FTS Real Time Project: The Accruals Anomaly (Advanced)

In this project, your objective is to develop and apply your financial reporting skills to a real world trading problem. The basic task requires working with the "accruals anomaly" first identified by Sloan (1996). The anomaly is described below, but basically says that companies that have low "non-cash" earnings significantly outperform companies that do not. The implied investment strategy is to buy companies whose earnings are mostly cash income and to go short others.

The project has several steps, and is based on the FTS 1000 Stock case and the FTS Real Time Client (RTFTS). You will do the following:

- Stock selection
  - Identify two subsets of stocks, Set A and Set B, such that: based on the accruals anomaly, Set A is predicted to have strong fundamentals relative to Set B and these stronger fundamentals are underpriced in the market relative to Set B.
- Portfolio construction
  - You will then construct a market neutral position using RTFTS by going long Set A and short Set B. You can use the "long-short" analytic of RTFTS to make your portfolio market-neutral.
- Portfolio Management
  - In this project, the goal is to see how the stocks in the different sets performed, so once the position is established, you should hold it until the end.
- Performance Analysis
  - You will compare the performance of the two sets of stocks as well as the overall portfolio, and draw conclusions about the accruals anomaly.
  - RTFTS provides a measurement of your performance along several dimensions in terms of the absolute performance generated from being simultaneously long and short.
  - Depending upon time allocated to this project by your instructor you may have to provide a small team presentation. This presentation should combine both the qualitative (e.g., your strategy), the predicted and realized performance, what worked what didn't and recommendations for the future.

In completing this project, you will work with real world data and gain experience with the many judgment calls that need to made when working with the accruals anomaly. The FTS tools required to complete this project are designed to develop your real world problem solving skills by working on the problem in small teams.

 Background Information

Overview

The "accruals anomaly" was first identified by Sloan (1996). It is unusual for accounting to make the cover story of Business Week, however October 2004 this happened and it was observed that:

"[I]nvestors are clamoring to exploit this market inefficiency. "They seem in a bit of a frenzy about it," says Sloan. ... But as more people catch on, this trading opportunity should diminish. How long it lasts depends on the ability and determination of investors to review earnings estimates skeptically. ... More portfolio managers are using sophisticated screening to identify companies that make aggressive estimates. ... Goldman Sachs Asset Management, BG1, Citadel, Starmine, and Susquehanna Financial Group, among many others, are employing versions of the Sloan-Richardson models to guide their investments. Strategists at brokerages, including Sanford C. Bernstein Research, CSFB, and UBS have built model portfolios using similar techniques."

The anomaly exploits information that results from decomposing accounting income into cash income and accruals. In this project your task is to apply various forms of the decomposition and identify two sets of stocks, from the set of stocks in the FTS 1000 Case, Set A and Set B, such that Set A:

I.   Set A, given the accruals anomaly has stronger predicted fundamentals relative to Set B, and
II.   The stronger predicted fundamentals are underpriced in the market relative to Set B.

For part I, you should decompose accounting income into two components, cash income and accruals. Cash income is predicted to have greater persistence than accruals. Accounting accruals arise from the application of the accounting matching principle which attempts to match "efforts" to "performance" when measuring accounting income. For an obvious example consider selling commissions that have not been paid for sales made on account. Under the accounting matching principle cash sales, sales on account, paid and unpaid commissions are all recognized when measuring income, whereas cash income only recognizes cash sales and cash commissions when measuring cash income. However, this principle extends to other situations that have less obvious cause and effect relationships such as accelerated depreciation and expense recognition based upon managerial judgments and income smoothing. That is, the accounting rules are such that many accruals have a tendency to revert over time especially whenever accruals result in the smoothing of income.

Insights such as above have resulted in extensive empirical testing of the hypothesis that the cash income component of accounting income has greater persistence than the accrual component of accounting income. These empirical tests have:

i.   tested the hypothesized fundamental relationships hold (e.g., equations (8) and (10) below), and
ii.   market returns are consistent with observed fundamental relationships (i.e., (8) and (9) are consistent and (10) and (11) are consistent) in the formal description below:

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + \upsilon_{t+1.} \qquad (8)$$

$$(r_{t+1} - \bar{r}_{t+1} | \phi_t) = \beta(Earnings_{t+1} - \alpha_0 - \alpha_1^* Earnings_t) + \varepsilon_{t+1}. \qquad (9)$$

Market efficiency imposes the constraint that $a_1 = a_1^*$. This nonlinear constraint requires that stock prices correctly anticipate the average persistence of earnings performance.

