm has a marginal tax rate of 34 percent 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.
20. a. The income statement for the company is:

| Income Statement | |
|-------------------------------------|-----------|
| Sales | \$809,000 |
| Costs | 549,000 |
| Administrative and selling expenses | 136,000 |
| Depreciation expense | 85,000 |
| EBIT | \$ 39,000 |
| Interest expense | 67,000 |
| EBT | -\$28,000 |
| Taxes | 0 |
| Net income | -\$28,000 |

- b. $OCF = EBIT + Depreciation - Taxes$
 $OCF = \$39,000 + 85,000 - 0$
 $OCF = \$124,000$
- 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.
21. 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 = $OCF - \text{Change in NWC} - \text{Net capital spending}$
 Cash flow from assets = $\$124,000 - 0 - 0 = \$124,000$

Cash flow to stockholders = $\text{Dividends} - \text{Net new equity}$
 Cash flow to stockholders = $\$75,000 - 0 = \$75,000$

Cash flow to creditors = $\text{Cash flow from assets} - \text{Cash flow to stockholders}$
 Cash flow to creditors = $\$124,000 - 75,000$
 Cash flow to creditors = $\$49,000$

Cash flow to creditors is also:

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

So:

Net new LTD = $\text{Interest} - \text{Cash flow to creditors}$
 Net new LTD = $\$67,000 - 49,000$
 Net new LTD = $\$18,000$

22. a. The income statement is:

| <u>Income Statement</u> | |
|-------------------------|-----------------|
| Sales | \$44,600 |
| Cost of goods sold | 27,500 |
| Depreciation | <u>4,630</u> |
| EBIT | \$12,470 |
| Interest | <u>1,050</u> |
| Taxable income | \$11,420 |
| Taxes (40%) | <u>4,568</u> |
| Net income | <u>\$ 6,852</u> |

b. $OCF = EBIT + Depreciation - Taxes$
 $OCF = \$12,470 + 4,630 - 4,568$
 $OCF = \$12,532$

c. $Change\ in\ NWC = NWC_{end} - NWC_{beg}$
 $= (CA_{end} - CL_{end}) - (CA_{beg} - CL_{beg})$
 $= (\$7,720 - 4,830) - (\$6,840 - 4,580)$
 $= \$630$

$Net\ capital\ spending = NFA_{end} - NFA_{beg} + Depreciation$
 $= \$35,610 - 27,510 + 4,630$
 $= \$12,730$

$CFA = OCF - Change\ in\ NWC - Net\ capital\ spending$
 $= \$12,532 - 630 - 12,730$
 $= -\$828$

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 \$828 in funds from its stockholders and creditors to make these investments.

d. $Cash\ flow\ to\ creditors = Interest - Net\ new\ LTD$
 $= \$1,050 - 0$
 $= \$1,050$

$Cash\ flow\ to\ stockholders = Cash\ flow\ from\ assets - Cash\ flow\ to\ creditors$
 $= -\$828 - 1,050$
 $= -\$1,878$

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:

$Net\ new\ equity = \$2,275 - (-1,878)$
 $= \$4,153$

The firm had positive earnings in an accounting sense ($NI > 0$) and had positive cash flow from operations. The firm invested \$630 in new net working capital and \$12,730 in new fixed assets. The firm had to raise \$828 from its stakeholders to support this new investment. It accomplished this by raising \$4,153 in the form of new equity. After paying out \$2,275 of this in the form of dividends to shareholders and \$1,050 in the form of interest to creditors, \$828 was left to meet the firm's cash flow needs for investment.

23. a. Total assets 2016 = $\$1,066 + 5,184 = \$6,250$
 Total liabilities 2016 = $\$475 + 2,880 = \$3,355$
 Owners' equity 2016 = $\$6,250 - 3,355 = \$2,895$

Total assets 2017 = $\$1,145 + 5,472 = \$6,617$
 Total liabilities 2017 = $\$518 + 3,090 = \$3,608$
 Owners' equity 2017 = $\$6,617 - 3,608 = \$3,009$

b. NWC 2016 = $CA_{2016} - CL_{2016} = \$1,066 - 475 = \$591$
 NWC 2017 = $CA_{2017} - CL_{2017} = \$1,145 - 518 = \$627$
 Change in NWC = $NWC_{2017} - NWC_{2016} = \$627 - 591 = \$36$

c. We can calculate net capital spending as:

Net capital spending = Net fixed assets 2017 – Net fixed assets 2016 + Depreciation
 Net capital spending = $\$5,472 - 5,184 + 1,339$
 Net capital spending = $\$1,627$

So, the company had a net capital spending cash flow of \$1,627. We also know that net capital spending is:

