FSA Module: Student Handbook and Users Guide

1. Introduction

Financial Statement Analysis extracts information from a company's financial statements and uses it to evaluate the company's financial performance. Financial Statement analysis is used by many different people, including:

- Investors who are interested in the profitability of the company and its ability to grow shareholder value;
- Analysts who provide recommendations on the company's stock;
- Company's managers to improve performance;
- The company's creditors who decide whether to lend money to the company.

The FTS Financial Statement Analysis (FSA) Module is a unique "hands-on" way to learn Financial Statement Analysis, and has four major goals:

- To teach you what is in financial statements, including the terminology employed;
- To show you the conceptual framework through which financial information is analyzed;
- To let you see how ratios and other measures of performance are calculated and, finally,
- To understand how they are used to evaluate and compare company performance.

To achieve these goals, we have created a visual and interactive learning system with some distinct elements:

- The "exploratory" element
  - You view the actual filings of companies, see how different companies report information, what terms they use
    - You plot statement line items to look at time trends, see how compositions of different categories have changed, learn how to do common size analysis
    - You learn how sub-items within statements are calculated
    - We cover the filings of over 3500 companies, so you can select companies you are interested in or simply look at the filings of different types of companies
  - You learn the definitions of different concepts used to measure a company's performance (such as financial ratios), their definitions, how they are calculated
    - You actually learn the calculation by dragging and dropping terms to create the formula; the module checks your work
    - All definitions are online, used to reinforce your understanding
- The "application" element

- You learn how to extract information from actual company filings and calculate ratios and other measures of company performance in an intuitive way by dragging and dropping data from the statements into specially designed calculators
  - The calculators take you through the major steps involved in analyzing a company.
- You learn how to interpret the measures, compare companies, and come up with an assessment of a company's financial performance
- Once you have mastered the steps, you can use your skills to analyze any of the over 3500 companies whose filings we cover.

Data

You can work with three different types of data:

- SEC filings
  - You get the most insight about a company and what it considers important from the original filings. However, the data are not standardized, and soanalyzing and comparing companies requires a bit more work
- Morningstar data
  - Many universities subscribe to Morningstar. You can download and use this data instead. This has the advantage that raw company filings are mapped into standard fields, making it much easier to analyze and compare companies. The disadvantage is that you lose important details about how a company chose to report its information and what it considered important to point out.
- Computstat/WRDS data
  - Many universities subscribe to Compustat through WRDS. You can download and use this data as well. It has the same advantages and disadvantages as using Morningstar data. By comparing the standardized statements with raw company filings, you can see if this makes any difference to your conclusions.

SEC filings are automatically downloaded and accessed by the FSA module. The "Import Data" menu lets you import other data.

In this document, we show you how to work with SEC filings. You can follow essentially the same steps if you use the other data sources.

2. Overview of the FSA Module

The following "tree" shows you the organization of the module.
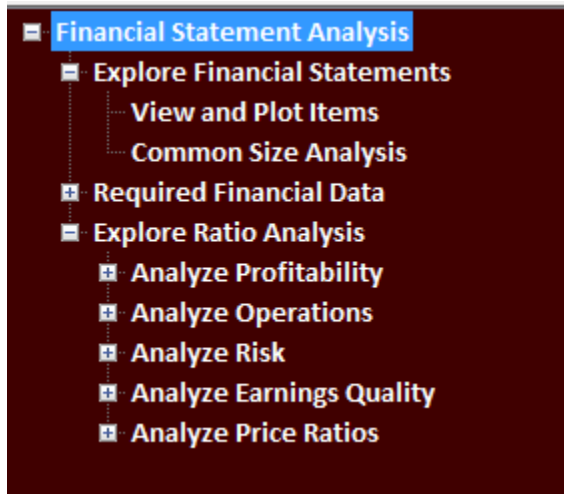
"Explore Financial Statements" has two branches:

The first lets you look at the actual filings of companies, see how they are organized, and what information they contain. The second teaches you what the terms within the statements mean and also how some sub-items within the statements are calculated.

"Explore Ratio Analysis" has several branches. In this part of the module, you learn how to extract data from company filings and calculate ratios and other measures of company performance. The data you extract is an *input* into a calculation, and is used to calculate a *concept*.

In each branch, you learn different techniques, and learn the concepts and their practical application.

The first is profitability: you will learn how to take information from a company's filings and measure its profitability. Some of the concepts here include the gross profit margin, operating profit margin, and NOPAT margin (NOPAT stands for "Net operating profit after tax"). All these measure a company's ability to convert sales into profits, taking into account items such as interest expense and taxes. Profitability can also be measured by considering returns, for example, what is the return being generated for shareholders? How exactly is this return being generated?

The next set of measures deal with efficiency of operations, including management of working capital and efficiency of asset utilization. The third set deals with risk, mostly different ways of measuring the extent to which a company can meet its liabilities. The fourth set covers earnings quality. Here, a simple question is asked: how reasonable are the profitability numbers? The need for this topic arises because there are different ways to book a profit or a sale and different ways to account for one-time gains and losses.

The last topic is <u>price ratios</u>. The measures described above (which are sometimes called "Business Ratios") are historical: they tell you what a company's performance was, as revealed in its financial statements. Prices, on the other hand, are determined by the willingness of investors to buy the company's stock and so are based on expectations of future performance. For example, the Price to Earnings (P/E) ratio measures the price of $1 of earnings. Consider a company that has a high P/E ratio relative to others, i.e. a high price and low earnings. The only way this can be rationalized is that the company's earnings are expected to grow more rapidly than those of others.   This may not be reflected in earnings growth calculated from the company's filings. In practice, investors' adopt different measures to examine the impact of expected growth. These include Price/Expected Earnings and the (P/E)/Expected Growth (PEG) ratio. So the study of price ratios extends financial statement analysis to account for the impact of expectations upon ratio analysis.

3. Exploring Financial Statements
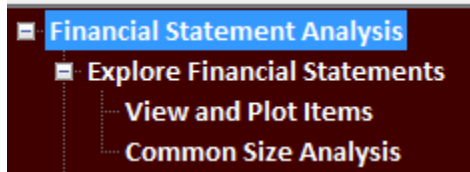
An important pre-requisite for financial statement analysis is an understanding of the statements themselves, including understanding what information is presented where and how some basic variables reported by a company have changed over time

3.1 Viewing Statements

To look at the filings of a company, click on "View and Plot Items" to get:
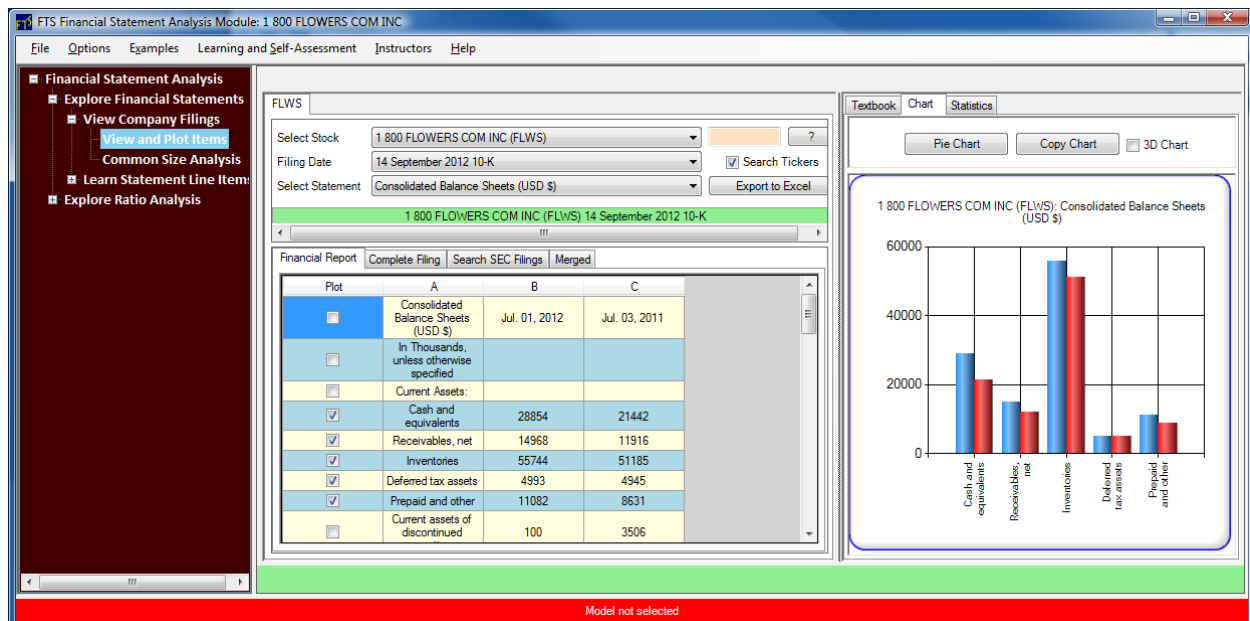
The list of companies we cover is sorted alphabetically, and at the time of this writing, 1 800 FLOWERS INC, with the ticker symbol FLWS, appears first.

You can select a company (or stock, as we call it) by:

- Selecting it from the Select Stock dropdown
- By typing in the ticker in the search box next to it and pressing enter
- By un-checking "Search Tickers" and typing in the beginning of the company's name

Once you have selected a stock, you will see the filings available, by date (and statement type). In the picture, the 10-K filing of FLWS dated 14 September, 2012, is selected.

Within the filing are the statements. You select the statement you want to look at from the third dropdown.
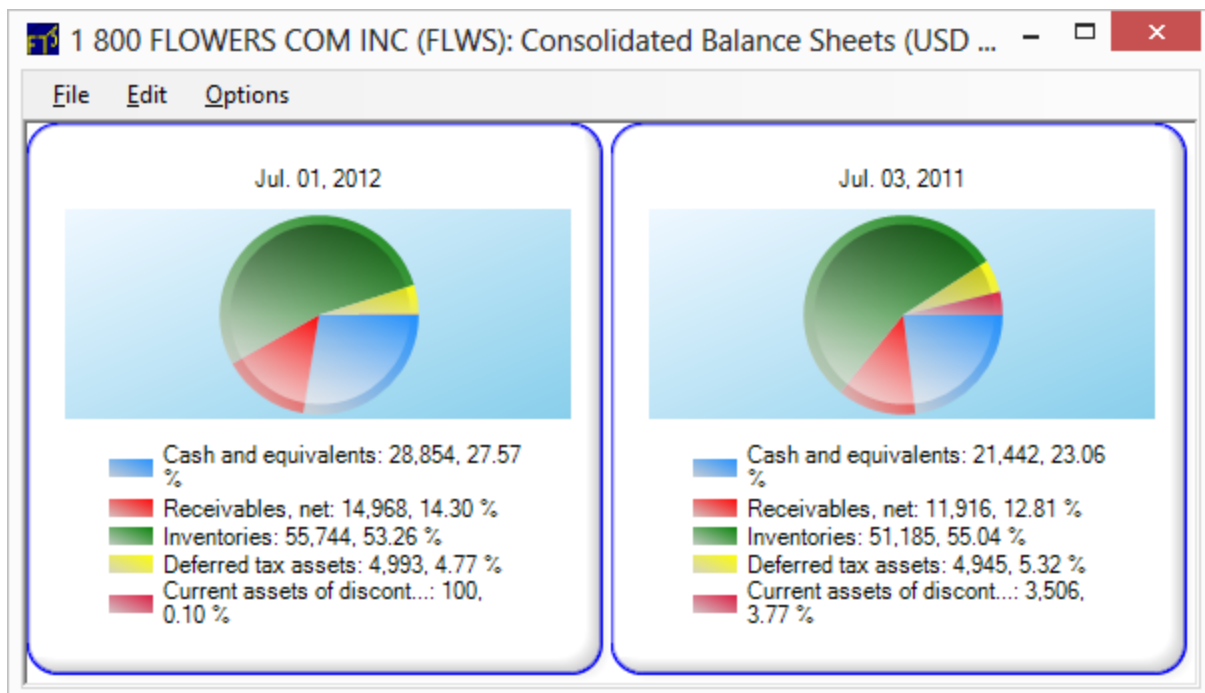
The statement is shown immediately below. Next to each line item is a check box, and if you check something on, it is plotted. You can select a 2-dimensional or 3-dimensional chart, and the 3-D chart can be rotated, e.g.

