

14.2: Solutions to CH 2 Exercises

Question 1

The income statement captures all activity related to revenues and expenses over a particular time period. For instance, the quarterly income statement includes all revenue and expense items for that quarter. The beginning of the quarter is treated the same as the end of the quarter. The same applies for annual income statements. However, balance sheets represent a firm's assets, liabilities, and owners' equity at a particular point in time. The quarterly balance sheet only reflects the last day of that quarter and the annual balance sheet only reflects the last day of the year. As such, the balance sheet is more open to seasonality issues and short-term fluctuations. For instance, if the balance sheet is prepared 1 day prior to a large cash payment the cash account will appear artificially large. On the other hand, if it is prepared 1 day after the payment the cash account will appear artificially small.

Question 2

The firm has \$60 million in total liabilities.

$$A = L + OE$$

$$\$100M = L + \$40M$$

$$\$60M = L$$

Question 3

Depreciation is a noncash expense. While it lowers net income, the firm is not actually paying anything for depreciation so it has no impact on cash flows (ignoring taxes...when considering taxes, depreciation lowers net income but increases cash flows as less cash is paid in taxes). The cash flow impact of an asset purchase from a finance perspective occurs when the asset is purchased. Spreading the cost equally over the assets useful life ignores the time value of money and understates the true cost of the purchase. A few other issues that may create a difference between cash flows and earnings include (this is not a complete list) –

- Revenue recognition
- Inventory accounting method
- Prepaid expenses
- Accounts Payable/Receivable

Question 4

While many people use ratio analysis, the primary parties interested are

- Management
- Competitors
- Stockholders (and potential stockholders)
- Long-Term Creditors
- Short-Term Creditors

When analyzing **Liquidity Ratios**, the most interested parties are management and short-term creditors. Management needs to understand the firm's liquidity position in order to properly manage the firm. Short-term creditors typically do not care much about the long-term health of the firm, but only if they have enough liquid capital to meet the short-term obligations. Long-term creditors and stockholders would also be interested, but primarily only if the liquidity ratios were weak enough to damage the long-term health of the firm.

When analyzing **Asset Management Ratios**, the most interested parties are management, competitors, and stockholders. Again, management must be interested in all the ratios as they must manage all aspects of the firms operations. Competitors are interested as a gauge of their own performance. If our competition has a total asset turnover of 2.50 and ours is only 1.95 we must understand what they are doing to outperform us in this measure. By identifying our weaknesses, we can address them. Stockholders have some interest in that often asset management ratios impact a firm's ability to generate profits and increase firm value. Long-term and short-term creditors are typically not significantly concerned with these measures as they do not share in any "extra" profits the company generates. As long as the firm is able to meet interest and principle obligations, debt holders are happy.

Management, long-term creditors, short-term creditors, and stockholders are all focused on **Debt Management Ratios**. These ratios measure a firm's ability to meet their debt obligations, so creditors want to see these ratios strong in order to be confident of receiving their full interest and principle payments. Long-term creditors are probably more focused on this as short-term creditors hope to be repaid quickly enough that they are more concerned about the liquidity issues. Stockholders are concerned because if the firm is unable to meet its debt obligations it will be forced into bankruptcy and the stockholders will likely lose all of their investment.

Profitability Ratios are a concern primarily for management, competitors, and stockholders. Creditors, both LT and ST, do not participate in profits so their only concern with profitability ratios is if they are negative and threaten the ability of the firm to meet interest and principal payments. Like asset management ratios, competitors use profitability ratios as a method to gauge their strengths and weaknesses. Since stockholders "own" the business, the profits belong to them. Therefore, the stronger the profitability ratios, the happier the stockholders are.

Market Value Ratios are looked at by stockholders and management. These ratios measure how "cheap" or "expensive" the stock is. Management typically wants these ratios to be high as it is a sign that they are maximizing firm value. Potential stockholders typically want them low as that is an indication that the stock may be cheap (except for dividend yield). As a side note, market value ratios are often much more difficult to analyze than many people would like.