Net capital spending = Fixed assets bought – Fixed assets sold
 $\$1,627 = \$2,740 - \text{Fixed assets sold}$
 Fixed assets sold = $\$2,740 - 1,627$
 Fixed assets sold = $\$1,113$

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

EBIT = Sales – Costs – Depreciation
 EBIT = $\$15,690 - 3,739 - 1,339$
 EBIT = $\$10,612$

EBT = EBIT – Interest
 EBT = $\$10,612 - 562$
 EBT = $\$10,050$

Taxes = EBT $\times .35$
 Taxes = $\$10,050 \times .35$
 Taxes = $\$3,518$

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

$$\text{OCF} = \$10,612 + 1,339 - 3,518$$

$$\text{OCF} = \$8,434$$

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

$$\text{Cash flow from assets} = \$8,434 - 36 - 1,627$$

$$\text{Cash flow from assets} = \$6,771$$

$$d. \text{ Net new borrowing} = \text{LTD}_{2017} - \text{LTD}_{2016}$$

$$\text{Net new borrowing} = \$3,090 - 2,880$$

$$\text{Net new borrowing} = \$210$$

$$\text{Net new borrowing} = \$210 = \text{Debt issued} - \text{Debt retired}$$

$$\text{Debt retired} = \$634 - 210$$

$$\text{Debt retired} = \$424$$

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

$$\text{Cash flow to creditors} = \$562 - 210$$

$$\text{Cash flow to creditors} = \$352$$

24.

| <u>Balance sheet as of Dec. 31, 2016</u> | | | |
|--|------------------|----------------------|------------------|
| Cash | \$21,364 | Accounts payable | \$27,349 |
| Accounts receivable | 28,283 | | |
| Inventory | <u>50,287</u> | Long-term debt | 71,550 |
| Current assets | \$99,934 | | |
| Net fixed assets | <u>\$179,166</u> | Owners' equity | <u>180,201</u> |
| Total assets | <u>\$279,100</u> | Total liab. & equity | <u>\$279,100</u> |
| <u>Balance sheet as of Dec. 31, 2017</u> | | | |
| Cash | \$21,856 | Accounts payable | \$25,639 |
| Accounts receivable | 31,864 | | |
| Inventory | <u>51,675</u> | Long-term debt | 83,476 |
| Current assets | \$105,395 | | |
| Net fixed assets | <u>\$183,440</u> | Owners' equity | <u>179,720</u> |
| Total assets | <u>\$288,835</u> | Total liab. & equity | <u>\$288,835</u> |

| <u>2016 Income Statement</u> | | <u>2017 Income Statement</u> | |
|------------------------------|-----------------|------------------------------|-----------------|
| Sales | \$40,743.00 | Sales | \$43,277.00 |
| COGS | 14,020.00 | COGS | 15,912.00 |
| Other expenses | 3,322.00 | Other expenses | 2,776.00 |
| Depreciation | <u>5,853.00</u> | Depreciation | <u>5,858.00</u> |
| EBIT | \$17,548.00 | EBIT | \$18,731.00 |
| Interest | <u>2,098.00</u> | Interest | <u>3,142.00</u> |
| EBT | \$15,450.00 | EBT | \$15,589.00 |
| Taxes (35%) | <u>5,407.50</u> | Taxes (35%) | <u>5,456.15</u> |
| Net income | \$10,042.50 | Net income | \$10,132.85 |
| | | | |
| Dividends | \$4,966.00 | Dividends | \$5,468.00 |
| Additions to RE | \$5,076.50 | Additions to RE | 4,664.85 |

25. OCF = EBIT + Depreciation – Taxes

$$\text{OCF} = \$18,731 + 5,858 - 5,456.15$$

$$\text{OCF} = \$19,132.85$$

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

$$\text{Change in NWC} = (\$105,395 - 25,639) - (\$99,934 - 27,349)$$

$$\text{Change in NWC} = \$7,171$$

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

$$\text{Net capital spending} = \$183,440 - 179,166 + 5,858$$

$$\text{Net capital spending} = \$10,132$$

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

$$\text{Cash flow from assets} = \$19,132.85 - 7,171 - 10,132$$

$$\text{Cash flow from assets} = \$1,829.85$$

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

$$\text{Net new LTD} = \text{LTD}_{\text{end}} - \text{LTD}_{\text{beg}}$$

$$\text{Cash flow to creditors} = \$3,142 - (\$83,476 - 71,550)$$

$$\text{Cash flow to creditors} = -\$8,784$$

$$\text{Net new equity} = \text{Common stock}_{\text{end}} - \text{Common stock}_{\text{beg}}$$