The Pie Chart button above the chart gives an alternate view of the same data:

1 800 FLOWERS COM INC (FLWS): Consolidated Balance Sheets (USD ...

Jul. 01, 2012

- Cash and equivalents: 28,854, 27.57 %
- Receivables, net: 14,968, 14.30 %
- Inventories: 55,744, 53.26 %
- Deferred tax assets: 4,993, 4.77 %
- Current assets of discont...: 100, 0.10 %

Jul. 03, 2011

- Cash and equivalents: 21,442, 23.06 %
- Receivables, net: 11,916, 12.81 %
- Inventories: 51,185, 55.04 %
- Deferred tax assets: 4,945, 5.32 %
- Current assets of discont...: 3,506, 3.77 %

A big part of what you learn in this part is the terminology used; companies use different names for statements and also for line items reported within a statement.

For example, here is part of the "balance sheet" for two companies, IBM and WMT side by side.   It shows information from each company's 10-K filing. The 10-K is the annual financial report that must be filed by any public company in the United States with assets exceeding $10 million.

International Business Machines (IBM)	Wal Mart Stores (Inc (WMT)

International Business Machines (IBM)

Filing Date: 28 February 2012 10-K

Statement: Consolidated Statement of Financial Position (USD

	A	B	C
Consolidated Statement of Financial Position (USD $)		Dec. 31, 2011	Dec. 31, 2010
In Millions, unless otherwise specified			
Current assets			
Cash and cash equivalents		11922	10661
Marketable securities (Note D)		0	990
Notes and accounts receivable-trade (net of allowances of $256 in 2011 and $324 in 2010)		11179	10834
Short-term financing receivables (net of allowances of $311 in 2011 and $342 in 2010) (Note F)		16901	16257
Other accounts receivable (net of allowances of $11 in 2011 and $10 in 2010)		1481	1134
Inventories (Note E)		2595	2450
Deferred taxes (Note N)		1601	1564
Prepaid expenses and other current assets		5249	4226
Total current assets		50928	48116

Wal Mart Stores (Inc (WMT)

Filing Date: 27 March 2012 10-K

Statement: Consolidated Balance Sheets (Audited) (USD $)

	A	B	C
Consolidated Balance Sheets (Audited) (USD $)		Jan. 31, 2012	Jan. 31, 2011
In Millions, unless otherwise specified			
Current assets:			
Cash and cash equivalents		6550	7395
Receivables, net		5937	5089
Inventories		40714	36437
Prepaid expenses and other		1685	2960
Current assets of discontinued operations		89	131
Total current assets		54975	52012

You can see several things right away:

- They have different reporting periods (WMT's fiscal year ends in January, IBM's in December)
- They use different names for their statements; IBM reports it assets in a "Statement of Financial Position" while WMT calls it a "Consolidated Balance Sheet (Audited)."

- We have taken a snapshot that shows the composition of current assets. Some of the terms are the same, like "Cash and cash equivalents" and "Inventories."
- IBM separates its receivables into sub-components

So part of what you have to learn is the terminology. The best way to do this is to just look at different companies and see what they report. We include the filings of more than 3500 US companies (as of August 2012) and an increasing number of international companies (and both these will grow over time), so you can explore many different filings. We also cover the quarterly reports, so you can compare differences between quarterly filings and annual filings.

3.2 Common Size Analysis

In common size analysis, you scale all the line items in a statement by a base item. For example, in a balance sheet, you could express everything as a percentage of Total Assets. This tells you, for example, whether Current Assets have risen or fallen as a percentage of Total Assets. You could also scale everything by Sales (which appears in the income statement).

When you select Common Size Analysis from the Topics menu of the viewer, the middle part of the screen splits into two sections:
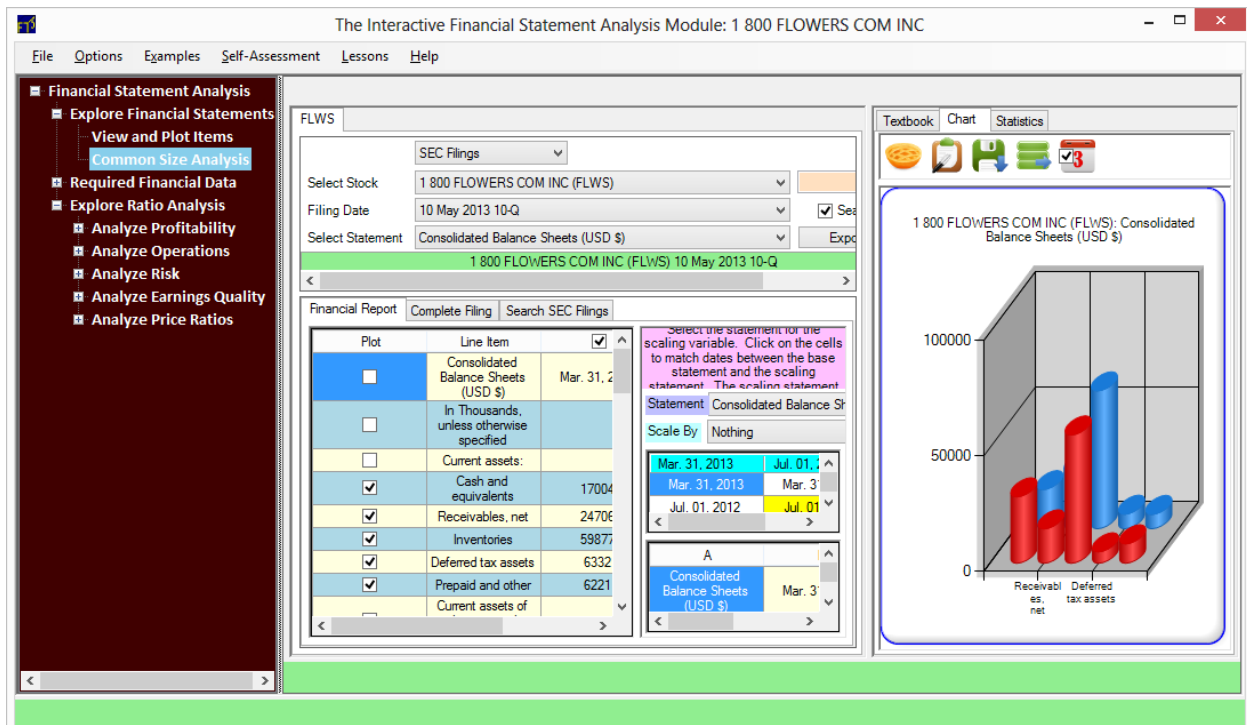
The left part displays the statement, as before, and other lets you select how to scale variables.

Scaling has two parts:

- What variable to scale by
  - The base statement is scaled by a variable from the "scaling statement"
  - For example (as in the picture), you can scale everything on the statement by Total Assets, so the scaling statement is also the balance sheet
- What time period to use for the scaling
  - The yellow squares map time. In what is shown, the Dec 31, 2011 variables will be scaled by Total Assets taken the Dec 31, 2011. By clicking on the square, you could, for example, scale the variables on the Dec 31, 2011 balance sheet with Total Assets from the Sep 24, 2011 statement:

Select the statement for the scaling variable. Click on the cells to match dates. between the base statement and the scaling statement. The scaling statement is shown below.

Statement   CONDENSED CONSOLIDATED BALANCE SHEET

Scale By   Total assets

Dec. 31, 2011	Sep. 24, 2011	
Dec. 31, 2011	Dec. 31, 2011	
Sep. 24, 2011	Sep. 24, 2011	

Once you select a scaling statement and a scaling variable, the values in the base statement are shown as percentages.

Example: Common Size Analysis using Total Assets for Apple

Bring up Apple's 25 January 2012 10-Q filing, select the balance sheet, and scale by Total Assets:
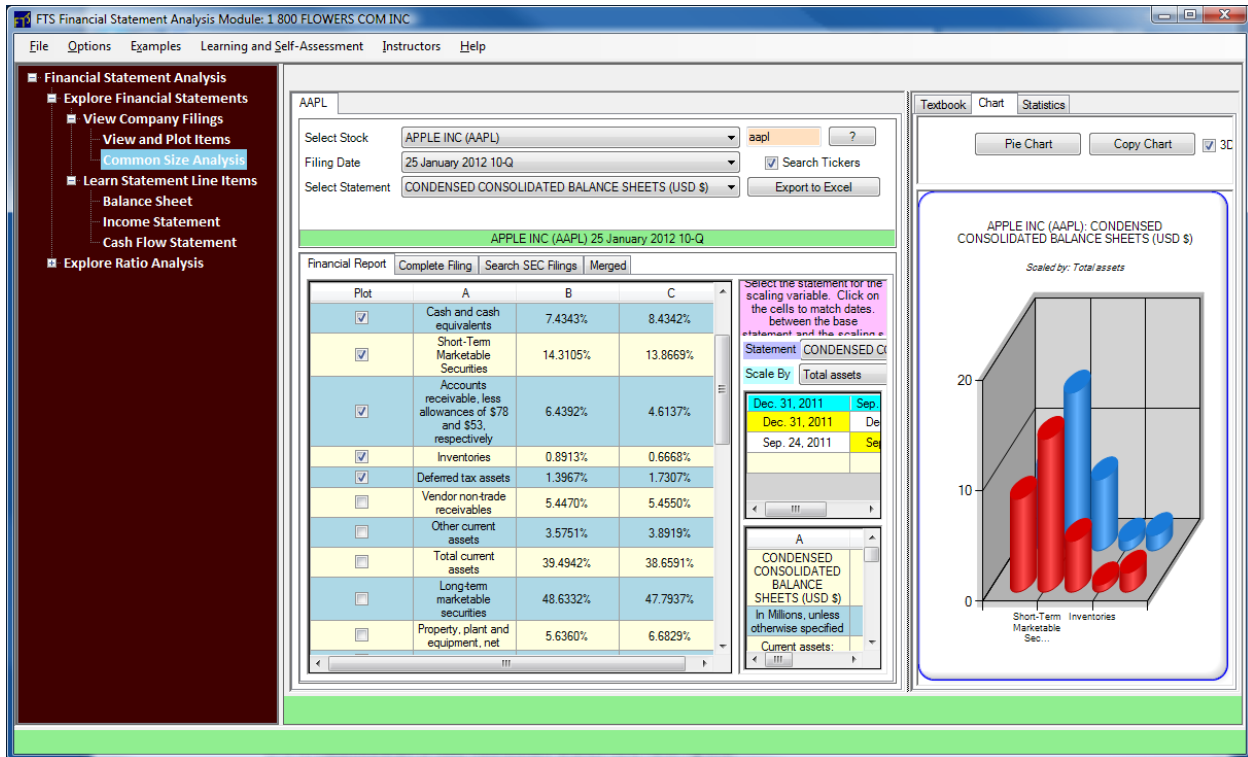
Some immediate observations jump out. First, Property, Plant and Equipment is not very important to Apple. This reflects the fact that manufacturing hardware such as the Apple iPhone is outsourced. But the relative importance of Financial Assets is very high; the big spike in the chart is "Long term marketable securities." So in the composition of Total Assets, financial assets play a bi there is a much greater emphasis upon financial as opposed to real assets for Apple.

You can also see that this trend has increased over time: PPE is declining while Apple's financial assets are growing as a percentage of Total Assets. The chart also shows that Apple's working capital assets, such as inventory and accounts receivable, increased over time.