Question 5

The key to this question recognizing the role of the equation $A = L + OE$ in these two ratios. Because all firms use some degree of liabilities (long-term debt, accounts payable, accruals, etc.), we know that Assets must be larger than Owners' Equity. The greater the amount of debt financing (liabilities), the greater the difference between Assets and Owners Equity will be. Also, since the difference between ROA and ROE is the denominator (ROA is $NI/Assets$ while ROE is NI/OE), ROE will always be higher than ROA (for firms with positive NI). Finally, the greater the amount of debt financing (liabilities), the greater the difference between ROA and ROE will be.

When considering the above paragraph, we can now comment on the specific ROA and ROE numbers for Company A and B. Since Company B has a lower ROA and a higher ROE (relative to Company A), we know that Company B is using more leverage (debt financing) than Company A.

Neither approach is necessarily "better" or "worse" than the other. They are just different. Company B is using a more aggressive (riskier) strategy of financing. The higher level of debt increases the risk, but also means stockholders earn a greater return on their money when the company does well. However, if the company does poorly, the higher leverage (debt financing) will magnify the losses (as the interest must still be paid and the loss is spread over less shareholder capital). Thus, higher amounts of debt financing are riskier, but also increase the potential return. Which approach is better depends on the level of risk aversion for each shareholder.

Question 6

The DSO ratio does provide an indication of how long it is taking a firm to collect its credit sales. Thus, a high DSO ratio can be an indication of a problem in managing a firm's accounts receivables. However, one must be very careful in jumping to conclusions. First, DSO can be very industry dependent. Second, and the issue in this question, is that DSO uses both balance sheet and income statement values to calculate the ratio. As the Annual Income statement is not subject to seasonality while the Annual Balance Sheet is, there is the potential for seasonality issues to distort the ratio. Specifically, Company A has larger accounts receivable on their annual balance sheet due to the seasonal nature of their sales. This inflates their DSO ratio. Company B has had plenty of time to collect their accounts receivable. This is a prime example of why you need to consider seasonality when evaluating ratios.

If we think of the inventory turnover ratio, Company A should appear to be doing better. Specifically, they will have less inventory on hand at the end of the year (as their heavy sales season is winding down and they approach seasonally lower sales). Alternatively, Company B's inventory will be high to meet their seasonally high 1st and 2nd quarter sales that are right around the corner.

Question 7

Subject to Seasonality – Quarterly Income Statement, Quarterly Balance Sheet, Annual Balance Sheet

Not Subject to Seasonality – Annual Income Statement

Question 8

This is a FALSE statement. While it is true that everything else equal, a higher profit margin is better than a lower profit margin there is not enough information to make this a true statement. We are ignoring both trend analysis and comparative analysis, so we don't have the necessary context to evaluate the profit margin number. For instance company A could be in a low profit margin industry (such as banking or retail) while company B could be in a high profit margin industry (such as software or pharmaceuticals). Also, profit margin is only one ratio and to label one company as outperforming another based on a single ratio is shortsighted. We need to consider the larger picture before making such a statement. The purpose of this question is to illustrate that one ratio without context is close to meaningless.

Question 9

Trend Analysis refers to looking at a firm's ratios over a period of 3-5 years to identify whether specific areas are strengthening or weakening. Comparative analysis refers to looking at a firm's ratios relative to other firms in the same industry to evaluate whether they are better or worse than industry averages. Trend/comparative analysis provides us some of the necessary context to properly interpret the ratios.

Question 10

Potential problems with trend analysis include

Trends can change abruptly	While it is important to identify trends, we should remember that these are past trends. Volatile business conditions can cause trends to stop or reverse unexpectedly.
Some patterns are not trends	If ROA increases from year 1 to year 2, this is not a trend but a one-year change. Often it is hard to distinguish between true strengthening/weakening trends and just random noise.
Past data may be irrelevant	Structural/strategic changes in firms may make comparisons to past years virtually meaningless.

