Introduction

Your policy course integrates information learned in previous courses through the use of case analyses. One of the first steps in analyzing a firm is to assess its financial situation. For many of you, it may have been awhile since you have practiced these techniques. This supplement is intended to provide you with a relatively easy approach to quickly calculate some key ratios and assess the financial condition and performance of firms. Although this analytical technique is not a substitute for an in-depth financial analysis, it does provide a sense of how the firm is doing and what its financial options and limitations might be.

Financial statement analysis is used to:
· assess the current financial condition of the firm
· assess a firm’s access to additional resources.
· assess a firm’s strength within its industry.

Objectives

The premise of the Strategic Profit Model is that a firm should target itself to do three things:

1. Attain target levels of profitability
2. Maintain adequate liquidity
3. Generate funds to exploit growth opportunities

Limitations

· Comparing the ratios with commonly accepted targets and standards, an analyst can only identify possible problem areas that need further investigation.
· Most ratio targets are industry and/or situation specific. The targets in this supplement are intended to be used for case analysis only when actual industry comparisons are not available. The course website lists targets for most industries which you can use for your written analysis.
· Any financial analysis is based on accounting data. Accounting data can comply with all applicable laws and regulations, and still use different methodologies between firms, or between years for the same firm.
· The analysis is based on past performance - which may not accurately predict future performance.
· If only one year is calculated, you have a snapshot that may be distorted due to unusual data for that year. Always calculate all ratios in the model for at least the previous five years.
Using Ratio Analysis

A single ratio, by itself, has very little meaning. Ratios gain meaning when they are compared to other ratios. There are essentially three primary ways to compare ratios.

1. **Internal Comparisons, or Trends** - Trends are useful to compare a ratio with itself over time. Using ratios calculated for only a single year can be seriously misleading if unusual events occurred in that year. Single year accounting adjustments can inflate or understate revenues or costs, and therefore distort profitability.

2. **External Comparisons** - The most common external comparison is with a firm's industry averages. However, comparisons can also be made with just a few key competitors or with benchmark firms. Any external measure that is considered relevant to the firm's performance can be useful in assessing whether a performance ratio is 'good' or 'bad'.

3. **Normative comparisons** - Normative standards are arbitrary targets that are set either by the firm or external markets.
   - normative standards set *internally* by the firm emphasize measures important to the firm, such as quality, market share, annual growth rates, and customer service levels
   - normative standards set by *external* market forces can be based on tradition, such as liquidity measures and leverage.

The Strategic Profit Model Ratios Worksheet

The **Strategic Profit Model Ratios** (SPMR) worksheet is designed to provide information about a firm’s profitability, liquidity and growth in an easily interpretable format. The SPMRW is available on the course website in either Excel or pdf format as *Strategic Profit Model Worksheet*. Note that an in-depth financial analysis would require many more ratios that are mentioned in the course text and discussed in financial analysis texts.

The SPMR worksheet uses five types of ratios:

1. profitability,
2. activity,
3. leverage,
4. liquidity,
5. growth.

USING GENERIC TARGET RATIOS

A primary method of evaluating a ratio is to compare it with an industry average. To allow a quick assessment of possible problem areas that need more research when industry averages are not available (e.g., in class discussions and quizzes) generic target values for the ratios are provided in the following discussion. Bear in mind some significant limitations:

Generic targets are primarily for a quick analysis to identify obvious problems. For some industries, one or more of these generic targets may not apply, but they are good general guides for a quick analysis. For class exercises, quizzes and discussions you will
memorize and use these generic targets. Outside of class and after you graduate, the generic targets are still useful but when possible, comparisons should be made to actual industry or key competitor data. A current Fortune 500 Industry Average is provided on the course website.

Most of the targets in this guide are for strong competitors - top quartile firms, or firms that want to be in the top quartile. Failure to achieve an ROE of 15% does NOT necessarily mean a firm is poorly run.

**FIRST AREA - CURRENT DATA**

Put the year being calculated in the year box.

Record the firm’s profits, sales, total assets and net worth for the year being analyzed in millions.