Similarly, you can look liabilities and shareholder's equity as a percentage of total assets:
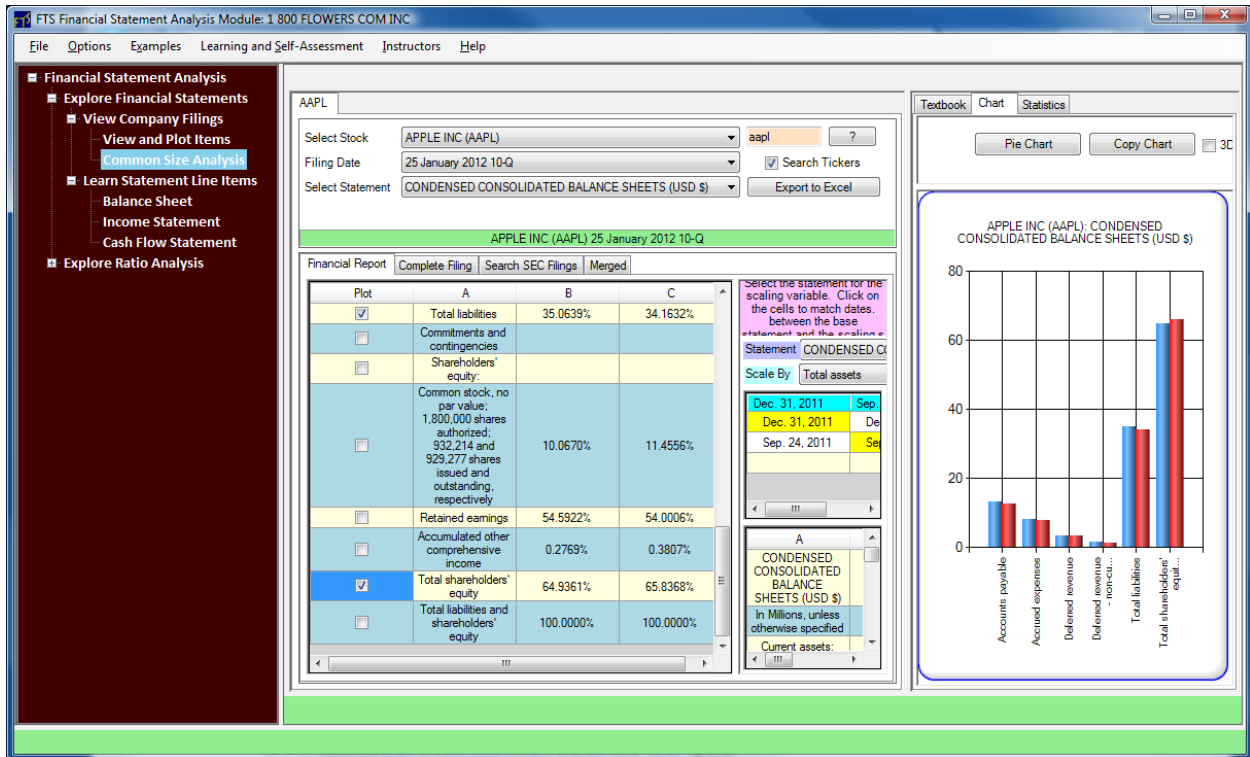
You can see that Apple has no debt and the composition is heavily skewed toward current liabilities (long term liabilities are approximately 10% of total liabilities).   Compared to Total Assets, Apples total liabilities are low, less than 40% implying that the stockholders' equity is relatively large (65%).

4. Ratio Analysis
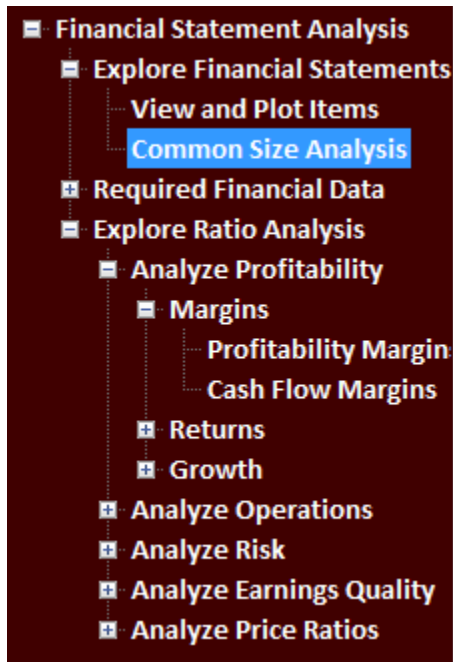
Now that you have familiarity with financial statements, you are ready to learn how to analyze them. The FSA Module has been developed with the view that this is one subject where a hands-on, learning-by-doing approach adds immense value. As you extract information and construct ratios, you absorb important practical details along with your conceptual understanding.

To help you learn in a step-by-step manner and at your own pace, the FSA module can create a Self-Assessment Dataset from data from Morningstar or Compustat (WRDS). From this data, the FSA module constructs every ratio internally. You have to construct the ratios on your own, but you get help along the way. You can work with different companies and follow your own path: either work through every concept for a company, or explore each concept for different companies before moving on. You can choose to receive help at one of three levels: detailed step-by-step instructions, less detailed hints, and finally a minimal hint telling you what needs to be done. One way to reinforce your learning is to start with detailed hits, and then try and solve the problem again with minimal hints. That way, you can easily tell whether you have mastered the material.

The videos, available at www.FSAmodule.com show you how to use the software to construct the measures. Once you are proficient at constructing and interpreting the performance measures, you can continue to work with the software and analyze any of the over 3500 companies whose statements are accessible through the software.

To summarize the conceptual development, you can see that it is divided into five parts:

- **Analyze Profitability** shows you different ways to assess the profitability of a company. You will understand how to judge profitability based on the income statement, on the cash flow statement, and then combine these with the balance sheet to see how a company grows

shareholder value. The measures constructed here give insight into how well a company's business model is working.

- **Analyze Operations** lets you drill down into the operations of the company. This provides detailed information on the efficiency of working capital and asset utilization.

- **Analyze Risk** shows you to assess a company's risk as reflected in its financial statements. This includes liquidity risk, solvency risk, coverage ratios as well as assessing the risk of bankruptcy using ratio analysis.

- **Analyze Earnings' Quality** lets you learn to evaluate how management is currently converting accounting earnings into cash. The difference between accounting earnings and cash earnings is accounting accruals, and earnings' quality lets you learn to estimate the extent that a company's current earnings relies upon accounting accruals.

- **Analyze Price Ratios** lets you learn to evaluate how the market and analysts are currently rating the company's performance. Price ratios extend ratio analysis to incorporate forward looking information such as price and analyst forecasts into the standard ratio analysis format. Price ratios are also used as a relative valuation tool.

4.1 Getting Started

If you select any branch in this part of the tree, you will see the following screen:

On the top left is the **stock selection dropdown**:

Here you select the company you want to analyze. We cover over 4000 companies. They are sorted alphabetically. You can search for company names or their ticker symbols by entering the first part of the name in the little text box and clicking the search button.

Just below that, as you have seen before, are the topics of study shown by the branches of the tree. You can select any topic you want and study them in any order.

In the middle, in blue and green, is the **calculator**:

It shows you *what* fields are needed for the current topic. As you can see, for Profitability Margins, we need information about the company's sales. We will show you how to extract this information in the section Constructing Ratios: A Worked Example. Fields with a green background are inputs; you have to put in those values. Fields with a blue background are outputs; they are calculated for you.

If you click on a term, such as Sales, you will see the definition of the term, such as:

The bottom half of the screen contains four panels:

The first panels two are **viewers** where you can see the financial statements of the company. Each has a *filing date dropdown* and once you select the filing date, the statements filed on that date are listed just below. The selected statement is shown in the grid within the panel. In the picture shown, you have

selected the Consolidated Balance Sheet from the 10-Q filed by 1-800-FLOWERS on 11 May 2012 (The company was selected on the earlier, at the top).

The third panel also contains a web browser and also the **Self-Assessment tab**. The browser lets you look up information on the internet.

The fourth panel contains a viewer and also the **Cell Editor**. For many fields needed in the analysis, you have to be able to modify and manipulate information in the statements. One example is calculating averages. In several topics, the variable of interest is an average of two numbers. The average is calculated in the cell editor. The worked example on constructing ratios shows you some uses of the Cell Editor.

4.2 Constructing Ratios: A Worked Example

We now show you how to construct ratios by working though a complete example. We will use Coca Cola as the company, and work through the topic "Fundamental (Sustainable) Growth." This topic also illustrates some of the uses of the Cell Editor.

So: select Coca Cola (KO) as the company, and then select the Latest 10-K (which at the time of this writing was the Feb 2012 filing), and select Fundamental (Sustainable) Growth as the topic of study:

Hint: just next to the filing date, you will see the little symbol [↔]. If you click that, it sets the filing dates on all the viewers to this one, and saves you setting them separately.

Next comes the all important **construction date**. This is the *period ending date* on the statement (not the filing date). For example, if you look at Coca Cola's February 2012 10-K filing, you will see this in the Consolidated Statements of Income:

A	B	D	F
CONSOLIDATED STATEMENTS OF INCOME (USD $)	12 Months Ended		
In Millions, except Per Share data, unless otherwise specified	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009
Other operating charges	732	819	313
OPERATING INCOME	10154	8449	8231
Interest income	483	317	249
Interest expense	417	733	355
Equity income (loss) - net	690	1025	781

The statement has data for three dates: the periods ending Dec 31, 2011, then 2010, and then 2009. So we can conduct the analysis on one or more of these dates; if you want to look at trends, you will want more than one date. We will do only one date in this example, Dec 31, 2011 since our focus is on the mechanics of the construction.

So: Drag and Drop the Date Dec. 31, 2011 (with the orange background) and drop it into the blue area of the calculator. You should see:

KO	31 Dec 2011
Consolidated Net Income	0.00000
Net Income Attributable to NCI	0.00000
Net Income Attributable to Shareholders	0.00000
Average Shareholders Equity	0.00000
Dividends Paid	0.00000
Dividend Payout Ratio	0.00000
Retention Ratio	1.00000
Return on Equity	N/A
Fundamental (Sustainable) Growth	N/A

You can see the default value of every input field (green background) is zero.

The first field needed is the Consolidated Net Income. This is reported on the income statement, outlined in black here:

Filing Date	23 February 2012 10-K		
Statement	CONSOLIDATED STATEMENTS OF INCOME (USD $)		

A	B	D	F
CONSOLIDATED STATEMENTS OF INCOME (USD $)	12 Months Ended		
In Millions, except Per Share data, unless otherwise specified	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009
Income taxes	2805	2384	2040
CONSOLIDATED NET INCOME	8634	11859	6906
Less: Net income attributable to noncontrolling interests	62	50	82
NET INCOME ATTRIBUTABLE			

So just drag and drop the number into the cell in the calculator, to get:

KO	31 Dec 2011
Consolidated Net Income	8,634.00
Net Income Attributable to NCI	0.00000
Net Income Attributable to Shareholders	8,634.00
Average Shareholders Equity	0.00000
Dividends Paid	0.00000
Dividend Payout Ratio	0.00000
Retention Ratio	1.00000
Return on Equity	N/A
Fundamental (Sustainable) Growth	N/A

Coca Cola reports its Net Income to NCI (Non Controlling Interest) on the next line (outlined in red above), so drag and drop that into the appropriate cell. The calculator now looks as follows:

KO	31 Dec 2011
Consolidated Net Income	8,634.00
Net Income Attributable to NCI	62.00000
Net Income Attributable to Shareholders	8,572.00
Average Shareholders Equity	0.00000
Dividends Paid	0.00000
Dividend Payout Ratio	0.00000
Retention Ratio	1.00000
Return on Equity	N/A
Fundamental (Sustainable) Growth	N/A

Next, we need the Average Shareholders Equity. The average means we take the average of the beginning of year and the end of year values (i.e. the average of Dec 31, 2010 and Dec 31, 2011). The shareholders equity is reported on the balance sheet, so select that statement in a viewer and scroll down to see:

Filing Date	23 February 2012 10-K	
Statement	CONSOLIDATED BALANCE SHEETS (USD $)	

A	B	C
CONSOLIDATED BALANCE SHEETS (USD $)	Dec. 31, 2011	Dec. 31, 2010
Accumulated other comprehensive income (loss)	-2703	-1450
Treasury stock, at cost - 1,257 and 1,228 shares, respectively	-31304	-27762
EQUITY ATTRIBUTABLE TO SHAREOWNERS OF THE COCA-COLA COMPANY	31635	31003

We have to calculate the average of 31635 and 31003. To do this, drag them **both** into the calculator cell for Average Shareholders Equity. You should see the following in the calculator and in the cell editor:

KO	31 Dec 2011
Consolidated Net Income	8,634.00
Net Income Attributable to NCI	62.00000
Net Income Attributable to Shareholders	8,572.00
Average Shareholders Equity	31,635.00
Dividends Paid	0.00000
Dividend Payout Ratio	0.00000
Retention Ratio	1.00000
Return on Equity	0.27097
Fundamental (Sustainable) Growth	0.27097

Cell Editor | Viewer

Average Shareholders Equity: 31 Dec 2011

Field	Field Value	Field Date	Filing
EQUITY ATTRIB...	31635.00	31 Dec 2011	23 February 2012...
EQUITY ATTRIB...	31003.00	31 Dec 2010	23 February 2012...