Potential problems with comparative analysis include

Finding a comparison industry	Conglomerate companies such as General Electric are often involved in several industries making it hard to compare their ratios to an industry average.
Few competitors	Some large firms such as Microsoft dominate an industry to the extent that it is often hard to make comparisons to industry averages.

Question 11

A very low quick ratio may be cause for concern because it could indicate liquidity concerns. A low level of cash and accounts receivable relative to our current liabilities could indicate that we will have a hard time paying those current liabilities when they are due. A very high quick ratio may be cause for concern because it indicates an inefficient allocation of resources. Cash and accounts receivable are not high return assets. We would likely be better off allocating our assets to areas with higher rates of return.

Question 12

The primary objective of financial statement analysis from the perspective of management is to identify potential strengths and weaknesses of our firm relative to our competitors so we can take full advantage of our strengths and work on fixing our weaknesses.

There are several difficulties that management might encounter in conducting a complete financial statement analysis. Some are mentioned in the question on potential problems with trend analysis and comparative analysis above. Other problems include comparability of financial statements across firms in the industry due to different fiscal years and/or different accounting

procedures. Also, the need to dig beyond the numbers is critical. For example, is a high ROE due to a well-run company or due to too much leverage that could cause significant problems if we hit a small rough patch? Another issue is that financial statement analysis may help us identify potential strengths and weaknesses. However, even after confirming them by digging deeper, the financial statement analysis often does not recommend HOW we can fix the weakness or exploit the strength.

The primary objective of financial statement analysis from the perspective of the stockholder is to identify companies to invest in (potential stockholders) or evaluate the companies the stockholder currently owns (current stockholders).

Stockholders face many of the same problems discussed above with management. However, an important challenge for stockholders is that they must not only analyze the company's financial health, but also evaluate how much they are paying for it. There may be situations where buying stock in a company with poor financial health is a good opportunity (the stock price is "cheap" enough and there is a chance for the company to rebound). There may also be situations where selling shares of stock in a company with strong financial health is good (the stock price is so expensive that the firm's success is already more than fully reflected in the stock price). Too often stockholders get caught up in what they are buying and don't think enough about how much they are paying for it.

Problem 1

2016

$CR = CA/CL = 7,000,000/4,500,000 = 1.56$
 $QR = (CA - Inv)/CL = (7,000,000 - 2,000,000)/4,500,000 = 1.11$
 $ITR = CGS/Inv = 6,000,000/2,000,000 = 3 \text{ times}$
 $DSO = AR/(Sales/365) = 2,000,000/(15,000,000/365) = 48.67 \text{ days}$
 $FAT = Sales/Fixed Asst = 15,000,000/10,000,000 = 1.5 \text{ times}$
 $TAT = Sales/Total Asst = 15,000,000/17,000,000 = 0.88 \text{ times}$
 $TD/TA = 10,000,000/17,000,000 = 58.8\%$
 $TD/OE = 10,000,000/7,000,000 = 142.86\%$
 $TIE = EBIT/Int = 4,000,000/1,000,000 = 4 \text{ times}$
 $GPM = (Sales - CGS)/Sales = (15,000,000 - 6,000,000)/15,000,000 = 60\%$
 $NPM = NI/Sales = 2,100,000/15,000,000 = 14.0\%$
 $ROA = NI/Asst = 2,100,000/17,000,000 = 12.4\%$
 $ROE = NI/OE = 2,100,000/7,000,000 = 30.0\%$
 $PE = Price/EPS = 25/1.05 = 23.81$
 $M/B = Price/BV = 25/(7,000,000/2,000,000) = 7.14$
 $DY = Div/Price = \$0.50/\$25 = 2.00\%$