Combining the expanded earnings forecasting model in equation (5) with equation (7) gives:

$$Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 Cash\, flows_t + \upsilon_{t+1}, \qquad (10)$$

$$(r_{t+1} - \bar{r}_{t+1} | \phi_t) = \beta(Earnings_{t+1} - \gamma_0 - \gamma_1^* Accruals_t - \gamma_2^* Cash\, flows_t) + \varepsilon_{t+1}. \qquad (11)$$

Reference: Sloan 1996

The above allows this important anomaly to be identified and described as follows. First, empirical evidence supports that in aggregate the market gets it right. That is, equations (8) and (9) are consistent with each other. Second, the evidence suggests that the market fails to decompose earnings into its two important components (i.e., (10) and (11) are inconsistent with each other. The anomaly is that the market overweight's the importance of accruals and underweights the importance of cash income.

In other words, buying stocks with earnings dominated by cash flows from operating activities and selling stocks with earnings dominated by accruals has resulted in past excess returns. Your task is to see whether this anomaly persists for the duration of this project!

Estimating Accruals

In the accruals anomaly literature there have been multiple methods used for measuring accruals. Three approaches are illustrated below (the first two are used by the Certified Financial Analysts and the third resulted from recent academic analysis :

To complete this project you will first use the FSA Module which is part of the Financial Trading System. This module directly supports the .CSV files that you can download from Morningstar if your school subscribes to their data services (5-year data is also available at www.morningstar.com).

If your school subscribes to Compustat/WRDS then the FSA Module can automatically process the WRDS ".csv" file for whatever number of stocks you want to analyze.

Step 1: Construct your personal data base.

Refer to the Appendix, which illustrates how you can get data for the set of stocks you are interested in analyzing into your personal folder. This becomes your database. You can link the FSA Module to this folder to automatically access your data.

The FSA Module provides the accounting analytics required to complete the task. However, we first review the important concepts that underlie these analytics.

Important Accrual Concepts

In evaluating a stock's use of accruals there are two main methods applied. One exploits information contained in the balance sheet and the second exploits information contained in the cash flow statement. To understand these approaches we first summarize some important definitions.

Balance Sheet Approach

Net Operating Assets (NOA) = (Total Assets – Cash & Marketable Securities) – (Total Liabilities – Total Debt)

That is, accruals are measured by taking the difference between operating assets and operating liabilities while eliminating accounts that are not subject to accounting accrual measurements:

Aggregate Accruals = $NOA_t – NOA_{t-1}$

And finally the decomposition of Accounting Income

Cash Income = Net Income – Aggregate Accruals

Cash Flow Statement Approach

A different approach that exploits the accrual adjustments in the cash flow statement is:

Aggregate Accruals = Net Income (NI) – Cash Flow from Operations (CFO)

The above refers to the operating activity component of the cash flow statement.

Comprehensive Approach

A recent more comprehensive approach for estimating accruals is:

Aggregate Accruals = Net Income (NI) – (Net Dividends & Distributions to/from Equity Holders + Increase in Cash and Marketable Securities Balance)

That is, the bracketed term decreases aggregate accruals if the cash balance increases after adding cash dividends paid to equity holders, subtracting any additional equity capital raised, and adding back the cost of any Treasury stocks repurchased.

**Extensions to Cash Flow from Operations: A Free Cash Flow Approach**

The accounting concept of Cash Flow from Operations has been extended to the concept of Free Cash Flows (Free Cash Flow to the Firm and Free Cash Flow to Equity). This is the cash that can be distributed to debt and equity holders. The concept of free cash flows extends cash flow from operations to further consider the impact of two major firm decisions upon the cash flows: The investment decision (via the CAPEX adjustment in FCFF) and the dividend decision after controlling for the financing decision in FCFE). Clearly, negative FCFF and FCFE is an indicator of weak financials.

We next illustrate using the FSA Module how to construct and combine the above concepts into a meaningful analysis. That is, you will learn how to extract relevant information from the financial statements.

Application of the Concepts Using the FSA Calculator

The following steps assume that you have downloaded some data as per the Appendix, so refer to this first.