Note that for this class the profits and revenues are always entered in millions. Data from annual reports as well as tables in cases you will analyze are variously provided in thousands or millions (or even billions) depending on the size of the firm. For the purposes of grading quizzes, your instructor will expect all data entries to be in millions on this worksheet. Thus all data extracted from financial worksheets should be converted to millions, and all numbers used in calculating ratios should be to one decimal place. All ratios calculated should be reported to one decimal place (with the sole exception of EPS, which is two decimal places). Note that if the numbers used in calculations are other than in millions, or one decimal place, you may get an answer that is ‘incorrect’ for grading purposes.

**SECOND AREA - PROFITABILITY - DUPONT FORMULA**

Next to the Current Data box, are the five ratios comprising the Dupont formula. The major benefit of the Dupont formula is that it combines into a single profit planning equation the principal elements of a firm’s operating statement and balance sheet.

<table>
<thead>
<tr>
<th>Net Profits</th>
<th>x</th>
<th>Net Sales</th>
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<th>Net Profits</th>
<th>x</th>
<th>Total Assets</th>
<th>=</th>
<th>Net Profits</th>
<th>Net Profits</th>
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<tr>
<td>Net Sales</td>
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Although the formula looks at three profitability measures - profit margin, ROA and ROE - the primary emphasis of the Dupont formula is ROE. In general, ROE is a measure of return to an investor - and economic theory predicts that investors compare returns on their money irrespective of where the money is invested. Therefore, for investments of similar risk, the returns should be the same regardless of the nature of the investment or the type of industry.

The shaded areas on the SPMR worksheet are for entering the financial data extracted from financial statements. Calculated results should be entered into the appropriate box to one decimal place.

The Dupont formula recognizes that there are three managerial decision areas (profit paths) to improve ROE.
1. **Margin manager** - improve profit margin
2. **Asset manager** - use assets more productively
3. **Financial manager** - Balance use of debt and equity to finance firm, and maximize leverage within the bounds of acceptable risk.

Note: ROE and ROA are measures of profitability - NOT sources.

**PROFIT MARGIN**

There are three primary types of profit margin:

1. **GROSS PROFIT MARGIN** = \( \frac{(SALES - COS)}{SALES} \)
   
   Sales are net sales after returns, and COS is cost of sales.

2. **OPERATING PROFIT MARGIN** = \( \frac{EBIT}{SALES} \)

   EBIT (Earnings Before Interest and Taxes) is Net Income plus Interest plus Taxes. Operating profitability disregards financing decisions (interest) and regulatory impacts (taxes) to focus on the contribution of continuing operations. Operating profit is an important measure because it indicates the performance of the firm’s business model. Extraordinary charges, sales/purchases of subsidiaries, etc., are not reflected in operating profit.

3. **NET PROFIT MARGIN** = \( \frac{NET PROFITS}{SALES} \)

   Net profit margin is a costs versus price indicator

   Net profit margin is the primary profit margin measure, and looks at the bottom line contribution of each sales dollar.

   Being an effective margin manager is the first step in increasing ROE (the organizational goal). Because profits are equal to revenues minus costs, thus improving profit margin requires increasing revenues, cutting costs, or both.

   **Net Profit Margin Targets:**
   - retail - 5%+
   - manufacturing - 8%+

**ASSET TURNOVER**

Asset turnover is important because being an effective asset manager is the second method for increasing ROE. The activity measure used in the Dupont formula is **asset turnover**. Asset turnover is very industry and situation specific, so you should look for industry averages to properly evaluate a firm’s asset turnover. Although some industries are much higher, we would expect it to be at least 1.0X.

**Asset Turnover target:** 1.0X+ (Use industry average if available).
RETURN ON ASSETS

ROA is a measure of the effectiveness of the total assets of the firm - where total assets = debt plus equity. For simplicity, in this class we will use 8%+ as the ROA target if industry data are not available.