$$\text{Common stock} + \text{Retained earnings} = \text{Total owners' equity}$$

$$\text{Net new equity} = (\text{OE} - \text{RE})_{\text{end}} - (\text{OE} - \text{RE})_{\text{beg}}$$

$$\text{Net new equity} = \text{OE}_{\text{end}} - \text{OE}_{\text{beg}} + \text{RE}_{\text{beg}} - \text{RE}_{\text{end}}$$

$$\text{RE}_{\text{end}} = \text{RE}_{\text{beg}} + \text{Additions to RE}$$

$$\text{Net new equity} = \text{OE}_{\text{end}} - \text{OE}_{\text{beg}} + \text{RE}_{\text{beg}} - (\text{RE}_{\text{beg}} + \text{Additions to RE}_{2014})$$

$$\text{Net new equity} = \text{OE}_{\text{end}} - \text{OE}_{\text{beg}} - \text{Additions to RE}_{2014}$$

$$\text{Net new equity} = \$179,720 - 180,201 - 4,664.85$$

$$\text{Net new equity} = -\$5,145.85$$

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

$$\text{Cash flow to stockholders} = \$5,468 - (-\$5,145.85)$$

$$\text{Cash flow to stockholders} = \$10,613.85$$

As a check, cash flow from assets is \$1,829.85.

Cash flow from assets = Cash flow to creditors + Cash flow to stockholders

Cash flow from assets = $-\$8,784 + 10,613.85$

Cash flow from assets = \$1,829.85

Challenge

26. 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 = $\$321 + 185 + 34 + 96$

EBIT = \$636

Now we can calculate the operating cash flow as:

Operating cash flow

| | |
|------------------------------------|------------|
| Earnings before interest and taxes | \$636 |
| Depreciation | 177 |
| – Current taxes | <u>185</u> |
| Operating cash flow | \$628 |

The net capital spending is found in the investing activities portion of the accounting statement of cash flows, so:

Net capital spending

| | |
|-----------------------------|-----------|
| Acquisition of fixed assets | \$332 |
| – Sale of fixed assets | <u>42</u> |
| Capital spending | \$290 |

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 | \$27 |
| Accounts receivable | 52 |
| Inventories | –41 |
| Accounts payable | –33 |
| Accrued expenses | 17 |
| Other | <u>–4</u> |
| NWC cash flow | \$18 |

Except for the interest expense and notes payable, 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 | \$96 |
| Retirement of debt | <u>195</u> |
| Debt service | \$291 |
| – Proceeds from sale of long-term debt | <u>–105</u> |
| Total | \$186 |

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 | \$158 |
| Repurchase of stock | <u>26</u> |
| Cash to stockholders | \$184 |
| – Proceeds from new stock issue | <u>–50</u> |
| Total | \$134 |

$$\begin{aligned}
 27. \text{ Net capital spending} &= NFA_{\text{end}} - NFA_{\text{beg}} + \text{Depreciation} \\
 &= (NFA_{\text{end}} - NFA_{\text{beg}}) + (\text{Depreciation} + AD_{\text{beg}}) - AD_{\text{beg}} \\
 &= (NFA_{\text{end}} - NFA_{\text{beg}}) + AD_{\text{end}} - AD_{\text{beg}} \\
 &= (NFA_{\text{end}} + AD_{\text{end}}) - (NFA_{\text{beg}} + AD_{\text{beg}}) = FA_{\text{end}} - FA_{\text{beg}}
 \end{aligned}$$

28. 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. Assuming a taxable income of \$335,001, the taxes will be:

$$\begin{aligned}
 \text{Taxes} &= .15(\$50,000) + .25(\$25,000) + .34(\$25,000) + .39(\$235,000) \\
 \text{Taxes} &= \$113,900
 \end{aligned}$$

$$\text{Average tax rate} = \$113,900 / \$335,000$$

$$\text{Average tax rate} = .34, \text{ or } 34\%$$

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

For corporate taxable income levels greater than \$18,333,334, average tax rates are equal to marginal tax rates.

$$\begin{aligned}
 \text{Taxes} &= .34(\$10,000,000) + .35(\$5,000,000) + .38(\$3,333,334) \\
 \text{Taxes} &= \$6,416,667
 \end{aligned}$$

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

$$\text{Average tax rate} = .35, \text{ or } 35\%$$

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.

$$\begin{aligned} \text{c. Taxes} &= .34(\$200,000) = \$68,000 \\ \$68,000 &= .15(\$50,000) + .25(\$25,000) + .34(\$25,000) + X(\$100,000) \\ X(\$100,000) &= \$68,000 - 22,250 = \$45,750 \\ X &= \$45,750 / \$100,000 \\ X &= .4575, \text{ or } 45.75\% \end{aligned}$$