The following screen populates all calculators for you automatically.
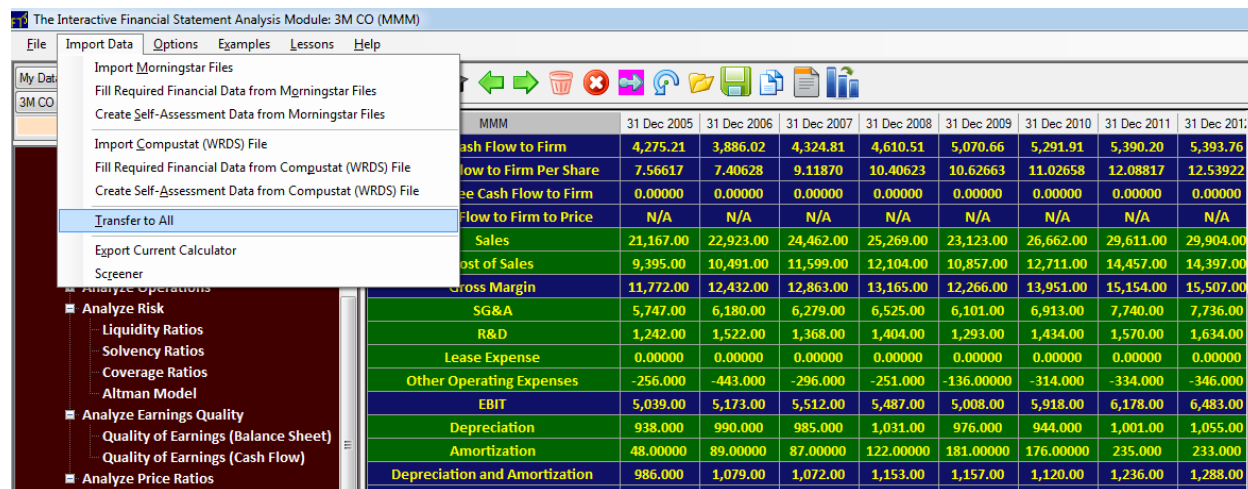
In the Appendix, the three steps are:

Step 1: Import Morningstar Files or Important Compustat (WRDS) files

Step 2: Click on Fill Required Financial Data from either Morningstar or Compustat whichever is relevant.
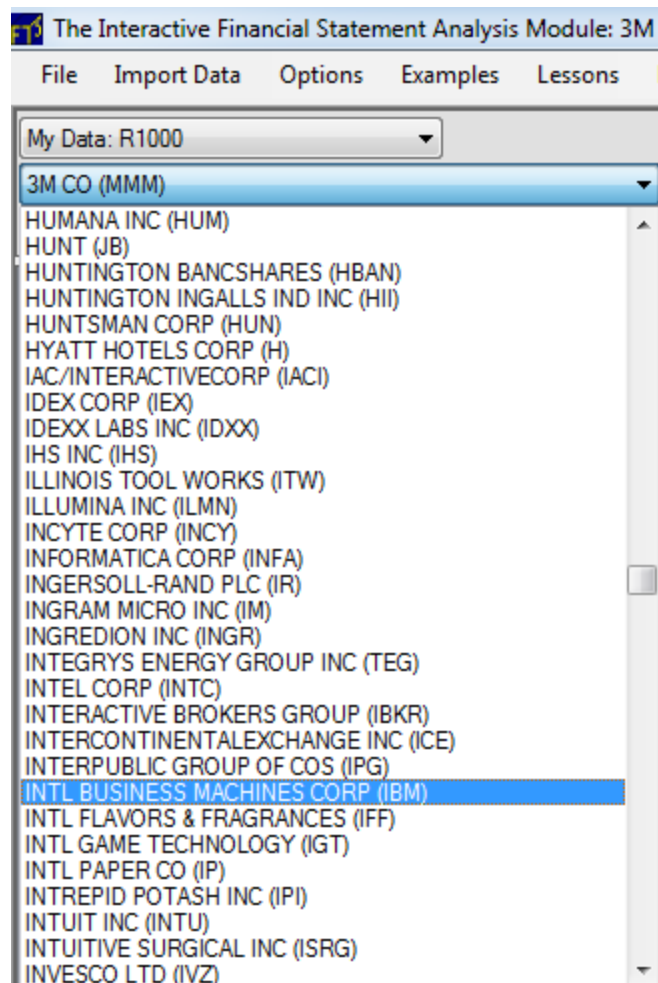
Step 3: Transfer to All

Now all calculators are populated for the entire population of stocks you are working with e.g., 1000 if you want to!