2017

$CR = CA/CL = 11,050,000/7,000,000 = 1.58$
 $QR = (CA - Inv)/CL = (11,050,000 - 4,000,000)/7,000,000 = 1.01$
 $ITR = CGS/Inv = 11,000,000/4,000,000 = 2.75 \text{ times}$
 $DSO = AR/(Sales/365) = 4,000,000/(20,000,000/365) = 73 \text{ days}$
 $FAT = Sales/Fixed Asst = 20,000,000/11,000,000 = 1.82 \text{ times}$
 $TAT = Sales/Total Asst = 20,000,000/22,050,000 = 0.91 \text{ times}$
 $TD/TA = 15,000,000/22,050,000 = 68.0\%$
 $TD/OE = 15,000,000/7,050,000 = 212.77\%$
 $TIE = EBIT/Int = 3,000,000/1,500,000 = 2 \text{ times}$
 $GPM = (Sales - CGS)/Sales = (20,000,000 - 11,000,000)/20,000,000 = 45\%$
 $NPM = NI/Sales = 1,050,000/20,000,000 = 5.25\%$
 $ROA = NI/Asst = 1,050,000/22,050,000 = 4.76\%$
 $ROE = NI/OE = 1,050,000/7,050,000 = 14.89\%$
 $PE = Price/EPS = 17.5/0.525 = 33.33$
 $M/B = Price/BV = 17.5/(7,050,000/2,000,000) = 4.96$
 $DY = Div/Price = \$0.50/\$17.50 = 2.86\%$

Problem 2

Each item in the income statement is expressed as a percentage of sales (revenues) and each item in the balance sheet is presented as a percentage of total assets.

	2016	16CS	2017	17CS
Sales	15,000,000	100.0%	20,000,000	100.0%
CGS	6,000,000	40.0%	11,000,000	55.0%
S&A Exp.	3,000,000	20.0%	3,500,000	17.5%
Depreciation	2,000,000	13.3%	2,500,000	12.5%
EBIT	4,000,000	26.7%	3,000,000	15.0%
Interest	1,000,000	6.7%	1,500,000	7.5%
EBT	3,000,000	20.0%	1,500,000	7.5%
Taxes (30%)	900,000	6.0%	450,000	2.2%
Net Income	2,100,000	14.0%	1,050,000	5.2%
Num. of Shares	2,000,000		2,000,000	
EPS	\$1.05		\$0.525	
Div. per Share	\$0.50		\$0.50	
Stock Price	\$25		\$17.50	
Cash	3,000,000	17.6%	3,050,000	13.8%
A/R	2,000,000	11.8%	4,000,000	18.1%
Inv.	2,000,000	11.8%	4,000,000	18.1%
Cur. Assets	7,000,000	41.2%	11,050,000	50.1%
Net Prp, Plant & Equip	10,000,000	58.8%	11,000,000	49.9%
Total Assets	17,000,000	100%	22,050,000	100.0%
A/P	2,500,000	14.7%	3,500,000	15.9%
Accruals	1,500,000	8.8%	2,000,000	9.1%
Notes Payable	500,000	2.9%	1,500,000	6.8%
Cur Liabilities	4,500,000	26.5%	7,000,000	31.7%
Long-Term Debt	5,500,000	32.4%	8,000,000	36.3%
Total Liabilities	10,000,000	58.8%	15,000,000	68.0%
Common Stock	1,000,000	5.9%	1,000,000	4.5%
Retained Earnings	6,000,000	35.3%	6,050,000	27.4%
Owners' Equity	7,000,000	41.2%	7,050,000	32.0%
Tot. Liab. & O.E.	17,000,000	100.0%	22,050,00	100.0%

Problem 3

To start the analysis of finding strengths and weaknesses, I started with the common size statements. The first thing that I noticed was the increase in Cost of Goods Sold from 40% of sales in 2015 to 55% of sales in 2017. This indicates that our production costs jumped significantly and will act to lower our net income. Selling and Administrative expenses dropped slightly from 20% of sales to 17.5% of sales. This is a strength, but is not a very large change so I don't place much emphasis on it. The declines in EBIT and Net Income as a % of sales are due to the increase in CGS, so do not need further analysis. Thus, from the Common Size Income statement, I focus on the increase in CGS as a significant weakness and would classify the decline in S&A Expenses as a small strength.