ROA target is 8%+

LEVERAGE

Leverage is a term used to describe some measure of the relative proportions of debt and equity in making up total assets. In other words, leverage identifies the sources of a firm’s capital base - investors or creditors. Because debt + equity = total assets, the ratio of any two of these numbers is a measure of leverage. The Dupont formula uses the ratio of total assets to net worth.

Financial management is the third approach to increasing ROE, and involves the use of leverage to increase ROE. As leverage increases, however, risk increases. Thus, financial management involves selecting the optimum mix of debt and equity to increase ROE within acceptable risk levels.

Historically, for most industries for a firm to be in a position of proper balance between risk minimization and profit maximization, the financial community expects the asset/equity ratio to be between 1.5x - 2.5x. This is comparable to total debt being 40-60% of assets.

Generally acceptable leverage: 1.5x to 2.5x

ROE - RETURN ON EQUITY (or RONW - RETURN ON NET WORTH)

A firm needs to maintain an acceptable ROE to maintain good access to financial markets. Investors do not like to buy stock in companies with poor ROE prospects. For the purposes of our quick analysis, the following are typical targets of top quartile performers.

ROE targets:
Negative = unacceptable
0%-5% = Poor
5%-10% = Fair
10%-15% = good (but not top quartile)
15%-20% = very good (> 15% is generally top quartile)
20-25% = excellent
25%+ = outstanding

Concluding comments on the Dupont formula

In the unfortunate case where profits are negative, the ROA and ROE ratios should still be calculated and reported, but the assessment is reported as NM (not meaningful). If either or both profits and equity are negative, ROE has no easily interpretable meaning, other than the firm is very likely in serious trouble.

THIRD AREA - LIQUIDITY ANALYSIS

Liquidity ratios assess the firm’s ability to meet short term obligations - to pay the bills.
Liquidity is an extremely important portion of your financial analysis because as long as a firm is liquid it can remain in business.

The two primary types of liquidity measures are current and quick ratios:

1. **CURRENT RATIO** = \( \frac{\text{CURRENT ASSETS}}{\text{CURRENT LIABILITIES}} \)

   The Current Ratio (CR) is the most common liquidity measure. Historically, firms were expected to maintain a CR of about 2.0x. In other words, current assets ought to be twice current liabilities. Deviation from 2.0X does not necessarily mean that the firm is illiquid or overly liquid. Further investigation is necessary to see if CRs above or below 2.0x are a problem. Further investigation means look at historical trends for the firm and industry averages.

   **CR Target:** 2.0X

2. **QUICK RATIO** = \( \frac{\text{CURRENT ASSETS-INVENTORY}}{\text{CURRENT LIABILITIES}} \)

   Sometimes called the acid test ratio, the quick ratio (QR) is a stiffer test of liquidity. For some firms, inventory may not be very liquid, and thus the QR is a better test of short term ability to meet obligations. A quick ratio of 1.0x is the common expectation. However, just as for the CR, this is more unexamined truth than a hard standard.

   For both the CR and QR, in recent years many financial managers have become much more aggressive, utilizing sophisticated cash management techniques, and you will find firms with numbers substantially less than 2.0x/1.0x. These lower numbers are still flags to be investigated further, but comparison with trends or industry data may indicate that the lower numbers are acceptable for the particular firm. Note that numbers significantly higher than the liquidity targets are also flags to be investigated as the firm may be highly liquid due to poor management (bad) or to a defensible strategy (OK).

   Also note that because the QR is a more demanding test, an acceptable QR is evidence of acceptable liquidity for the firm even if the CR is well below 2.0x.

   **QR Target:** 1.0X

3. **CASH RATIO** = \( \frac{\text{CASH}}{\text{CURRENT LIABILITIES}} \)

   A third measure of liquidity is the cash ratio. Here, the nominal target ratio is 15-20%. However, many firms can operate successfully with lower levels, and many firms maintain significantly higher levels of cash, such as 25-30%. In some cases a firm may reach 60-80%. A firm’s historical trend is often the best guide to acceptable levels of cash.