Formula

31635.00

The calculator only shows the first value, but both are in the Cell Editor. The calculator actually shows whatever is shown as the *formula* in the Cell Editor. When you drop a value into a calculator cell, the first this you drop becomes the formula. If you drop multiple things, like we have done, you have to edit the formula. You can type in arithmetic formulas, including parentheses, and click OK when you are done to enter the formula value into the cell editor.

Here, we will use the shortcut button, marked μ (pronounced "mu", a Greek letter commonly used to denote a mean or average). Clicking this will automatically create the average and transfer it to the calculator. The result of clicking μ is:

KO	31 Dec 2011
Consolidated Net Income	8,634.00
Net Income Attributable to NCI	62.00000
Net Income Attributable to Shareholders	8,572.00
Average Shareholders Equity	31,319.00
Dividends Paid	0.00000
Dividend Payout Ratio	0.00000
Retention Ratio	1.00000
Return on Equity	0.27370
Fundamental (Sustainable) Growth	0.27370

Cell Editor | Viewer

Average Shareholders Equity: 31 Dec 2011

Field	Field Value	Field Date	Filing
EQUITY ATTRIB...	31635.00	31 Dec 2011	23 February 2012...
EQUITY ATTRIB...	31003.00	31 Dec 2010	23 February 2012...

Formula

(31635.00+31003.00)/2

The formula has been adjusted to the average, and the result, 31319, transferred.

Next, we need the field Dividends Paid. These are reported on the cash flow statement:

A	B	C	D
CONSOLIDATED STATEMENTS OF CASH FLOWS (USD $)	12 Months Ended		
In Millions, unless otherwise specified	Dec. 31, 2011	Dec. 31, 2010	Dec. 31, 2009
Payments of debt	-22530	-13403	-12326
Issuances of stock	1569	1666	664
Purchases of stock for treasury	-4513	-2961	-1518
Dividends	-4300	-4068	-3800
Other financing activities	45	50	-2

You can see that Coca Cola reports dividends as a negative number; other companies report this as a positive number. The software expects a positive number, so after dragging and dropping the value to the calculator cell, we have to fix the sign in the Cell Editor; this is easily done by clicking the minus sign in the cell editor; it simply changes the formula to the negative of the formula and adds parentheses. In our case, the result of clicking the minus sign is:

| KO	31 Dec 2011
Consolidated Net Income	8,634.00
Net Income Attributable to NCI	62.00000
Net Income Attributable to Shareholders	8,572.00
Average Shareholders Equity	31,319.00
Dividends Paid	4,300.00
Dividend Payout Ratio	0.50163
Retention Ratio	0.49837
Return on Equity	0.27370
Fundamental (Sustainable) Growth	0.13640

And we are done: the sustainable growth for Coca Cola is 13.64%, and the return on equity is 27.37%

4.3 The Toolbar

Just above the calculator is the toolbar:
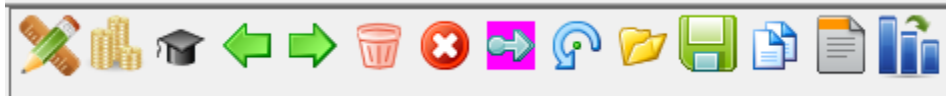
If you hold the mouse cursor over any icon, you will see a description of the icon.

	"Concept Check:" Check your understanding of a concept. The powerful feature lets you test whether you know how ratios are calculated.
	Financial statement viewer. This brings up a window where you can view and plot the raw financial statement,
	Enable Self-Assessment Mode. This lets you learn how to construct the variables of interest from the financial statements in a systematic and step-by-step manner. You have to have created a self-assessment dataset.
	Move a date column to the left
	Move a date column to the right
	The trash icon clears all entries in the selected date column
	Delete the selected date column
	Column replicator. If you have dragged and dropped entries into a column and have created a new date column to its right, you don't have to repeat the drag/drop for the new column. Click on the new column and then on this icon and the software will re-create as much of the new column as it can based on the old column.
	The curved arrow is very useful as you work across calculators: it transfers previously constructed entries into the current calculator. For example, if you have calculated Average Shareholders Equity in one calculator and need it in another, simply click this arrow, it will transfer the calculation so you don't have to do it again.
	Retrieve your construction from a file.
	Save your construction to a file. You should always save as you go; this also lets you work on part of the problem at a time.
	Copy the calculator contents. You can then paste them into another application, such as a word processor or spreadsheet.
	Produce a report of your construction. The top part of the report shows the calculator. Below that, you see the details of every cell you have constructed.

	Display charts so you can plot the current calculator fields for every company for which you have constructed data. Charts are useful for comparisons. You can look at the performance of a company over time, or you can compare the performance of two or more companies.

4.4 Charts

Charts are useful for comparisons.   You bring up charts with the Charts icon on the Toolbar.

 You can look at the performance of a company over time, or you can compare the performance of two or more companies. Once you have completed a construction for either two companies or over multiple dates for a company, you can view the calculator results graphically. For example:

You can look at the performance of a company over time, or you can compare the performance of two or more companies. Once you have completed a construction for either two companies or over multiple dates for a company, you can view the calculator results graphically. For example:
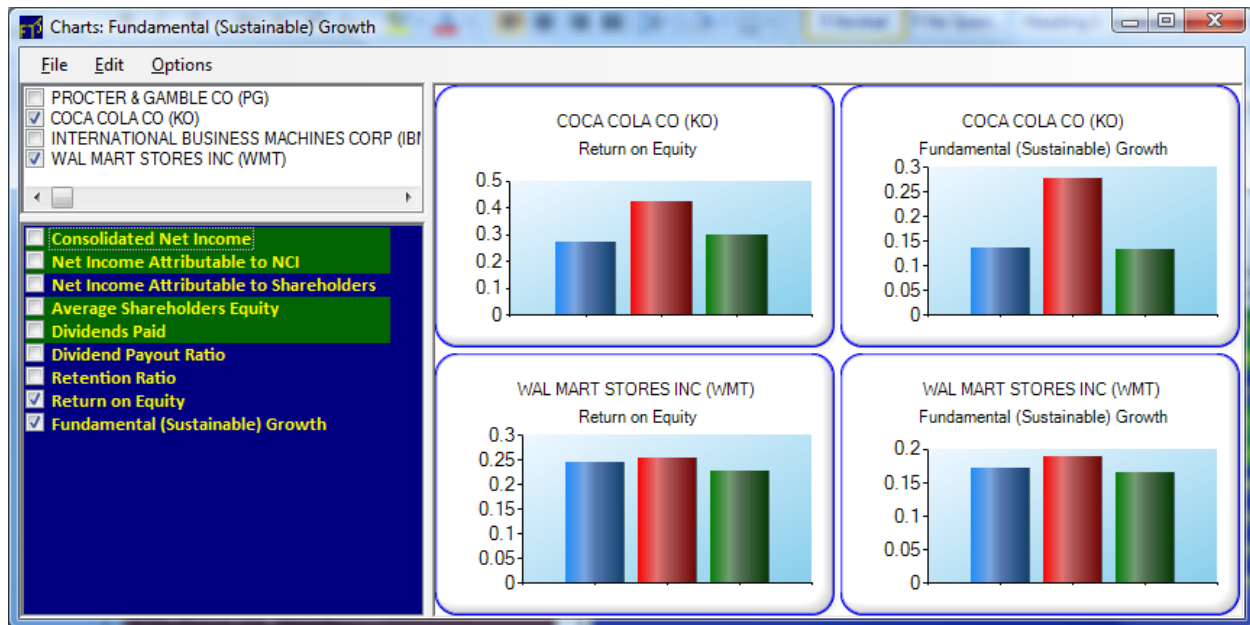
5. Using Morningstar and Compustat Data

Instead of working with the raw company filings, you can also work with "standardized" data from Morningstar and Computstat if your university subscribes to these sources. The process for using such data is explained in the "Help" menu of the Import Data screen. You can also use this data to create a self-assessment data set, that takes you, step by step, through the process of constructing ratios.

6. Summary of Concepts

In the previous section, you saw how to take information from the statements and map them into the input (green) fields of the concept calculator, and the resources you have for learning the concepts themselves. In this section, we provide a summary of every concept.

6.1 Profitability Analysis

In the Financial Statement Analysis Module the sub branch above, "Analyze Profitability" has around three sub-branches:

Margins
Returns
Growth

Margins address the question, how profitable are the operations of a firm?
Returns address the question, how profitable is the firm in generating a return on capital invested as well as capital under the control of management?
 Growth addresses the question, how do the major firm decisions impact upon profitability?

Combined these three dimensions provide a broad picture of a firm's profitability including raising flags regarding future profitability when trends are negative versus reinforcing positive outlooks about future profitability when comparisons and trends are positive.

Formula Convention for Dealing with Stocks and Flows

We apply a common convention for working with ratios involving a mixture of stocks and flows. A flow variable is a variable that is measured between two points in time. A stock variable is a variable that is measured at a point in time. The convention for constructing ratios is:

 Flow Variables / Average Stock Variable or Average Stock Variables / Flow Variables

For example, the income statement contains important flow variables such as sales, revenues and the balance sheet contains important stock variables such as assets, stockholders' equity. A ratio that relates earnings to stockholders' equity divides a flow variable (net income) by a stock variable (stockholders' equity). As a result, applying the above convention requires that Net Income is divided by the Average Stockholders' Equity. Average Stockholders' Equity is defined as follows:

 Average Stockholders' Equity = (Beginning Period Stockholders' Equity + Ending Period Stockholders' Equity)/2

 The SEC requires that public companies file Balance Sheets that provide both the beginning and ending period values.

 Margins focus on the Income Statement and Cash Flow Statements for a firm.

From the Income Statement three bottom line profitability measures are calculated and expressed relative to sales revenue:

Gross Profit Margin
Operating Profit Margin
Net Operating Profit after Tax Margin

From the Cash Flow Statement two major measures are produced:

Cash Flow Margin
Free Cash Flow Margin

The above ratios are formally defined below and provide insights into how profitable the firm is relative to sales revenue and how successful management is with respect to converting profits into cash.

Returns focus on measures of profitability defined relative to different measures of capital invested in the company:

Return on Shareholders' Equity (ROE)
Return on Assets (ROA)
Return on Invested Capital (ROIC)
Return on Capital Employed (ROCE)

This set of performance measures provide insights into how profitable the firm is relative to the resources available to management.

Growth focuses on how the major decisions made by management, the investment, financing and dividend decisions, drive profitability:

Fundamental Growth
DuPont Analysis
DuPont Burden Analysis

Fundamental growth results from the product of all three major firm decisions (investing, financing and dividend) and the DuPont analyses further decompose ROE into the impact of decisions at a finer level (operating, financial leverage and tax).

Profitability Ratios

Gross Margin = Sales Revenue less Cost of Sales

This is an important ratio for any firm reporting under the merchant model for sales revenue recognition. Sales Revenue equals the total amount the company ultimately expects to collect from their customers. It is gross revenue less discounts, and related items the company provides. Under the merchant model of accounting the merchant bears all of the risk of the inventory and books the selling price as revenue when sold (Gross Revenue Recognition) and accounts for the immediate cost of the sales separately. Combined this generates the Gross Margin.