Once you have the data in the calculator you can now work with the Quality of Earnings Calculators.

Estimating Accruals: Cash Flow Approach

Suppose you want to work with IBM: First select it from your dropdown or just enter the ticker: IBM.

Then select the Earnings quality calculator:

IBM	31 Dec 2005	31 Dec 2006	31 Dec 2007	31 Dec 2008	31 Dec 2009	31 Dec 2010	31 Dec 2011	31 Dec 2012
Total Assets	105,748.00	103,234.00	120,431.00	109,524.00	109,022.00	113,452.00	116,433.00	119,213.00
Cash & Cash Equivalents	12,568.00	8,022.00	14,991.00	12,741.00	12,182.00	10,661.00	11,922.00	10,412.00
Short-term Security Investments	1,118.00	2,634.00	1,155.00	166.00000	1,791.00	990.000	0.00000	717.000
Operating Assets	92,062.00	92,578.00	104,285.00	96,617.00	95,049.00	101,801.00	104,511.00	108,084.00
Total Liabilities	72,650.00	74,728.00	91,961.00	96,059.00	86,267.00	90,280.00	96,197.00	100,229.00
Short-term borrowings	4,228.00	6,134.00	8,545.00	2,294.00	1,946.00	2,761.00	4,158.00	3,589.00
Long-term Debt due within 1-year	2,988.00	2,768.00	3,690.00	8,942.00	2,222.00	4,017.00	4,305.00	5,592.00
Long-term Debt	15,425.00	13,780.00	23,039.00	22,689.00	21,932.00	21,846.00	22,857.00	24,088.00
Operating Liabilities	50,009.00	52,046.00	56,687.00	62,134.00	60,167.00	61,656.00	64,877.00	66,960.00
Net Operating Assets	42,053.00	40,532.00	47,598.00	34,483.00	34,882.00	40,145.00	39,634.00	41,124.00
Net Operating Assets (previous year)	0.00000	31,867.00	29,475.00	34,585.00	23,009.00	23,144.00	28,506.00	28,523.00
Average Net Operating Assets	21,026.50	36,199.50	38,536.50	34,534.00	28,945.50	31,644.50	34,070.00	34,823.50
Consolidated Net Income	7,934.00	9,492.00	10,418.00	12,334.00	13,420.00	14,824.00	15,849.00	16,593.00
Net Income Attributable to NCI	0.00000	0.00000	0.00000	0.00000	-5.00000	-9.00000	-6.00000	-11.00000
Net Income Attributable to Shareholders	7,934.00	9,492.00	10,418.00	12,334.00	13,425.00	14,833.00	15,855.00	16,604.00
Cash Flow from Operations	14,874.00	15,007.00	16,090.00	18,812.00	20,773.00	19,549.00	19,847.00	19,586.00
Net Cash used in Investing Activities	-4,423.00	-11,550.00	-4,675.00	-9,286.00	-6,729.00	-8,507.00	-4,396.00	-9,004.00
Aggregate Accruals (Cash Flow)	-2,517.00	6,035.00	-997.000	2,808.00	-619.000	3,791.00	404.000	6,022.00
Accrual Ratio (Cash Flow Statement)	-0.11971	0.16672	-0.02587	0.08131	-0.02139	0.11980	0.01186	0.17293
Percent Operating Accruals	-0.87472	-0.58102	-0.54444	-0.52521	-0.54734	-0.31794	-0.25178	-0.17960

Observe the data has been automatically transferred to the calculator by following the steps in the Appendix. Your task is to focus on understanding, interpreting, and extracting information from this calculator repeated below in larger format.

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Percent Operating Accruals	-0.87472	-0.58102	-0.54444	-0.52521	-0.54734	-0.31794	-0.25178	-0.17960

We will not provide any explicit interpretations of the above screen – this is left as an exercise. The measure is one of the measures used by the Financial Analysts association for assessing earnings quality.

Interpretation:

The evidence above is mixed. The Cash Flow Accrual Ratio measure includes Cash Flows from Investing Activities whereas the Percent Operating Accruals focuses purely on Cash Flows from Operating Activities relative to Accounting Net Income. IBM is exhibiting an increasing trend – that is, IBM's earnings quality as per this measure is strong but the trend is weakening. Observe that Cash Flows from Operations are greater than net income but by reducing amounts each year. You can further analyze trends by clicking on the Statistics tab (circled below) and if you want to analyze further you can copy and paste to Excel:

Team Task I

Your task is to analyze a larger set of stocks than you plan to use and assess an approximate ranking for how much their financial statements reflect using accruals. That is, are accruals over used (i.e., accrual ratios are strictly positive) to underused.(accrual ratios are strictly negative.

