

FA Module 4: The balance sheet (statement of financial position) – practice problems

(The attached PDF file has better formatting.)

Note: Many practice problems in this module deal also with financial ratios, which are discussed briefly in this module and more completely in later modules.

Exercise 4.1: Profitability ratios

On December 31, 20X1, a firm's balance sheet shows

- long-term debt = 100
- other liabilities = 150
- shareholders' equity = 200

The firm's 20X1 income statement shows

- net income = 50
- other comprehensive income = 0
- tax expense = 15

Shareholder dividends in 20X1 are 10. No shares are issued or repurchased in 20X1.

- A. What are total assets at December 31, 20X1?
- B. What is the financial leverage at December 31, 20X1?
- C. What is shareholders' equity at December 31, 20X0?
- D. What is the return on equity in 20X1?

Part A: Total assets = total liabilities + equity = $100 + 150 + 200 = 450$.

Part B: Financial leverage = total assets / shareholders' equity = $450 / 200 = 2.25$.

Part C: The change in shareholders' equity from 12/31/20X0 to 12/31/20X1 =

$$\text{net income} - \text{shareholder dividends} = 50 - 10 = 40$$

Shareholders' equity at December 31, 20X0, is $200 - 40 = 160$.

Question: Should we deduct tax expense to derive the change in shareholders' equity?

Answer: Tax expense is already deducted from net income.

Question: If other comprehensive income were not zero, would the solution change?

Answer: The change in retained earnings = net income – shareholder dividends. The change in shareholders' equity is the change in retained earnings + other comprehensive income (which is a direct credit to equity).

Part D: The return on equity = net income / average shareholders' equity =

$$50 / ((160 + 200) / 2) = 27.78\%.$$

Exercise 4.2: Profitability ratios

A firm's balance sheet shows

	<i>December 31, 20X1</i>	<i>December 31, 20X2</i>
Long-term and short term debt	100	100
Other liabilities	140	160
Common stock + additional paid-in capital	70	70
Retained earnings	20	40

The firm declared and paid shareholder dividends of 30 in 20X2.

- A. What is shareholders' equity at December 31, 20X1 and 20X2?
- B. What is the debt-to-equity ratio at December 31, 20X1 and 20X2?
- C. What are total assets at December 31, 20X1 and 20X2?
- D. What is the financial leverage at December 31, 20X1 and 20X2?
- E. What is net income in 20X2?
- F. What is the return on equity in 20X2?
- G. What is the return on assets in 20X2?

Part A: Shareholders' equity = common stock + additional paid-in capital + retained earnings:

- December 31, 20X1: $70 + 20 = 90$
- December 31, 20X2: $70 + 40 = 110$

Part B: The debt-to-equity ratio is interest-bearing liabilities / shareholders' equity:

- December 31, 20X1: $100 / 90 = 1.1111$
- December 31, 20X2: $100 / 110 = 0.9091$

Part C: Total assets = total liabilities + shareholders' equity:

- December 31, 20X1: $100 + 140 + 70 + 20 = 330$
- December 31, 20X2: $100 + 160 + 70 + 40 = 370$

Part D: The financial leverage is total assets / shareholders' equity =

- December 31, 20X1: $330 / 90 = 3.6667$
- December 31, 20X2: $370 / 110 = 3.3636$

Part E: Net income – shareholder dividends = the change in retained earnings, so

net income = shareholder dividends + Δ (retained earnings) = $30 + (40 - 20) = 50$ in 20X2

Part F: The return on equity = net income / average shareholders' equity during the year =

$$50 / ((90 + 110) / 2) = 0.50$$

Part G: The return on assets = net income / average assets during the year =

$$50 / ((330 + 370) / 2) = 0.1429$$

Exercise 4.3: Shareholders' equity

- A firm begins operations on December 31, 20X0, and issues 100 shares with par value of 2 per share.
- The shares are sold to the public at 14 per share.
- In 20X1, the firm has net income of 80 and pays shareholder dividends of 0.50 per share.
- On December 31, 20X1, the firm's shares have a market value of 16 per share.

On December 31, 20X1, what is the firm's balance sheet entry for

- A. Common stock
- B. Additional paid-in capital
- C. Retained earnings
- D. Shareholders' equity

Part A: Common stock is the number of shares times the par value per share = $100 \times 2 = 200$.

Part B: Additional paid-in capital is the number of shares times (the cash received for per share – the par value per share) = $100 \times (14 - 2) = 1,200$. Equivalently, additional paid-in capital is the cash received for the shares – the common stock balance sheet entry = $14 \times 100 - 200 = 1,200$.