Cost of sales can vary in nature under the "merchant model" ranging from the traditional cost of sales as illustrated by Wal-Mart to non-traditional as illustrated by Google. Wal-Mart describes this in their 10-K report as follows:

"Cost of sales includes actual product cost, the cost of transportation to the company's warehouses, stores and clubs from suppliers, the cost of transportation from the company's warehouses to the stores and clubs and the cost of warehousing for our Sam's Club segment."

However, Google describe their cost of sales as follows:

"Cost of revenues consists primarily of traffic acquisition costs. Traffic acquisition costs consist of amounts ultimately paid to our Google Network members under AdSense arrangements and to certain other partners (our distribution partners) who distribute our toolbar and other products (collectively referred to as access points) or otherwise direct search queries to our website (collectively referred to as distribution arrangements). These amounts are primarily based on the revenue share and fixed fee arrangements with our Google Network Members and distribution partners."

Technology has resulted in innovative business models that push accounting revenue recognition to the limits. For example, Groupon provides an example of a business model where they initially applied the merchant model for revenue recognition until just prior to their IPO when they shifted to the Agent Model. Under the agent model there is no Gross Margin because only net revenue is reported.

Example: If Groupon sell a coupon for $25 that promises $50 in services under the merchant model they would record $25 for sales revenue whereas under the agent model this is recorded as $12.50 because Groupon remits 50% (i.e., $12.50) to the merchant that actually provides the goods or services. The difference is clearly significant for recorded sales revenue on an income statement, and depends upon the extent to which Groupon bears the risks associated with the ultimate goods and services being provided.

Operating Profit Margin = Operating Income (EBIT) divided by Sales Revenue

The operating profit margin measures profitability relative to a broader set of costs from operations than are included in a gross margin. Many of these costs are associated with the same accounting period for the company's operations as opposed to being directly associated with the goods and services provided during the period. Profits generated from a firm's continuing operations are referred to as "Operating Income" or departing from US GAAP but more conventionally described as "Earnings Before Interest and Taxes" (EBIT).

EBIT is computed by starting with Gross Margin or Sales Revenue net of any remittances to the merchant who actually provides the goods and or services. Additional operating expenses are then subtracted away that result from supporting the firm's ability to generate revenues from their continuing operations. These support activities under EBIT do not include financing activities and costs arising from discontinued operations. Major examples here are marketing costs, selling costs, general and general administration. Some operating costs arise from accounting principles that determine whether a cost is expensed to the period or capitalized on the balance sheet in the period in which they were incurred. For example, research and development (R&D) fall into this latter category under US GAAP. For most industries R&D is expensed to the period in which it is incurred but an exception is software development costs which can be capitalized on the balance sheet as an asset and subsequently amortized over their economic life. As a result, operating costs arise from a combination of the economics associated with the operations as well as GAAP.

Net Operating Profit after Tax (NOPAT) = After tax profit from operations (EBIT * (1 − Effective Tax Rate)

NOPAT Margin = NOPAT divided by Sales Revenue

This profitability measure further extends the concept of operating profit margin to take into account corporate taxes. That is, the profitability measures such as Operating Profit Margin and NOPAT margin are carefully teasing out the impact of important firm decisions from their continuing operations. For the case of the Operating Profit Margin the effects from the firm's financing and tax decisions are excluded from consideration. For the case of the NOPAT margin only the impact of the financing decision is ignored.

Cash Flow Margin = Cash flows from operating activities divided by Sales Revenue

An important function for management is not only to generate profits from sales revenue but to convert these profits into cash. The cash flow related margins have the objective of providing insight into how the firm is performing along this dimension. The cash flow from operations measure provided on the Consolidated Cash Flow Statement in its indirect form starts with net income and then "undoes" the effects of accounting accruals on net income. What results, is an estimate of the cash that was generated from operations over the accounting period in question.

Free Cash Flow to the Firm (FCFF) = Cash Flow from Operating Activities less Capital Expenditure plus after tax net interest expense (FCFF).

This measure provides some additional refinements to Cash Flows from Operating Activities in order to account for the effects of Capital Expenditure (expenditures required for maintaining the physical capacity for generating cash from operations. In addition, the impact of accounting standards mixing operating and financing activities upon the measurement of cash flows from operations is also eliminated. In particular, the tax benefit from interest expense is subtracted out.

Return on Total Assets (ROA) = Net Income attributable to shareholders' divided by the average Total Assets

The average total assets is used to reflect the fact that net income was generated over the entire accounting period and the denominator should also reflect this. This profitability measure provides insight into how well the total resources under control of management are used to generate income independently of how they are financed. By considering the fundamental accounting equation Total Assets equals Total Equities, alternatively, ROA can be viewed as the return generated to the Total Equities or the total providers of capital to the firm. From this perspective one variation of ROA is to add back Interest Expense net of tax. That is, net income is an after tax number that treats interest paid to debt-holders as an expense but not dividends paid to shareholders. So the above adjustment treats each class of equity holder equal.

Adjusted Return on Total Assets (ROA) = (Net Income attributable to shareholders' + Interest Expense (1 − tax rate)) divided by the Average Total Assets
The Return on Equity measures the return provided to the shareholders' over the time period.

Return on Shareholders' Equity (ROE) = Net Income attributable to shareholders divided by Average Shareholders' Equity for the period

The average shareholders' equity is used to reflect the fact that net income is generated over the entire accounting period and so the denominator should also reflect this. This is a bottom line measure of overall performance that results from the firm's investment and financing decisions. The investment decision is the primary driver of the numerator, net income attributable to shareholders, and the financing decision is the primary driver of the average shareholders' equity. Shareholders' Equity equals Total Assets minus Total Liabilities plus Non-Controlling Interests. As a result, the more successful investing activities have been the higher is net income and the more financial leverage employed the smaller average shareholders' equity will be relative to the available total assets. The performance measure is useful for comparing companies within the same or similar industries because significant cross sectional differences arise when working across industries. One cause of this is the nature of technology applied within an industry. For example, some industries are capital intensive which will result in a larger fixed asset base while other industries are human capital and talent driven which usually implies a smaller fixed asset base.

The definition of ROE implies a positive relationship between financial leverage and ROE if net income increases with total assets. Whether or not this relationship translates into the same predicted relationship in the capital markets between leverage and returns, is subject to much controversy. That is, higher leverage is predicted to be associated with higher expected returns but empirical evidence is mixed with respect to leverage and returns.

From the fundamental accounting equation shareholders' equity equal Total Assets minus the sum of Total Liabilities and other equity classes. As a result, again some common adjustments are to subtract out distributions to these classes. As noted earlier, Net Income already accounts for Debt-holders but Net Income does not account for preferred stockholders. As a result, a common adjustment is to subtract out Preferred Dividends from Net Income.

Adjusted Return on Shareholders' Equity (ROE) = (Net Income attributable to shareholders – Preferred Dividends) divided by Average Shareholders' Equity for the period

Another important question asked of profitability measures is whether or not management is adding value? The answer to this question depends upon whether the return generated for the firm exceeds the weighted average cost of capital taking into account the various classes of equity holders. A popular measure for assessing whether management is adding value is the Return on Invested Capital (ROIC).

Return on Invested Capital (ROIC) = Net Income attributable to shareholders' minus Dividends divided by the sum of Average Debt, Average Lease Obligations and Average Shareholders' Equity

The Return on Invested Capital (ROIC) measure provides a profitability measure relative to the invested capital in a firm. If this measure is less than the firm's after tax Weighted Average Cost of Capital (WACC) then management's investment decisions are failing to add value. This is because the discount rate is greater than the returns generated from the investment.

Return on Capital Employed is a popular performance measure among value investors. It assesses profitability from the perspective of re-investing profits into the business. It is defined as follows:

Return on Capital Employed (ROCE) = Net Operating Profit After Tax (NOPAT) divided by Capital Employed

Capital Employed = Average Total Assets – (Average Short Term plus Average Long Term Security Investments) – Average Current Liabilities or equivalently,

Capital Employed = Average Fixed Assets + Average Working Capital - (Average Short Term plus Average Long Term Security Investments)

ROCE provides insight into what income is earned from reinvesting in the firm's normal operations. If this is too low then the company will have less available for future investments and shareholders would prefer that the income be paid out as a dividend. What is too low again depends upon the opportunity cost of capital for the firm which is measured as the firm's after tax weighted average cost of capital. As a result, from the perspective of the accounting equation, Assets equal Equities plus Liabilities. ROIC provides insight into profitability from the perspective of equity holders and ROCE provides insight into profitability and future profitability, from the perspective of total assets or capital employed for productive purposes.

Fundamental Growth
An important dimension to understanding the profitability of a firm is forecasting future profitability in terms of how profits grow over time. In particular, when viewed from the perspective of current stockholders it is profits retained in a business that drive the growth of stockholders' equity over time. As a result, fundamental growth is defined from the perspective of growth in stockholders' equity defined relative to income retained times the return on equity generated:

Fundamental Growth = ROE * RR where ROE equals the return on shareholders' equity and RR equals the retention ratio (= 1 – Dividend Payout Ratio)

In the above we are assuming that there have not been any additional contributions or distributions of capital from or to owners.

Fundamental growth is an important relationship because it represents the outcome from three major decisions management make for a firm. These are the Investment Decision, the Financing Decision and the Dividend Decision. That is, RR captures the effects from the Dividend decision and ROE captures the effects from both the investment and financing decisions. To see why this is the case for ROE we need to introduce a powerful concept in ration analysis which is referred to as "decomposition analysis."

For example, return on equity can be viewed as the outcome of two major firm decisions, the investment and financing decisions. Consider multiplying ROE by Total Assets/Total Assets or 1. Clearly, ROE times 1 equals ROE. However, the advantage of doing this is that we can rearrange the terms as follows:

ROE * Average Total Assets/Average Total Assets = Net Income/Average Total Assets * Average Total Assets/Average Stockholders' Equity

The above has re-expressed ROE into two components, ROA (Return on Assets) and Financial Leverage. The ROA term results from the investment decision, and the financial leverage term results from the

financing decision. As a result, ROE can be viewed as the outcome from the product of two major firm decisions and Fundamental Growth results from the product of three major firm decisions.

The major advantage of decomposing ratios is to understand how major firm decisions affect a firm's profitability. Motivations along these lines gave rise to a major decomposition which has become known as the DuPont Decomposition.

DuPont Decompositions

Among the stocks that currently make up the Dow Jones Industrial Index the oldest is E. I. du Pont de Nemours And Company more commonly referred to simply as DuPont. DuPont was originally a gunpowder mill founded in July 1802 by Eleuthère Irénée du Pont and today is one of the largest chemical companies in the world. DuPont was a pioneer with respect to management accounting systems, including devising the accounting ratio Return on Investment (ROI). Around 1912 their ROI approach was extended by one of their financial officers, Donaldson Brown, who decomposed the ROI calculation into a product of the sales turnover ratio and the profit margin ratio. In 1914 DuPont invested in General Motors (GM) to assist the struggling automobile company. In 1920, Pierre DuPont became chairman of GM, and during his tenure implemented a pioneering management accounting system that focused sharply on understanding the drivers of return on investment. By organizing resources around this system GM grew to be the largest automobile company in the world. In 1957 DuPont had to divest itself of General Motors because of the Clayton Antitrust Act. The DuPont decomposition became popular after its successful use at GM and DuPont.

Formally, the Return on Equity (ROE) equals Net Income for the period divided by the Average Shareholders Equity. Under the DuPont decomposition ROE is decomposed into Return on Assets (ROA) and Financial Leverage by multiplying and dividing by the average total assets for the period. ROE measures the rate at which shareholder wealth is increasing. ROA measures the productivity of the assets in generating income, and therefore measures the efficiency of the investment decision and financial leverage measures the extent to which the firm is using debt. In the traditional DuPont formula ROA is further decomposed by multiplying ROA by Sales/Sales and recombining the terms into Net Income/Sales and Sales/Average Total Assets. This breaks the investment decision outcome into two components, operating efficiency (i.e., profitability) and asset turnover efficiency (i.e., utilization).