Next I proceed to the Common Size balance sheet. The first things I notice are the increases in accounts receivable and inventory as a % of total assets. This is a concern that needs more analysis before I declare it a weakness. Consider accounts receivable first. AR could increase due to higher sales levels. If 25% of my sales are done on credit and sales increase, my AR will automatically increase as well. This could result in AR being a bigger portion of my firm's assets and would not be seen as a negative. On the other hand, AR may be increasing because fewer customers are paying their bills on time. This could lead to more bad debt expense or higher collection costs. I can not tell which explanation is causing the increase in AR from the CS balance sheet, so I will make a note of it and look more at the issue as I move through my analysis. Like AR, inventory increases may or may not be a weakness. If sales increase, I will need more inventory on hand to handle the increase in sales which is likely to cause inventory to make up a larger portion of my firm's assets. Alternatively, if I am getting stuck with more out-of-date inventory it will also make up a larger portion of my firm's assets until I am forced to do a write down and take the loss. From the CS balance sheet I can't tell which scenario is taking place so this is also something to investigate further.

Net PPE shows a large drop in the CS Balance sheet, but that is primarily a result of the increase in current assets caused by the jump in AR and Inv which have already been discussed, so I will not pay much attention to the decline in Net PPE. Notes Payable shows a large jump, however that could just be a function of me financing some of my increase in current assets so again that is not something that would concern me too much. I would probably want to note it and make sure I find out the reason for the increase but it likely is not a strength/weakness. The jump in Total Liabilities as a % of total assets is something that might concern me. Higher levels of liabilities as a % of total assets indicates higher risk levels. The firm has a greater chance of serious financial problems if there is a slowdown. This is not necessarily bad as the higher debt levels also have the chance to increase our profits if things go well, however it is something to note with a degree of caution due to the higher risk. Finally, the drop in OE is merely the flip side to the increase in TL, so needs no further analysis.

Next I move on to the ratio analysis. My liquidity ratios appear to be sound as both are stable from year to year and similar to the industry averages. Next is my Inv. Turnover Ratio. This, combined with the increase in inventory on the CS balance sheet indicates a problem. If my inventory increase was merely a result of increased sales, the inventory turnover ratio would hold steady or increase slightly. Instead it has decreased slightly and is noticeably lower than the industry average. This means that I am tying up more of my capital as inventory and probably ending up with older inventory that will need to be marked down and sold at a loss.

I also notice problems with my Days Sales Outstanding ratio. The significant jump in the DSO ratio tells me its taking me an about 24 days longer on average to collect each dollar in sales. Since this is also much higher than the industry average it means one of two things. Either I have a lot of customers that aren't paying on time and may end up with higher levels of bad debts or that I have to offer more favorable credit terms to my customers to keep sales from dropping. Both of these possibilities are bad, so my accounts receivable situation is a definite cause for concern.

Fixed Asset Turnover and Total Asset Turnover both look good. FAT is up and both are higher than the industry average. This is a sign that I am doing a good job overall of using my assets (especially my LT assets) to generate sales.

The debt management ratios are troublesome. My TD/TA and TD/OE ratios have increased by quite a bit and are higher than the industry averages. Also, my TIE ratio has dropped and is lower than the industry average. This means that our firm is using more debt financing and has less margin for error. If we experience an off year or two our firm is likely to run into severe financial problems and could face bankruptcy. On the other hand, if we have a couple of strong years, we will make higher returns for our shareholders due to the leverage provided by debt. This is not necessarily a strength/weakness but is a sign of high financial risk.