Part C: Retained earnings is a cumulative account. The change to retained earnings each year is net income minus shareholder dividends. The problem has only one year, so retained earnings = $80 - 0.50 \times 100 = 30$.

Part D: Shareholders' equity is the sum of common stock, additional paid-in capital, and retained earnings = $200 + 1,200 + 30 = 1,430$.

Question: Why isn't shareholders' equity equal to the number of shares times the market value per share, or $100 \times 16 = 1,600$?

Answer: The book value of shareholders' equity (which appears on financial statements) is 1,430. The market value of the firm is 1,600.

Exercise 4.4: Current ratio

On December 30, 20X1, a firm has

- deferred revenue = 50
- accounts payable = 150
- long-term debt = 300
- shareholders' equity = 500

The firm has no other liabilities or equity. The firm's current ratio on December 30 is 2.500.

On December 31, 20X1, the firm buys 100 of inventory on credit, payable in 30 days.

- A. What are the firm's current liabilities on December 30, 20X1?
- B. What are the firm's current assets on December 30, 20X1?
- C. What are the firm's current assets and liabilities on December 31, 20X1?
- D. What is the firm's current ratio on December 31, 20X1?

Part A: On December 30, current liabilities are deferred revenue + accounts payable = $50 + 150 = 200$.

Part B: Current assets = the current ratio \times current liabilities = $2.5 \times (50 + 150) = 500$

Part C: On December 31, inventory is bought for 100 and accounts payable increases 100.

- Current assets = $500 + 100 = 600$.
- Current liabilities = $50 + 150 + 100 + 300$.

Part D: The current ratio on December 31, 20X1, is $600 / 300 = 2.000$.

Exercise 4.5: Shareholders' equity

A firm has the following values for its debt and its shares on December 31, 20X1:

	<i>Book Value</i>	<i>Market Value</i>
<i>Long term debt</i>	100	90
<i>Outstanding common shares not held by the firm</i>	200	450
<i>Treasury shares</i>	50	80
<i>Perpetual, non-redeemable preferred shares</i>	40	50
<i>Preferred shares with mandatory redemption at a fixed amount at a future date</i>	60	60
<i>Retained earnings</i>	140	NA
<i>Minority interest</i>	20	NA

How do each of the following affect shareholders' equity?

- A. Long term debt
- B. Outstanding common shares (not held by the firm)
- C. Treasury shares
- D. Perpetual, non-redeemable preferred shares
- E. Preferred shares with mandatory redemption at a fixed amount at a future date
- F. Retained earnings
- G. Minority interest

Part A: Long-term debt is a liability; it is not part of shareholders' equity.

Part B: Common shares are

- Authorized to be issued by the corporation's charter (including those not yet issued)
- Issued by the corporation (including those repurchased by the firm)
- Outstanding, or issued minus repurchased. (Repurchased shares are Treasury shares.)

The outstanding shares are included in shareholders' equity.

Part C: Treasury shares are shown on the balance sheet but are not part of shareholders' equity. The firm itself owns the shares; they are not the firm's value to its owners.

Illustration: A firm issues 2 shares which it sells to David and Jonathan for 100 each. Its issued shares = its outstanding shares = 200. It repurchases the share it sold to Jonathan for 100: its issued shares remain 200; its Treasury shares are 100; and its outstanding shares are 100. Jonathan is no longer an owner of the firm. The only owner is David, whose share is worth 100.

Part D: Perpetual, non-redeemable preferred shares are similar to common shares in that the firm has no fixed obligations that can lead to bankruptcy and the shares need not be repaid to shareholders. The shares may have a stipulated dividend rate that must be paid before common dividends can be paid, but preferred shareholders can not force the firm into bankruptcy for not paying dividends. These preferred shares are part of shareholders' equity.

Part E: Preferred shares with mandatory redemption at a fixed amount at a future date are like long-term debt, except that the coupon rate is called a dividend rate. They are liabilities, not shareholders' equity, for financial

statement reporting. For tax accounting, preferred shares are equity, not liabilities, and the preferred dividend is not an offset to taxable income.

Part F: Retained earnings are the cumulative net income minus the cumulative shareholder dividends. If the firm sold shares for 100 on December 31, 20X0, earned 50 in 20X1, and paid shareholder dividends of 20 in 20X1, its retained earnings on December 31, 20X1, are $50 - 20 = 30$. If it earned 60 in 20X2, and paid shareholder dividends of 15 in 20X2, its retained earnings on December 31, 20X2, are $30 + 60 - 15 = 75$.