Formally, the DuPont formula is:

ROE = (Net Income/Sales) * (Sales/Average Total Assets) * (Average Total Assets/Average Shareholders' Equity)

Each term in the decomposition has a specific meaning:

Profit Margin Ratio = Net Income/Sales
Asset Turnover Ratio or Asset Use Efficiency = Sales/Average Total Assets
Financial Leverage Ratio= Average Total Assets/Average Shareholders' Equity

The first two terms provide important insights into the investment decision and how it affects ROA whereas the latter provides insights into the role played by financial leverage to boost ROE relative to ROA.

For the case of ROA the profit margin ratio provides insight into the effectiveness of managing costs. That is, how profitable is a dollar of sales? When contrasted with immediate competitors a relatively low margin implies higher costs and a relatively higher margin implies lower costs compared to the competitors. This of course may be a result of the business strategy employed (e.g., full service firm versus a discounter) or it may be the result of poor managerial cost controls. The numbers raise questions that guide the further analysis of ratios, some of which go beyond just profitability analysis and some considered next.

Extended DuPont Analysis
The objective of extending the DuPont analysis is to provide a finer decomposition of the major firm decisions into the Investment, Financing and Tax decisions. The Extended DuPont analysis provides this by conducting an additional decomposition of the Profit Margin Ratio (Net Income/Sales) into two burden components, Tax and Interest, times the Operating Profit Margin. This provides a refinement of the profit margin ratio into the operating profit margin ratio by taking out the effects arising from taxes and interest expense. As a result, it provides both management and the financial analyst with finer information about a company and its immediate competitors.

Formally, the Extended DuPont formula is:

ROE = (Net Income/EBT) * (EBT/EBIT) * (EBIT/Sales) * (Sales/Average Total Assets) * (Average Total Assets/Average Shareholders' Equity)

Each term in the decomposition has a specific meaning:

Profit Margin Ratio =Net Income/Sales now decomposes into:
Net Income/Earnings Before Taxes = Tax Burden Ratio
Earnings Before Taxes/Earnings Before Interest and Taxes = Interest Burden Ratio
Earnings Before Interest and Taxes/Sales = Operating Profit Margin
Asset Turnover Ratio or Asset Use Efficiency = Sales/Average Total Assets
Financial Leverage Ratio= Average Total Assets/Average Shareholders' Equity

Net Income is measured after taxes. So if taxes are zero the tax burden equals one and so the lower this number, the higher the tax burden. Similarly, if Interest Expense is zero then interest burden ratio equals one and therefore the higher the financial leverage, the lower is this number. The advantage of adjusting for taxes and interest is to gain better insight into the firm's profit margin by focusing upon the operating profit margin.

Note that the product of the first four terms is now ROA. This is driven by operations, financing and the management of taxes. A nice property of the Extended DuPont formula is that one can examine the breakdown of ROA from the perspective of major firm decisions --- investment, financing and tax decisions.

The remainder of this decomposition is as before. That is, the fifth term is again related to the financing decision; a highly leveraged firm has low Shareholders Equity compared to Assets.

6.2 Analyzing Operations

The sub branch "Analyzing Operations" is has two sub-branches:

Working Capital
Asset Turnover

Working capital deals with the day-to-day operations of the firm including accounts receivables, accounts payables and inventory. Ratio analysis applied to working capital is often referred to as "Activity Analysis" which deals with re-expressing the day-to-day operations relative to Sales revenue in terms of turnover ratios and re-expressing turnover ratios in units of time (i.e., days to pay payables, days to sell inventory, days to collect receivables). Activity analysis is important for evaluating how efficiently a firm's operating cash flows are being managed. Activity analysis ratios combine income statement information such as Sales Revenue and Cost of Sales with average balance sheet information to extract important insights.

A second component for analyzing operations is to consider the impact of sales revenue on non-current assets. Here an analyst is applying ratio analysis to assess how efficiently a firm's fixed assets are being utilized relative to the sales revenue being generated.

Working Capital

Working Capital is defined as Current Assets minus Current Liabilities net of financing and tax related activities. This leads to eliminating items such as short term debt and the current portion of long term debt as well as deferred tax assets/liabilities. The problem group is cash and marketable securities. The last group is usually split between the financing and investment decisions, but predominately is influenced by the financing decision.   As a result, the usual simplifying assumption is to eliminate cash and marketable securities from working capital. With these eliminations it largely consists of: Accounts Receivable, Inventory and Accounts Payable. These major components lead to the three major turnover ratios.

Turnover Ratios

These ratios relate income statement information to balance sheet information. The numerator of these turnover ratios is usually defined relative to their closest driver. For example, Accounts Receivable is driven by Sales on Account and therefore Net Credit Sales is used in the numerator if available otherwise Sales. Similarly, under historical cost accounting Inventory as measured on the balance sheet is more closely aligned with the Cost of Goods Sold (COGS) to an external analyst. Finally, Accounts Payable is driven by Purchases and so either Purchases if available or COGS is used in the numerator for this ratio. Formally, we can define them as follows:

Accounts receivable turnover = Sales/Average Accounts Receivables
Inventory turnover = COGS/Average Inventory
Accounts payable turnover = Purchases/Accounts payable or otherwise COGS/Average Accounts Payable

There are variations to the above definitions that do not use the "Average" but instead just use the end of period balances. What is important is to be consistent in the application of the definition given available data. The required reporting format for the Consolidated Balance Sheet in a 10-K is to provide

investors with both the beginning and end of period account balances and so the average is then defined as (Beginning plus End of Period Balance)/2 in the above definitions. Conceptually, this reflects the fact that Sales Revenue is usually generated relatively evenly over the year.

Converting Turnover Ratios into Days

If the accounting period is defined as 1-year (e.g., if the financial statements are obtained from the 10-K) then turnover ratios can be expressed in terms of number of days by dividing by the turnover ratio by 365:

Number of days to Collect Accounts Receivable = 365/Accounts receivable turnover
Number of days to Sell Inventory = 365/Inventory turnover
Number of days to Pay Creditors =365/ Accounts payable turnover

Example: Working with the 10-Q

Suppose you are working with a 10-Q which is a quarterly financial report. Typically in the 10-Q the latest quarter results are provided as well as the latest 6-months or 9-months is sometimes provided. For example, 1-800 Flowers provides both 3- and 6-month data as follows:

The three months revenue number is $179659 in thousands.

The quarterly balance sheets often do not provide the opening and closing balances for three months and so additional quarterly balance sheets need to be brought up to align the time around the beginning and end of period balances. This is illustrated for 1-800 Flowers as follows:

Here the last two quarterly reports are required to get to the beginning and end of quarter balances for accounts receivable:

End of period is April 1, 2012: $21477
Beginning of Quarter is Jan 1, 2012: $30078
Average for the quarter is: (21477 + 30078)/2 = $25,777.5
Accounts Receivable Turnover = 179659/25777.5 = 6.97
Days to Collect Accounts Receivable (assuming 91 days between April 1, 2012 and January 1, 2012) = 91/6.97 = 13days.

Number of days to Collect Accounts Receivable = 91/Accounts receivable turnover
Number of days to Sell Inventory = 91/Inventory turnover
Number of days to Pay Creditors =91/ Accounts payable turnover

Operating Cycle

Operating Cycle = Number of Days to Sell Inventory + Number of days to collect accounts receivables

The operating time cycle measures the time taken from inventory acquisition to collecting cash. That is, it is sum of the days taken to sell inventory and the days taken to collect cash from accounts receivable. This measure can be sensitive to the business cycle such that operating cycles lengthen in recessions and shorten when economic growth is strong.

Cash Conversion Cycle

The cash conversion cycle is defined a little more broadly than the operating cycle. The cash conversion cycle includes accounts payable so that it includes resources associated with the acquisition and selling of inventory or service provision. That is, the number of days required to convert resources associated with operations to cash. Usually, the shorter the cash conversion cycle the better.

Calculating the Cash Conversion

First, calculate the accounts payable turnover by dividing the cost of goods sold by accounts payable. Next, divide 365 days by the accounts payable turnover to determine the days' payables outstanding. To determine the cash conversion cycle, first add the days' sales outstanding and the days' sales in inventory, and then subtract the days' payables outstanding. The resulting cash conversion cycle measures the time period between the cash outflow for materials required for the production of a product or service and the cash inflow from sales. A decrease in the cash conversion cycle can lead to an increase in the operating profit margin. Finally, the Cash Conversion cycle is then the aggregate number

of days for collecting accounts receivable plus the number of days required to sell inventory minus the days to pay creditors.

Cash Conversion Cycle = Number of Days to Sell Inventory + Number of days to collect accounts receivables – Number of Days to Pay Payables

The cash conversion cycle is closely related to the firm's credit policy for accounts receivable as well as the credit policy given to the firm for accounts payable. For example, Amazon has an aggressive business model that generates a negative cash conversion cycle given the float it receives from its creditors.

Asset Turnover

The objective for constructing asset turnover ratios is to measure how efficient management is using its assets. Again, interpretation is on a relative basis that varies across industries and sectors. The higher the number the more efficient asset utilization is.

The three main measures span both fixed and current assets:

Average working capital turnover = Sales / Average working capital
Average fixed asset turnover = Sales / Average fixed assets (net plant property and equipment)
Average total asset turnover = Sales / Total Assets

Each measure reveals for $1 of denominator (Average Working Capital or Average Net Plant Property and Equipment or Total Assets) what dollar amount of sales revenue was generated.

Example:

In their Dec 31, 2011 10-K Intel disclosed the following numbers for their Property, Plant and Equipment (PPE) and Sales Revenue:

Average PPE: $20,763 in millions
Sales Revenue: $53,999 in millions
Average fixed asset turnover = 53,999/20,763 = 2.6007

That is, for every $1 of average PPE Intel generated $2.60 in sales.

6.3 Analyzing Risk

The sub branch above, "Risk Analysis" is organized around four sub-sections:

Liquidity Ratios

Solvency Ratios

Coverage Ratios

Altman Model

Assessing risk takes on different meanings depending upon how risk is defined. In modern portfolio theory risk is defined from the perspective of an investor who holds the market portfolio. For this case risk is equated to market risk and it is measured in terms of the stocks' sensitivity to general market risk, referred to as beta. That is, beta measures the volatility contributed by the stock to the total market portfolio volatility.

However, there are other equally valid perspectives for assessing risk from. When viewed from a different perspective then the appropriate measure of risk changes. For example, consider the fundamental accounting equation, Total Assets equal Total Equities. The equity holders have claims against the total assets and from their perspective risk is defined in terms of ability to meet their obligations. Ratios associated with the Analyzing Risk branch of the above tree are defined from this perspective.

The four broad categories are defined as follows. Liquidity ratios are designed to let you assess a company's ability to meet its short term credit obligations. Solvency Ratios are designed to let you assess a company's ability to meet its long term debt obligations. Together these two sets of ratios emphasize covering balance sheet obligations. The third category is designed to let you assess a company's ability to meet its interest expense obligations. This set of ratios is referred to as the coverage ratios and finally the Altman Model is a traditional application of ratios designed to assess probability of bankruptcy.

Formula Convention for Dealing with Stocks and Flows

In this topic we apply a common convention for working with ratios involving a mixture of stocks and flows. A flow variable is a variable that is measured between two points in time. A stock variable is a variable that is measured at a point in time. The convention for constructing ratios is:

Convention: Stock Variables / Stock Variable, Flow Variables/ Average Stock Variables, Average Stock Variables / Flow Variables

That is, if both the numerator and denominator of the ratio contain only stock variables then the ratio is constructed at a point in time. For example, the balance sheet contains both current assets and current liabilities. The current ratio divides current assets by current liabilities at a point in time (e.g., end of period or beginning of period). The average current assets or average current liabilities are not used in this ratio. If the ratio relates a flow variable, such as earnings, to a stock variable, such as stockholders' equity, then the usual convention applies that divides a flow variable by the average of the stock variable.