Team Task II

Given you have ranked accrual use in team task I your team's second task is to assess whether the accruals are relatively over or under priced given the spot stock price. Here your goal is to identify whether price ratios tend to be relatively high or low.

To answer these types of questions you can examine the price ratios. Here the traditional measures are Price to Earnings Ratio (PE) and Price to Earnings to Growth (PEG) ratios. The latter is important because current market prices reflect the consensus analyst growth forecasts (e.g., 5-year consensus analyst forecast) and dividing by growth provides a control for this. In this project you can extend the basic PEG ratio to your cash flow and accrual measures to assess whether you think the market is currently over- or under-valuing these parameters when forming the two portfolios.

Finally, once you have identified your two sets of stocks and their rankings then form a long/short position from a subset of stocks such that you have at least 5 stocks in each position (i.e., 5-long and 5-short).

Implementation Phase: Portfolio Construction

In this phase you will implement your positions using RTFTS. Each team will go long/short their selections. This forms a market neutral position that is predicted to exploit your analysis of accruals. All positions are marked-to-market every day and your relative performance compared to the other teams in this class is available in real time. You will have one million dollars to work with and be careful to note that when selling short you do not get use of the all of the proceeds from a short sale. You should practice working with long and short positions in your personal trading accounts before working with the team account. Once positions are set it is not recommended that you engage in day-to-day adjustments but if you do you should document this in your final report.

Grading (Suggested only or as announced by your Professor)

You will be graded in terms of both actual performance and the quality of your team's analysis that is written up in the report. The final project grade will be broken up into 30% for relative performance and 70% for project quality. Relative performance will be evaluated in terms of absolute performance as well as specific performance over the set of days the market went up and down respectively. Project quality is assessed in terms of both the form of your write-up and presentation, as well as its content. In terms of the 70% allocated to project quality the breakdown between form and content is 30% (i.e., .3*.7 = 0.21) for form and 70% for content (.7*.7 = 0.49).

Report Requirement:

Main body should not exceed 7-pages including the Executive Summary. You can add additional material to appendices if you want.

Page 1: Executive Summary --- this should be a self-contained summary of the bottom line findings in your report. Well over 90% of users in business never read past the executive summary so you should write up an executive summary carefully.

Pages 2-7: The main body of your report. You can organize this any way but it should present clearly your objectives, how you evaluated and selected your two sets of stocks in terms of strong versus weak financials, relative pricing analysis and the results from the investing phase. You should use a combination of text and graphics in your report to communicate this information. Finally, your report should include a summary of the bottom line results, and concluding comments in terms of what you learned including what you would change if you were doing this again.

For additional details you can use appendices. For example, support numbers for a chart or an assertion in the main body can be provided in the appendix. These numbers should be selected summary support numbers --- that is *we do not want* every financial statement in the appendix.

Summary of Important Events

1. Form teams
2. Planning Phase: Screening and analysis of your subset of stocks, planning of long/short position.
3. Implementation Phase
4. Implementation phase ends
5. Analysis phase
6. Team Presentations

Appendix: Importing data into the FSA Module

Morningstar Files (www.morningstar.com)

Step 1: Enter the ticker you want to work with and then click on "Financials"
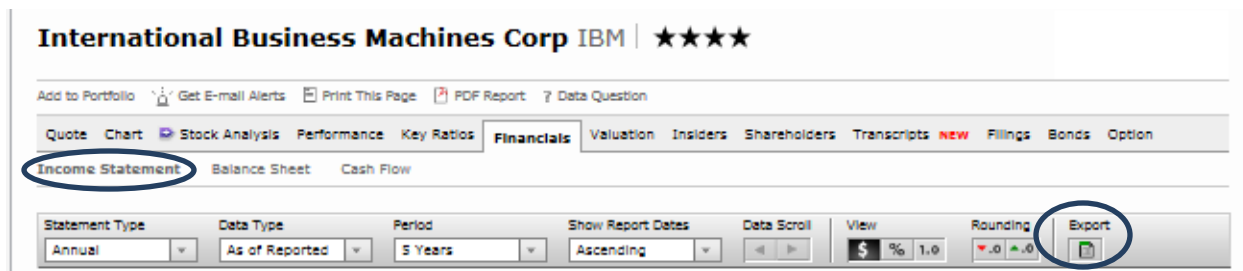

In the above first select Income Statement and click on Export circled above.

