CHAPTER 4
Financial Ratio Problems

Types of problems and the approach to ratio problem solving

Overall

- There are several steps that should be followed for all ratio problems.

- Following these steps will make it easier to correctly solve each problem.

- These steps provide a way to approach all ratio problems.
First, always identify all ratios mentioned in the problem and write the formulas down.
Second, determine what you are trying to find.
Third, identify the data that you have available and try to determine the type of problem you are facing (see next page).
Fourth, enter the data in the ratios and solve for your answer.

Types of problems

- Ratio problems are hard to classify since there are many combinations and many ways to solve them.
- However, in general there are three basic types of ratio problems you will see.
  - Plug-n-chug
  - multiplicative
  - now-and-later
The plug-n-chug problems are the easiest. Such a problem is one where all but one item in a ratio is given to you, and all you have to do is solve for the remaining one.

Example:
Your firm had net income of $1,000,000 last year and had total assets of $5,000,000. What was the firm’s return on assets?

The only ratio mentioned is return on assets so we write that formula. (ROA is what we are finding.)

\[
\text{ROA} = \frac{\text{net income}}{\text{total assets}}
\]

We next identify what we know.

Net income=$1,000,000 \quad \text{Total assets}=$5,000,000

This is a plug-n-chug problem since we know all entries for the ratio except the ROA which we can solve for.

\[
\text{ROA} = \frac{1,000,000}{5,000,000} = .20 = 20\%
\]
I call the next type multiplicative problems.

These types of problems generally require you to multiply or divide several ratios to get a solution.

Example: Your return on assets was 20% last year. You financed 30% of your assets with debt. What was your return on common equity?

Two ratios are directly mentioned. ROA and ROE.

\[
\text{ROA} = \frac{\text{NI}}{\text{TA}} \\
\text{ROE} = \frac{\text{NI}}{\text{CE}} \text{ or } \text{ROE}=(\text{NPM})(\text{TATR})(1/(1-\text{DR}))
\]

We are looking for the ROE. We know:

ROA = 20%

30% of assets were financed with debt (this is actually telling us the debt ratio since the debt ratio’s definition is that it tells us the percentage of assets financed with debt (debt ratio = (total liabilities) / (total assets))
To solve the problem, we also need to recognize the relationship of the various ratios.

NOTE:
NPM = (net income) / (sales)
TATR = (sales) / (total assets)

Thus,

\[ \text{NPM} \times \text{TATR} = \frac{\text{net income}}{\text{sales}} \times \frac{\text{sales}}{\text{total assets}} \]

\[ \text{NPM} \times \text{TATR} = \frac{\text{net income}}{\text{total assets}} = \text{ROA} \]

Thus,

\[ \text{ROE} = \frac{\text{ROA}}{1 - \text{debt ratio}} \]

\[ \text{ROE} = (0.20) \frac{1}{1 - 0.30} = 0.2857 = 28.57\% \]

This is actually an example of the DuPont Equation that we discussed earlier in the lecture notes.
The third type of problem is the now-and-later. It usually gives you information about the firm at one time, and then wants you to solve for information for a different period.

EX: RRR’s target current ratio is 3.0. Presently, the current ratio is 4.0 based on current assets of $10 million. If RRR expands its current assets using current liabilities, how much additional financing can it get before it reaches its target current ratio?

The only ratio mentioned is the current ratio.

\[ \text{CR} = \frac{\text{CA}}{\text{CL}} \]

To solve one of these types of problems we always need to know everything about the present situation before trying to solve for future information.

Currently,

\[ \text{CR} = 4.0 \quad \text{Current assets (CA)} = 10 \]

Thus,

\[ 4 = \frac{10}{\text{CL}} \quad \text{so} \quad 4\text{CL} = 10 \quad \text{and} \quad \text{CL} = 2.5 \]
After we know all present information, we can focus on the future information.

We know that the target current ratio is 3.0. To change to CR=3.0 from CR=4.0 we must change the CL and/or CA accounts (we will be either adding or subtracting).

In this case the problem says we are increasing CA by using CL. Thus, however much CL goes up is the same amount CA goes up.

We must start with the current balances for CA and CL and determine the change.

\[
\text{CR} = \frac{\text{CA}}{\text{CL}} \quad \text{target CR=} 3.0
\]

\[
3 = \frac{10 + x}{2.5 + x}
\]

\[
3 (2.5 + x) = 10 + x
\]

\[
7.5 + 3x = 10 + x
\]

\[
2x = 2.5
\]

\[
X = 1.25
\]

CHECK: \[ \text{CR} = \frac{10 + 1.25}{2.5 + 1.25} = 3 \]
OVERALL

- Always remember to write the formulas down first, and then identify what you are looking for, what you have, and the type of problem you are facing.

- If you follow these steps, the problem are much easier.