   **Cash Ratio Target:** 15-20%

4. **Times Interest Earned** (TIE) = \( \frac{\text{EBIT}}{\text{DEBT}} \)
INTEREST

EBIT (Earnings Before Interest and Taxes) is Net Income plus Interest Expense plus Taxes. Times Interest Earned (TIE) is a measure of the cushion lenders have on their loans. Historically, lenders looked for a minimum of 7x, but many firms successfully operate today with TIEs of 5.0x. Note that TIE is not a measure of a firm's ability to make loan payments. It is a measure of ability to make interest payments. 5.0X is the minimum expectation. Higher TIE’s are clearly acceptable.

| TIE Target: 5.0X+ |

FOURTH AREA - COMPOUND ANNUAL GROWTH RATIOS

Compound Annual Growth Rates

Growth, and the ability of a firm to sustain its historical growth or, more importantly, support its stated growth objectives is a frequently ignored area. Proper interpretation of compound growth rates requires thoughtful analysis and an assessment of the firm's general situation.

The firm’s historical compound annual growth rates should be calculated for at least the last five years if data are available. Top quartile target growth rates for assets, sales, profits, equity and EPS are 15%+ but it is rare for even well run firms to achieve all of these.

<table>
<thead>
<tr>
<th>Nominal Growth Rate Targets</th>
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<tbody>
<tr>
<td>Assets15%+</td>
</tr>
<tr>
<td>Revenues15%+</td>
</tr>
<tr>
<td>Profit15%+</td>
</tr>
<tr>
<td>Equity15%+</td>
</tr>
<tr>
<td>EPS15%+</td>
</tr>
</tbody>
</table>

However, note that these are very demanding targets given a typical GNP growth rate of 2-4%. Many otherwise solidly performing companies will not have growth rates of 15%. Do not be too quick to condemn firms with growth rates of 10-15%.

Interpreting Compound Growth Rates

Assessing what is an acceptable growth rate is very dependent on the industry growth rate. The economy typically grows at 2-4%, thus a 15% target is very aggressive. But if the industry is growing at 20% or more, then the growth target should be much higher than 15%.

Proper consideration of compound growth rates is very important in your analysis. High historical growth rates will likely require substantial funds to sustain future growth. Funds must be generated internally, or obtained from debt or equity sources. A firm's desired growth rates should be compared with historical growth rates to determine the firm's ability to sustain desired growth.
Asset Growth

- The nominal target is 15%+ but in reality we are more concerned about its relation to profit and equity growth (see below).

Revenue Growth

- The nominal target is 15%+ but in reality we are more concerned about revenue growth in relation to profit and asset growth.
  - Watch out for companies where sales are growing much faster than profits. The financial community typically wants profits to grow at least as fast as sales. Where sales growth is much larger than profit growth, the growth in sales is coming at the expense of profitability and there should be a compelling reason for this.
  - We want revenues to grow faster than assets, otherwise the firm is becoming more asset intensive, and over time, it becomes harder to achieve desired ROA’s and ROE’s as asset turnover decreases.

Profit Growth

- The target for top quartile firms is 15%+. If the industry is growing significantly faster than the economy (e.g., 10% or more) then the profit growth target should increase.

- The overall growth goal is for profit > revenue > asset growth.

Equity Growth

- The nominal target is 15%+ but in reality we are more concerned about the relation of equity growth with asset growth.

- In the long run, equity growth should be comparable to asset growth to keep leverage within the desired target range.
  - if the equity growth rate is not as large as the firm’s asset growth rate, this means the firm is adding debt faster than equity and the leverage ratio is increasing. Thus, over time additional stock will have to be sold to keep leverage from becoming too high.
  - if the equity growth rate is larger than the firm’s asset growth rate, the firm is funding growth primarily through equity and the leverage ratio is decreasing. Thus, over time the equity growth rate will have to be reduced (dividends, stock buyback) to keep leverage from becoming too low.