Repeat for Balance Sheet and Cash Flow and ensure you keep all files together in one folder. In the illustration below, we save them in a folder called **R1000**.

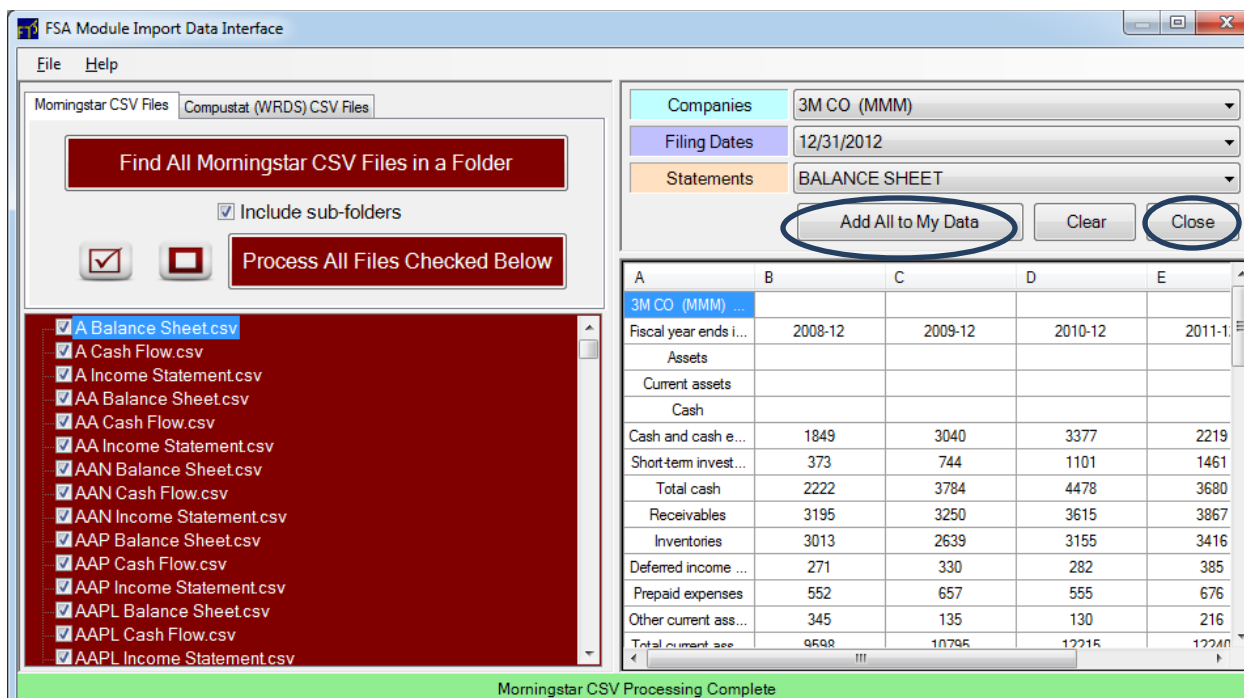Repeat this for the entire set of stock tickers you want to work with.