Exceptions to the Above Stock/Flow Convention in Ratios:

In some cases general practice has resulted in exceptions to the above stock and flow conventions. When this is the case we deviate from the convention to maintain consistency with the widespread practice. Some examples of this arise in this current topic with the application of the Altman Model. Here two variables are defined as EBIT/Total Assets, and Sales/Total Assets as opposed to using the Average Total Assets.

Liquidity Ratios

Liquidity ratios can be traced back to emergence of ratio analysis when banks started to demand financial statements in the latter 19th century. These ratios are designed to provide an indicator of a firm's ability to repay its debts over the next twelve months. As a result, they are computed from the current assets and liabilities section of the balance sheet. Recall, the previous topic introduced working capital ratios. These ratios let a user assess how efficiently a firm is transforming its inventory into sales and how the firm is managing to collect its receivables and pay its payables. Liquidity ratios complement this working capital analysis by extending this to the analysis to assess whether a firm can meet its short run or current obligations.

The primary liquidity ratios are the Current Ratio and its major liquidity refinements the Quick and the Cash Ratios. The Quick and Cash Ratios focus upon a firm's ability to immediately repay its obligations. These are defined as follows:

Current Ratio = Current Assets/Current Liabilities

Quick Ratio = (Cash + Marketable Securities + Accounts Receivable)/Current Liabilities

Cash Ratio = (Cash + Marketable Securities)/Current Liabilities

A major property of the Quick Ratio is that Inventory is excluded from Current Assets because this requires effort to convert into cash plus it may only be quickly convertible at a significant discount. Similarly, for Accounts Receivable but the discount is usually much smaller especially since the emergence of securitization. Securitization is the process of combining different company's accounts receivable and issuing securities against their cash flows that are sold to investors.

Solvency versus Liquidity

A further distinction can be made in the subsequent topic, between liquidity and solvency. Liquidity adopts a short run focus whereas solvency adopts a longer term focus. Solvency ratios assess whether a company is likely to be able to repay their debts in the longer run and thus whether they are a going concern.

Broadly, Financial Leverage is defined as the ratio:

Total Assets/Shareholders Equity

This can be re-expressed using the fundamental accounting equation (using the fact that Total Assets - Total Liabilities = Shareholders' Equity):

1/Financial Leverage = 1 + Total Liabilities/Total Assets

That is, financial leverage is a function of the Debt Ratio:

Debt Ratio = Total Liabilities/Total Assets

There are a number of variations to the Debt Ratio and the ones covered by the module calculator are listed and defined below:

Debt to Assets = (Long Term Debt + Debt Due within One Year) / Total Assets

Debt to Capital = (Long Term Debt + Debt Due within One Year) / Total Equity

Debt to Equity = (Long Term Debt + Debt Due within One Year) / Shareholders' Equity

Financial Leverage = Total Assets/Shareholders Equity = 1 + Total Liabilities/Shareholders Equity

Long Term Debt Ratio = (Long Term Debt / Shareholders' Equity)

Each of the above ratios provide a measure of the amount of leverage used by the company and the larger the leverage the more default risk a company has. This is because debt-holders have a higher ranked claim to the firm's assets over equity holders and if their obligations are not met debt-holders can wind up the firm. This leads to another class of risk ratios which are referred to as coverage ratios.

Coverage Ratios

These ratios let you assess a company's ability to pay expenses and/or obligations. A common specific coverage ratio is Interest Coverage defined as follows:

Interest Coverage = EBIT/EBT

However, coverage ratios in general vary in terms of the nature of the expenses and obligations, as well as employing different measurements for ability to pay. In general, a coverage ratio is defined as:

Coverage Ratio: Ability to Pay divided by the Expense or Obligation being covered

Examples of expenses and obligations being covered are, interest expense, total debt, and average current liabilities. Additional examples of ability to pay measurements are Earnings Before Interest Taxes Depreciation and Amortizations (EBITDA), Cash Flow from Operations (CFO) and Free Cash Flow to the Firm (FCFF). Each of these measurements provide either a proxy for or a direct measurement of cash flows.

Altman Model

Risk ratios have been extensively used in practice to predict bankruptcy or an important part of any evaluation is also to assess whether a company is a going concern or a distressed firm. One way of approaching this problem is to develop a scoring system that is designed to measure the probability of a firm going bankrupt. This approach was adopted by Altman (1968), who developed what has become known as "Altman's Z-Score." This is easy to calculate from traditional financial ratios and provides a measure for the possibility of bankruptcy within 2-years.

Altman Z-Score

$$Z = 1.2R1 + 1.4R2 + 3.3R3 + 0.6*R4 + 0.999*R5$$

Here the accounting ratios are defined as follows:

R1 = Net working capital /Total assets

R2 = Retained Earnings/Total Assets

R3 = EBIT/Total Assets

R4 = Shareholders' Equity/Total Liabilities or Market Value of Equity/Total Liabilities

R5 = Sales/Total Assets

Interpreting Altman's Score

Z > 2.99 is viewed as Going Concern

2.7 < Z < 2.9 possible insolvency

1.81 < Z < 2.7 increased probability of insolvency

Z < 1.8 very high probability

If the Altman score is converted to a credit rating then the following cutoffs are usually applied:

Altman Score	Bond Rating

4	AAA
3.5	AA
2.9	A
2.5	BBB
2.25	BB
2	B
1.8	C
<1.8	D

6.4 Earnings Quality

The branch, "Analyze Earnings Quality" is organized around two sub-sections:

Quality of Earnings (Balance Sheet)
Quality of Earnings (Cash Flow)

Financial Reporting Quality is an area that has attracted both academic and practitioner attention. The quality of financial reports affects both the accuracy of the financial statements as well as how relevant they are for predicting future cash flows. This has led to a large body of research that attempts to understand accrual accounting and its impact upon financial reporting quality.

Accrual versus Cash Income

Accrual income differs from cash income by carefully accounting for expenses incurred but not yet paid for and expenses paid for but not yet realized. For example, an expense paid for but not yet realized is prepaid insurance. This covers a future accounting period and similarly future depreciation expense represents the cost of future services from plant property and equipment that has already been acquired. Examples of expenses incurred but not yet paid for arise from invoices that come into the business *after* the accounting period has ended. This is a common event in practice. On the revenue recognition side accrual income will deviate from cash income on the basis of whether or not the revenue is recognized in the current period. These cases arise when the goods or services provided have been paid for but not yet provided. Under accrual accounting this creates liability items (i.e., credits) on the balance sheet referred to as unearned revenue that can be both current and non-current.

Accounting resolves these differences between accrual and cash income by applying the matching principle. That is, accrual income attempts to match expenses to revenue per period irrespective of the timing of cash inflows and outflows. Cash accounting on the other hand matches cash inflows and outflows to the period. Accounting for these real economic differences in practice require managerial judgment and the accounting standards provide flexibility to allow for managerial judgment. As a result, both income measures are subject to being managed over time but accrual accounting provides management with greater flexibility for managing earnings. Financial Reporting Quality attempts to assess the degree to which management is relying upon accruals to meet earnings target. Earnings' are judged to be of higher quality the lower the dependence upon accruals. It is important to note that the use of accruals does not imply that earnings are being manipulated or that earnings management is bad, instead what is important is that the impact upon income from the use of accruals, tend to *reverse* over time whereas cash income tends to *persist* over time. As a result, earnings are judged to be more persistent the higher the quality of earnings is judged to be.

The reversal of accruals results from the matching principle and historical cost accounting. For example, if a firm chooses straight line over accelerated depreciation for their plant, property and equipment

then current income is higher than later income under straight line depreciation compared to an accelerated depreciation method. The hypothesized difference between cash flows and accruals, in terms of a sustainable earnings impact, is supported empirically. For example, a higher proportion of accruals relative to cash earnings is associated with lower earnings performance in the subsequent period (Sloan 1996). As a result, the question facing outside analysts is:

To what degree is the flexibility provided by accrual accounting being applied?

In the Earnings' Quality branch there are two calculators. These ratios are designed to provide an analyst with insight into earnings quality.

Quality of Earnings (Balance Sheet)

The scaling variable under the balance sheet measure is referred to as Net Operating Assets. This term is the difference between operating assets and liabilities and it is constructed to meet several needs. First, operating assets subtracts out cash and near cash in a consistent manner with the subtraction of cash earnings from Aggregate Accruals. Second, in the liabilities part financing decision effects are subtracted. Thus Net Operating Assets sharpens the measurement of the impact of accounting accruals upon the numbers resulting from the investment decision.

Operationally these defined relative to two successive Consolidated Balance Sheets as follows:

NOA(t) = Net Operating Assets (t) = (Total Assets(t) – Cash & Near Cash(t)) – (Total Liabilities(t) – Total Debt(t))

Average Net Operating Assets = (NOA(t) + NOA(t-1))/2

Net Operating Assets at time t is the difference between operating assets and operating liabilities after eliminating accounts that are not subject to accounting accrual measurements.

The quality of earnings using the balance sheet approach is now defined as:

Balance Sheet Accruals Ratio (t) = (Net Operating Assets (t) - Net Operating Assets (t-1) / Average Net Operating Assets (t, t-1)

That is, both the numerator and the denominator of the measure of accruals come entirely from the balance sheet.

Quality of Earnings (Cash Flow)

The Aggregate Accruals (AA) can be defined from the Consolidated Statement of Cash Flows as follows:

Aggregate Accruals(t) = Net Income(t) – (Cash Flows from Operating Activities(t) + Cash Flows from Investing Activities(t))

Cash Flow Accruals Ratio (t) = Aggregate Accruals (t) / Average Net Operating Assets (t, t-1)

The above measure differs from the balance sheet measure in terms of the numerator which measures aggregate accruals from the cash flow statement. This measure raises the question – why include Cash Flow from Investing Activities in the numerator?

The answer to this question depends upon whether or not future operations are included in the measure. That is, by including cash flow from investing activities includes cash capital expenditures that support *future operating activities* with current cash operating activities but excludes investments that are financed via a stock or debt issue. As noted earlier cash income is predicted to persist and accruals are predicted to reverse, the inclusion of investing activities and its relation to future operating activities is designed to reinforce this property.

A variation for assessing earnings quality that drops cash flows from investing activities is also provided in the calculator. In this variation the focus is purely on cash flow from operations and the scaling variable is changed to Net Income in an attempt to increase the sensitivity of the measure of the impact from accruals upon Income.

Quality of Earnings (Cash Flow) Scaled by Net Income

This refinement is analyzed empirically by Hafzalla, Lundholm and Winkel (2010) and is defined as:

Percent Operating Accruals = (Net Income – Cash from Operations)/Net Income

This relates the non-cash earnings to earnings to provide what is argued to be a more sensitive measure of the relative importance of earnings management.

6.5 analyzing Price Ratios

The branch "Analyze Price Ratios" is organized around four sub-sections:

Price to Earnings
Price to Sales
Price to Book
Price to Cash

Recently, the company Facebook went public and the initial public offering (IPO) price was set at $38. This was a controversial price, in that many investors thought that it did not represent good value given Facebook's fundamentals. However, if the IPO was set at $10 then few investors would have had this concern. Given a company's fundamentals, there will be some price at which investors would consider it to be fairly valued. However, what this price is at any point in time can fluctuate a lot. In fact, in the first two months of trading, the stock price of Facebook has fluctuated from a high of $45 to a low of $22.28.

This raises the question: how do you assess whether a stock's fundamentals represent good value?

The analysis of business ratios allows an investor to assess the relative strength of a company's fundamentals. However, this provides no insight into the question. A stock with strong fundamentals may not be good value while a stock with relative weak fundamentals may provide excellent value to investors. The major objective of price ratio analysis is to answer this type of question.

Price Ratios and Value Investors

Value investing was popularized by Benjamin Graham with the concept of "margin of safety" and the advantages of this approach have been demonstrated by Warren Buffet. In this topic you will learn how to construct the primary set of price ratios used by value investors to identify what stocks they assess to be value stocks, i.e. stocks with strong fundamentals that can be acquired relatively cheaply.