Retained earnings are included in shareholders' equity.

Question: Why is no market value shown for retained earnings?

Answer: Accounting statements distinguish common shares from retained earnings. Common shareholders own the sum of common shares and retained earnings. We speak of market value per share, which includes both the sale price of the common shares and the subsequent changes in the firm's value.

Question: Are you saying that the market value of the shares is the book value plus the retained earnings?

Answer: No. Retained earnings is the increase in the book value of the firm since it began, not the increase in the market value of the firm. Firms with growth opportunities and high expected income in the future may have high market values now, even if current income and retained earnings are low.

Part G: Minority interest is reported as part of shareholders' equity. The shareholders of the parent firm do not own the minority interest, but they are responsible for managing the operations of the combined firm. Assets and liabilities on the balance sheet include non-controlling (minority) interest, so shareholders' equity includes it as well.

Shareholders' equity on the firm's balance sheet is $200 + 40 + 140 + 20 = 400$

Exercise 4.6: Cost of goods sold

- A firm has 100 shares outstanding and earnings per share of 2.500.
- Its gross profit margin is 60% and its net profit margin is 10%.

- A. What is net income?
- B. What is net revenue?
- C. What is the cost of goods sold?

Part A: Net income = earnings per share \times shares outstanding = $2.5 \times 100 = 250$.

Part B: Net profit margin = net income / net revenue \Rightarrow

Net revenue = net income / net profit margin = $250 / 10\% = 2,500$.

Part C: Gross profit margin = $1 - \text{cost of goods sold} / \text{net revenue} \Rightarrow$

cost of goods sold = net revenue $\times (1 - \text{gross profit margin}) = 2,500 \times (1 - 60\%) = 1,000$.

Exercise 4.7: Current ratio & quick ratio

On December 30, a firm's balance sheet shows

- non-current liabilities = 200
- shareholders' equity = 300
- total assets = 600

On December 30, the firm's current ratio = 2.5 and its quick ratio = 2.0.

On December 31, the firm sells goods on credit (30 days net) for 100 at a gross profit margin of 60%, and it buys inventory for 60 on credit (60 days net).

- A. What are current liabilities on December 30?
- B. What are current assets on December 30?
- C. What are quick assets on December 30?
- D. What is inventory on December 30?
- E. How does the sale of goods on credit affect current assets and liabilities?
- F. How does the purchase of inventory on credit affect current assets and liabilities?
- G. What are current liabilities on December 31?
- H. What are current assets on December 31?
- I. What are quick assets on December 31?
- J. What is the current ratio on December 31?
- K. What is the quick ratio on December 31?

Part A: Total assets = current liabilities + non-current liabilities + shareholders' equity \Rightarrow

$$\text{current liabilities} = \text{total assets} - (\text{non-current liabilities} + \text{shareholders' equity}) = 600 - (200 + 300) = 100$$

Part B: Current assets = current liabilities \times the current ratio = $100 \times 2.5 = 250$.

Part C: Quick assets = current liabilities \times the quick ratio = $100 \times 2.0 = 200$.

Part D: Inventory = current assets – quick assets = $250 - 200 = 50$.

Part E: The sale of goods on credit increases accounts receivable (a current asset) by the sale price and decreases inventory by the cost of goods sold, which is the sale price \times (1 – the gross profit margin). The change in current assets = the change in the accounts receivable – the change in the inventory =

$$100 - 100 \times (1 - 60\%) = 60.$$

The sale of goods does not affect liabilities.

Part F: The purchase of inventory on credit increases current assets by the inventory of 60 and increases current liabilities by the accounts payable of 60. Net assets do not change, but the current ratio decreases if it is more than one and increases if it is less than one.

Part G: Current liabilities on December 31 are the current liabilities on December 30 + the change in accounts payable = $100 + 60 = 160$.

Part H: Current assets on December 31 = current assets on December 30 of 250 + the change in accounts receivable of 100 – the inventory sold of 40 + the inventory bought of 60 = $250 + 100 - 40 + 60 = 370$.

Part I: Quick assets on December 31 = current assets on December 31 – inventory at December 30 – the change in inventory on December 31 = $370 - 50 - 20 = 300$.

Alternatively, quick assets on December 31 = quick assets on December 30 + the change in quick assets, which are the accounts receivable in this exercise = $200 + 100 = 300$.

Part J: The current ratio on December 31 is current assets divided by current liabilities = $370 / 160 = 2.3125$.

Part K: The quick ratio on December 31 is quick assets divided by current liabilities = $300 / 160 = 1.8750$.