The profitability ratios are all showing an interesting pattern that ties back into my CGS observation from the CS income statement. My profitability (PM, ROA, ROE) is down due to the increase in CGS. However, all three ratios are consistent with the industry average. This might be an indication that the increase in CGS is more of an industry issue rather than firm specific. If a key input had a price increase, this is likely to impact all firms in the industry equally. For example, if grain prices jumped significantly both Kellogg's and General Mills may see a jump in their CGS and a decline in their profit margins. It doesn't indicate a management

problem, but an industry issue. If my profitability ratios declined significantly AND were lower than the industry average I would be more concerned about company specific problems.

Finally we have the market value ratios which are difficult to interpret in this instance. The PE ratio has increased significantly as my stock price fell, but earnings fell faster. It is also higher than the industry average which indicates the stock is more expensive in terms of what investors pay for each dollar of earnings (possibly indicating that they believe the earnings drop is not permanent). The MV/BV ratio has decreased significantly which indicates the stock is cheaper. This is because book value is less sensitive to the recent earnings decline which lowered the stock price (making the stock cheaper relative to its book value). However, the stock is still slightly more expensive than the industry average. While our dividend yield increased and is higher than the industry average (which is good), there is a danger sign here. If earnings drop any further, we may have to cut our dividend which would cause the yield to drop.

To summarize, our financial statement analysis indicates

- The firm needs to address the CGS issue, but that it is probably an industry issue instead of a company specific problem. This doesn't mean we can ignore it, just that it will be more difficult to fix.
- The firm needs to get control of its credit policies and improve its collections process.
- The firm needs to get control of its inventory concerns
- The firm is doing a good job at generating sales from its LT Assets.
- The firm has a high degree of financial risk
- The firm does not appear to have any major liquidity constraints.
- The stock is relatively expensive relative to the industry average and the dividend yield (while attractive) should be viewed with caution as it may not be sustainable.

Problem 4

You know that you need the current stock price and the book value per share in order to get the MV/BV ratio. To get current stock price, you can use the PE ratio:

$$PE = \text{Price}/EPS \Rightarrow \text{Price} = (PE) \times (EPS)$$

To get EPS, you need Net Income which you can get from the net profit margin:

$$\text{Net Profit Margin} = \text{Net Income}/\text{Sales} \Rightarrow \text{Net Income} = \text{Net Profit Margin} \times \text{Sales}$$

You have the Profit Margin, so you need Sales. You can get Sales from the Total Asset Turnover Ratio:

$$\text{Total Asset Turnover} = \text{Sales} / \text{Assets} \Rightarrow \text{Sales} = \text{TA Turnover} \times \text{Assets}$$

$$\text{Sales} = (1.5) \times (\$6,000,000) = \$9,000,000$$

$$\text{Net Income} = (0.05) \times (\$9,000,000) = \$450,000$$

$$EPS = (\$450,000) / (600,000 \text{ shares}) = \$0.75 \text{ per share}$$

$$\text{Stock Price} = (13) \times (0.75) = \$9.75$$

Now you need to solve for Book Value which is Owners' Equity per Share. We know the Return on Equity, so we can use that (along with Net Income) to get Owners' Equity:

$$ROE = \text{Net Income}/\text{Owners Equity} \Rightarrow \text{Owners Equity} = \text{NI}/ROE$$

$$\text{Owners' Equity} = (\$450,000) / (0.14) = \$3,214,285.71$$

$$\text{Book Value} = (\$3,214,285.71) / (600,000 \text{ shares}) = \$5.36 \text{ per share}$$

$$MV/BV = (\$9.75) / (\$5.36) = 1.82$$

Our MV/BV ratio is 1.82. This is a tough problem as it not only tests your knowledge of ratios, but your problem solving skills. Don't worry if you didn't get it at first, but hopefully once you see the solution it makes sense.

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