Price to Earnings (P/E) Ratio

Arguably the most popular of all ratios and certainly the most frequently cited is the P/E Ratio. Why this is the case is because it represents the number of years to recover the stock price with future zero growth earnings. That is, if current earnings persist without a change then the P/E ratio measures the number of years required to recover the current stock price. As a result, cross sectional variation among P/E ratios is related to growth expectations. This relationship is reinforced from the observation that average P/E ratios vary for the market as a whole with the business cycle and thus P/E ratios are popular because they are considered to be a leading indicator of future economic activity. This multiple can also be used to identify the relative value of similar stocks at a point in time by comparing P/E ratios across stocks.

The definition of a P/E ratio is as follows:

P/E Ratio = Stock Price / Earnings per Share (EPS)

In practice there are different types of P/E ratios commonly used in practice which vary depending upon the answer to the following question:

Which earnings should be used in the P/E ratio?

The financial statements provide measures of earnings for some completed accounting period. In addition, financial analysts provide forecasts of future earnings. These forecasts are usually provide for the current year, next year and annualized five year forecasts. As time moves forward the current year forecast becomes more accurate because it contains the information provided in 10-Q accounting reports including additional guidance provided by management.

The FSA module covers each of these cases. For example, consider Coca Cola (KO):

Suppose the spot price at the time of this example is $77.55 and the consensus for current year earnings per share is $4.0636 then the price earnings ratio for KO is 19.0838. In other words, if KO's earnings did not grow then it would take just over 19 years to recover the $77.55 stock price.

It is immediately clear from the above example that the "zero growth" assumption in a price earnings ratio is a critical assumption for understanding differences among P/E ratios.

Role of Growth Forecasts

A popular refinement of the P/E ratio designed to highlight the importance of growth assumptions to Price/Earnings ratio is the Price/Earnings to Growth Ratio (PEG) Ratio.

PEG Ratio = P/E Ratio divided by Forecast Growth

Here Forecast Growth is often defined as the expected Growth over the next 5-years.

Again, this ratio is interpreted relative to a similar stock or set of stocks in an industry. All other things being equal, the stock with a lower PEG ratio is ranked higher than a similar stock with a higher PEG ratio.

What is the PEG ratio?

Recall that the P/E ratio is measured in terms of years to recover the stock price with zero growth earnings. Thus the PEG ratio is Years scaled by % Growth or years per % of growth. For example, if years equal 10 and % growth equals 10 then the PEG ratio is 1 year per % of growth to recover the current stock price. Similarly, if the PEG ratio is 0.5 versus 2 the former (0.5) recovers the stock price in quicker time per % of growth than does the latter (2).

We illustrate these ideas next for a small set of well known stocks with similar business models.

Earnings Yield

How Can You Interpret P/E Ratios when Earnings are Zero or Negative?

This question identifies the problem with the P/E ratio which is that it is undefined when earnings are zero and rankings break down when earnings pass through zero. Relative valuation consists of ranking stocks by price ratios and the earnings yield is designed to overcome these problems with the P/E ratio. The reciprocal is called the Earnings Yield or Earnings to Price Ratio.

Earnings Yield = Earnings to Price Ratio = Earnings divided by Price

Because price is greater than zero this scaling variable overcomes the previous problems and preserves rankings as earnings pass through zero. The following example illustrates this property:

Example: P/E Ratios versus E/P Ratios

Suppose you are interested in ranking the following set of similar stocks in terms of relative over or undervalued on the basis of earnings and stock prices. Assume the EPS for this set of stocks is -.20, -.10, 0, 0.10 and 0.20 and that the stock price for each stock is $1.

	EPS	Price	P/E Ratio	Ranking	E/P Ratio	Ranking
1	-0.2	1	-5	2	-0.2	5
2	-0.1	1	-10	1	-0.1	4
3	0.0	1	Infinity	5	0.0	3
4	0.1	1	10	4	0.1	2
5	0.2	1	5	3	0.2	1

You can see that that the ranking is meaningless for the P/E Ratios but meaningful for the E/P Ratios. So when faced with positive and negative earnings the E/P Ratio is preferred for relative valuation.

The FSA Price Earnings Ratio Calculator

The first three columns of the calculator provide forward looking estimates of the P/E ratio. The first column is computed from the 5-year earnings growth forecast, column 2 from the next year's earnings growth forecast and column 3 from the current year earnings growth forecast. These measures attempt to refine the leading indicator properties of the P/E ratio by basing the measure upon consensus earnings' forecasts.

Price to Sales Ratio

Price/Sales Ratio is a measure of the number of years to recover the stock price with zero sales growth.

Price to sales ratio = Stock price by Sales Revenue per share.

One rationale for working with the price to sales ratio is that Sales Revenue is the top line of the income statement and thus potential less subject to manipulation. However, even though this top line item is usually subject to less potential manipulation care must still be taken to read item 7 in the 10-K, specifically the "Management's Discussion and Analysis (MD&A) and Forward Looking Statements, and Critical Accounting Policy" section. This section often provides a discussion of the stock's revenue recognition criteria. Specific issues to look out for are:

Under the merchant model of revenue recognition revenue is booked as the price a customer pays for the good or service whereas under the agent model only the net proceeds from the price is booked as revenue. This distinction becomes blurred with many dot com business models. For example, a web site company may actually keep only a small percentage of the price paid by a customer. For example, just prior to their initial public offering of Groupon stock, Groupon changed their revenue recognition criteria from a gross (i.e., merchant) reporting to a net (i.e., agent) reporting basis in response to some criticism of their accounting practices prior to going public. Many web based companies including Google adopt a mixed approach to revenue recognition and as a result it is always important to read the MD&A section of a 10-K to review a company's revenue recognition criteria.

Another method for managing revenue is what is referred to as "Contra deals or barter." This method involves booking revenue ahead of when the sale actually occurs. For example, a dot-com may exchange advertising space on its website for advertising space on another to build brand recognition and use up excess advertising capacity without using cash. GAAP requires recording barter transactions at fair value, but does not specify how to determine fair value. Many dot-coms have treated such barter advertising deals as a sale, thereby accelerating revenue as well as expenses.

The above and other cases are discussed by Mary-Jo Rebelo in "The Effect of the Dot-Com Decline on Independent Accountants" (The CPA Journal, May 2003).

On the positive side, Sales Revenue is relatively more stable and more predictable than net income. The price to sales ratio can be computed relative to reported sales as well as forecast sales revenue. In the FSA calculator the two standard analyst sales forecasts are used which are current and next year's sales. Finally, because sales revenue is always positive the price to sales ratio avoids the problems associated with the P/E ratio when earnings pass from positive to negative.

Working from top line sales towards the bottom line provides additional insight into the drivers of the price ratios. In order to gain insight into these drivers additional price ratios are provided in the calculator as follows:

Price to Gross Margin = Price / Gross Margin per share

Gross Margin to Price = Gross Margin per share / Price

Price to Net Operating Profit after Tax (NOPAT) = Price / NOPAT per share

NOPAT to price = NOPAT / Price

The inverse of each of these ratios is provided because both Gross Margin and NOPAT can be close to zero or negative and for the same reasons as the earnings to price ratio scaling by the positive number price preserves rankings.

The last set of ratios in this calculator relate to Enterprise Value as opposed to stock price. Enterprise Value is often used by value investors who are assessing stock investing from a long holding period perspective. From this perspective the prevailing view is that one is buying a business as opposed to buying a share. As a result, Enterprise Value is used in the place of Price. This leads naturally to a modification of the traditional Earnings Yield (Earnings to Price Ratio) which adopts a shareholder focus. The variation is to use Earnings Before Interest and Taxes in place of Earnings per share (EPS). This variation was popularized by Joel Greenblatt as part of his "Magic Formula," who uses EBIT to enterprise value ratio in place of EPS divided by stock price.

Enterprise Value

An important distinction often made by value investors such as Warren Buffet, is to view stock investing in terms of buying the business as opposed to buying a share in the business.

Enterprise value is defined as follows:

Enterprise Value = Market capitalization + Total Debt - Cash and Cash equivalents - Short term Security Investment + Non-Controlling Interest

Market capitalization = Spot price times shares outstanding (i.e., issued shares – treasury stock))

The use of enterprise value reflects the cost of acquiring the business as opposed a share in the business. The following enterprise value ratios are then computed:

Gross Margin to Enterprise Value = Gross Margin / Enterprise Value

Earnings Before Interest and Taxes (EBIT) to Enterprise Value = EBIT / Enterprise Value

Net Operating Profit after Tax (NOPAT) to Enterprise Value = NOPAT / Enterprise Value

The use of EBIT to Enterprise value estimates the pretax operating income relative to the cost of acquiring the business. This provides a strong performance metric for evaluating return from acquiring a business.

Price to Book Ratio

Price/Book Ratio is a measure of the number of years to recover the stock price with zero growth in book value per share. The book value per share is a measure of the capital that shareholders have invested in the company. It is defined as:

Price to Book = Stock price divided by Shareholders' equity per share

Book to Price or Book to Market = Shareholders' equity per share divided by stock price

The book to market ratio was popularized in Fama and French's 3-factor model designed to describe stock returns from the observed history of realized returns from US publicly listed stocks. Empirically this model was demonstrated to perform better than the popular Capital Asset Pricing Model (CAPM) for explaining realized return behavior.

In academic studies stocks with a high book-to-market ratio have been customarily referred to as value stocks as opposed to growth stocks. That is growth stocks are judged to be stocks with a low book to market (i.e., high price to book ratio) because for these stocks investors expect management to create more value from the set of resources under their control. A growth stock can also arise from accounting measurement issues because human capital is not measured in the balance sheet. As a result, a stock like IBM will have a low book to market because human talent is an important driver of returns for IBM. However, over a large sample of stocks value stocks have traditionally generated higher realized returns than growth stocks and in the Fama and French model this is argued to be a risk premium.

Price to Cash Ratios

Price/Cash Flow Ratio is a measure of the number of years to recover the stock price with zero growth in the cash generated per share. One of the main ideas behind the price to cash flow ratios is the assumption that cash flows are more persistent and less open to manipulation than are accrual based income measures. In the Earnings' Quality cash flow statement calculator accrual income was compared to cash flows from operating and investing activities. In the price to cash flow ratios these ideas are extended by providing a comparison with P/E ratios.

There are three major price to cash flow ratios which are defined as follows:

Price/Cash Flows from Operations per share = Price / (Cash Flow from Operations / (Issued Shares less Treasury Stock))

Price/Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) per share = Price / (EBITDA / (Issued Shares less Treasury Stock))

Price/Free Cash Flow (FCFF) per share = Price / ((Cash Flow from Operating Activities less Capital Expenditure plus after tax net interest expense)/ (Issued Shares less Treasury Stock)).

The first cash flow measure comes from the Accounting Cash Flow Statement. Cash flow from operations (CFO) is the cash the company generates from sales revenue excluding costs associated with long term investments and non-current assets. In the indirect form of the cash flow statement it is measured by starting with Net Income and then adjusting for Depreciation, Amortization, Deferred

Taxes, Changes in Working Capital and items related to Net Income that have cash implications but not accounting income implications.

EBITDA is a proxy for Cash Flows from Operations. It adds back the two major non cash expenses to Earnings Before Interest and Taxes. The major difference between CFO and EBITDA is how the firm chooses to finance their net working capital. For example, it could be a source of funds, which may imply that the firm is managing short term working capital to generate cash. This could range from delaying paying their creditors, collecting their accounts receivable more quickly, or turning over inventory more efficiently. The reverse of these types of scenarios would in turn imply that the short run change in working capital uses cash.

Finally, free cash flow is defined as cash flow from operations minus capital expenditure (expenditure on productive capacity which usually involves non-current assets) adjusted for US GAAP which treats interest expense as part of operations. Again the difference between Cash Flows from Operations and Free Cash Flow arises from the firm's investment decision in terms of how it impacts capital expenditure.

Each of these measures provides insight into how the market is assessing the growth in cash flows for the same reasons as discussed in the P/E section.