Step 2: In the FSA Module click on "Import Data" to bring up the following:
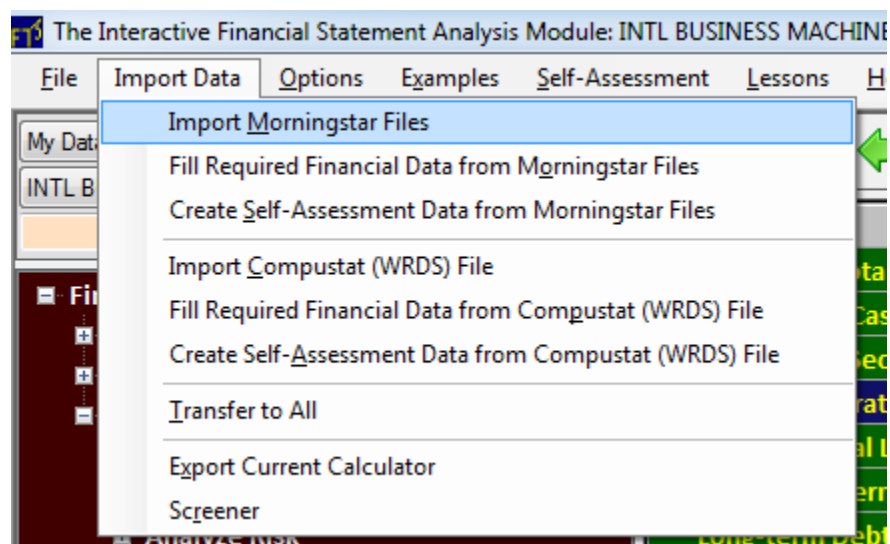
Click on Import Morningstar Files and then click on the button Find All Morningstar CSV Files, locate the folder and then click on OK
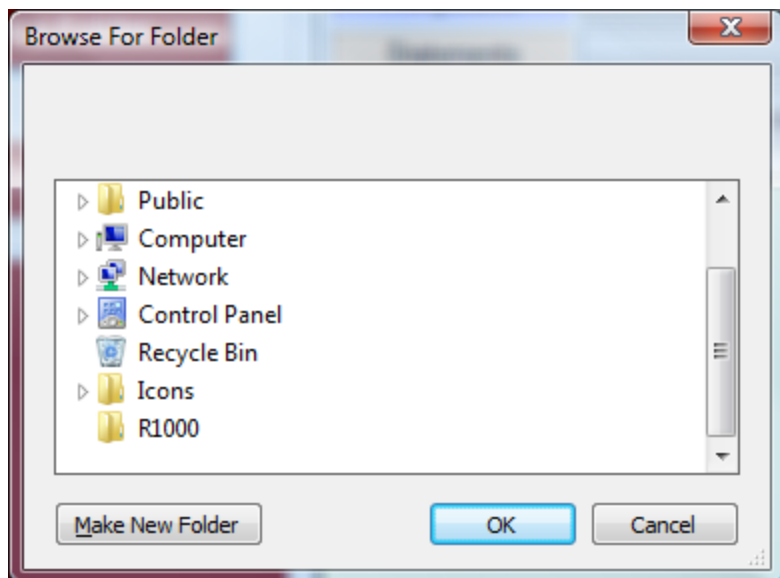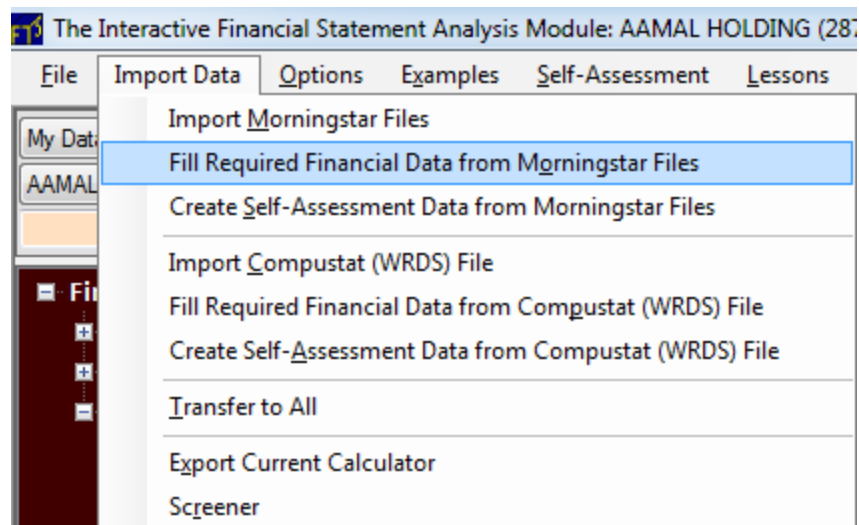
Next click on the button Process All Files:

Finally, click on Add All to My Data and Close as displayed above. This gets the data into the FSA Module.

Next, in the FSA Module click on Fill Required Financial Data from Morningstar Files and finally click on Transfer to All. That is it! All data is now in the module ready for you to compare and interpret.

Compustat Files:

If your school subscribes to Compustat/WRDS the above process is even easier. For the stocks in the FTS 1000 Stock Case, you can download one .CSV file that can be automatically prepared from WRDS. The FSA Module can then process the WRDS file directly in a similar way to that described above.

Instructions for how to process the files are in the Help of the "Import Data" screen of the FSA module.