- Although the general equity growth target for high performers would be 15%+, the primary comparison we will make is equity versus asset growth rate in relation to leverage. Our goal is to see if changes are necessary in the firm’s financial policies regarding financial structure.
  - If leverage is above the target range we would expect the firm to be taking action to increase equity faster than assets. (e.g., sell stock).
  - If leverage is below the target range we would expect the firm to be taking action to limit equity growth below asset growth. (e.g., buy stock, issue dividends).
EPS Growth

- EPS growth rates indicate whether the firm is buying or selling stock. If EPS > income growth, the firm is buying back its stock. If the EPS growth is < income growth, the firm is selling stock.

- If leverage is above the target range we would expect the firm to be taking action to increase equity faster than assets, and one approach is by selling stock.

- If leverage is below the target range we would expect the firm to be taking action to limit equity growth below asset growth by buying stock, or increasing dividends.

Calculating Compound Growth Rates

The classic way to calculate compound growth rates is to use the tables in the back of your finance book (you did keep it, didn’t you?). More modern and undoubtedly easier ways are to use a spreadsheet or a financial calculator. In Lotus, the formula to use is @RATE and in Excel it is =RATE. Both spreadsheets and financial calculators require the same inputs: - beginning amount, ending amount, and number of periods - and the result will be the compound annual growth rate. Note that if you have data for five years, say 1990-1994, this is four periods. The number of periods is always one less than the number of years.

A quick and dirty method that works well on any calculator if you have five years of data is to:

1. divide the ending number by the beginning number,
2. then take the square root twice
3. then subtract 1

Example. A firm has profits of $1500 in 1992 and $3400 in 1996.

1. 3400/1500 = 2.267
2. 1st square root = 1.50555, 2nd square root = 1.227
3. Subtract 1 = .227 or a 22.7% compound growth rate

Remember - this only works if you have five years (four periods) of data.

Concluding Remarks

The preceding ratios and targets are useful as a baseline to begin your analysis but remember the cautions and limitations mentioned in the guide’s discussion of the ratios. Avoid basing conclusions on a single ratio - consider them all together to create a more accurate conclusion.

The SPMR form is handy for learning the ratios and calculating a single year. In practice, the complete set of ratios should be calculated for each year for which data are available. A form such as Figure 1 should be used.

Remember, although you have been given generally acceptable targets, in the final analysis when assessing the financial performance of a firm, there is no substitute for good judgment.
The objective is to assess the overall financial condition of the firm - not just cite whether specific targets have been met.

Many firms announce ambitious growth plans without adequately assessing their ability to generate the needed funds. A critical measure of initiating new strategies that require additional funding is to ensure that access to resources is in place. There are three sources of funds:

- internal (positive cash flow – not profit),
- stock sales (equity),
- borrowing (debt).

Rapid growth typically requires access to external funding – the question is how much and is it available. Access to the financial markets is influenced by existing leverage levels (e.g., debt) for possible borrowing, and profitability measures such as ROE for selling stock.

Below is a summary of the targets mentioned in this guide that you can use when no other comparisons are available. A table published every year in the Fortune 500 provides industry averages for most industries.

<table>
<thead>
<tr>
<th>Summary of Targets for Top Quartile Performers:</th>
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<tbody>
<tr>
<td><strong>Dupont Formula</strong></td>
</tr>
<tr>
<td>Net Profit Margin Targets:</td>
</tr>
<tr>
<td>- retail – 5%+;  manufacturing – 8%+.</td>
</tr>
<tr>
<td>Asset Turnover targets: 1.0X+</td>
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<td>ROA target – 8%+</td>
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<tr>
<td>Acceptable Leverage (Asset/Equity) – 1.5x - 2.5x</td>
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<td>ROE targets: (for all industries)</td>
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| **Liquidity**                                |
| Current Ratio 2.0x                            |
| Quick Ratio 1.0x                              |
| Cash Ratio 15-20%                             |
| TIE 5x+                                      |

<p>| <strong>Compound Growth Rates</strong>                    |
| Assets 15%+                                  |
| Revenues 15%+                                |
| Profits 15%+                                 |
| Equity 15%+                                  |
| EPS 15%+                                     |</p>
<table>
<thead>
<tr>
<th>Ratio</th>
<th>Year</th>
<th>Trend</th>
<th>Ind Avg</th>
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