FTS Real Time Project: Forecasting Quarterly Earnings and Post Earnings Announcement Drift (PEAD)

"*Prediction is very difficult, especially if it's about the future*" -Niels Bohr (Danish Physicist) and others

This project is designed to develop and apply your financial reporting skills to a real world investment problem. The basic task requires learning how to forecast earnings, and exploiting the phenomenon called "PEAD" for Post-Earnings Announcement Drift, first described by Ball and Brown (1968). PEAD is described below, but basically says that earnings surprises persist over time in a way that is inconsistent with market efficiency. The implied investment strategy is to buy companies whose earnings you expect to beat the consensus and short those you expect to fall short of consensus earnings. Of course, you need your own forecast of earnings to make this determination.

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

- Stock selection
    - o Identify two subsets of stocks, Set A and Set B, such that: based on the your forecasts, Set A is predicted to have positive earnings surprises and Set B is predicted to have negative earnings surprises.
- Portfolio construction
    - o You will then construct a position using RTFTS by going long Set A and shorting Set B.
- Portfolio Management
    - o In this project, the goal is to see how the stocks in the different sets performed. Since earnings are announced at different times, you may have to add stocks to each set over time rather than all at once.
- Performance Analysis
    - o You will compare the performance of the two sets of stocks as well as the overall portfolio, and draw conclusions about the PEAD.
    - o Detailed steps are provided below.
    - o RTFTS provides a measurement of your performance along several dimensions in terms of the absolute performance generated from being simultaneously long and short.
    - o 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.

 Overview

Earnings' Season is one of the most closely watched times for markets and investors. Earnings' surprises move markets, though not always in the direction you might think: a positive (negative) earnings surprise leads to a short term stock price increase (decrease) about 60% of the time. However, among academic studies that study price and earnings changes, one of the most robust findings (dating back to Ball and Brown's discovery in 1968) is Post Earnings Announcement Drift (or PEAD).

PEAD is studied by using publicly available quarterly earnings data to forecast next quarters' quarterly earnings. Unexpected earnings are defined as the difference between the actual next quarters' earnings and the forecasted earnings. If unexpected earnings are positive, we have a positive earnings surprise; if negative, we have a negative earnings surprise. To compare unexpected surprises across stocks the empirical studies standardized unexpected earnings into what is commonly referred to as a "SUE" which is typically defined in one of two ways. The SUE is either defined as unexpected earnings standardized by dividing unexpected earnings by either the volatility of the seasonal earnings or the absolute value of the realized quarterly earnings. Finally, SUE's are ranked and portfolios are then constructed from the ranked SUEs.   Suppose we look at the top decile (i.e. the 10% of the companies with the biggest positive surprise) and the bottom decile (the 10% with the most negative surprise).   PEAD is present if the returns from the top decile increase over time and keep doing so for some time. Similarly, the returns from the bottom decile persistently decrease over time.

In fact, the effect that has been documented is even stronger: that this persistence of return works according to the decile, i.e. the top decile has the most positive drift, the next has the second most, and so on.

PEAD is not consistent with predictions from the semi-strong form of the Efficient Market's Hypothesis (EMH). This is because subsequent to the public announcement of quarterly earnings, market reaction should be unbiased and immediate, and so EMH predicts a zero drift.   Eugene Fama, who first formulated and tested the semi-strong version of the EMH, examined several different anomalies that were at odds with EMH. He states:

"*Which anomalies are above suspicion? The post-earnings-announcement drift first reported by Ball and Brown (1968) has survived robustness checks, including extension to more recent data (Bernard and Thomas, 1990; Chan et al., 1996*)." --- Eugene Fama, "Market Efficiency, Long-Term Returns, and Behavioral Finance", Journal of Financial Economics 1998.

Strangely, PEAD portfolios have behaved systematically for decades. Recent evidence on PEAD, and other anomalies, is summarized in this paper by Richardson, Tuna, and Wysocki (2009)

The FTS Real Time Client and the FTS FSA Module has been designed to let you learn about Earnings Season, PEAD and the implications for investment professionals "by doing." You will learn how to make your own quarterly earnings' forecasts, construct trading strategies relative to your forecasts in competition against other students or teams in your class, and assess PEAD given the collective experiences of your class.

Project Objective

The objective of this project is to become acquainted with quarterly earnings forecasts and reactions to announcements made in earnings. This will allow you to better interpret, analyze, and try your hand at trading on stock price behavior during earnings' season. That is, you get to view the problem from the perspective of a hedge fund manager who is attempting to out-perform broad based market indexes.

There are three phases to the project:

1. **Phase I**: you will learn how to forecast quarterly earnings using historical earnings. You will apply the quarterly earnings' forecast models used by academic researchers when studying PEAD.
2. **Phase II**: you will create a trading position that is designed to exploit the difference between your forecasts and the consensus forecast. In this phase you will compete against other teams in your class.
3. **Phase III:** You will present the results of your study. You should refer to the set of questions at the end of this project. Your instructor may require a formal presentation.

Payoffs from Completing this Project

Note that irrespective of whether or not you achieve trading success when competing against others, the overriding objective of the project is to develop real world skills, including making decisions based upon current accounting data and current events associated with earnings season.

A major payoff from completing this project is the understanding of how to forecast earnings and market reactions to earnings. These skills give you a big edge: while many students can read earnings forecast numbers from financial data providers such as Bloomberg, Reuters, or Morningstar, *very few can actually conduct the analysis themselves*. Summarizing and interpreting other peoples work is a replaceable skill; what you bring to the table is not.

Project Overview

In this project you will use Excel, the Internet, the FSA Module and the FTS Real Time Client to implement and manage your position.

In Phase I of this project you will learn how to forecast quarterly earnings and design your trading strategy. In Phase II you will implement your trading strategy during earnings season based upon your forecasts and available market data.

Project Steps:

Step 1: Log into the RTFTS Client for your assigned trading case. We show you the steps based on the FTS 1000 Stock case. In the ticker window, double click on IBM:
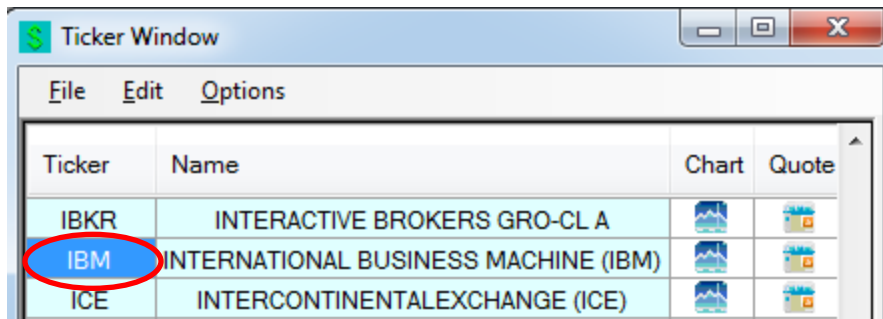
Tip: At any time you can click on the Edit menu in the Ticker window above and copy and paste into Excel to get the complete list of Stocks in your trading exercise. But first double click on any ticker (e.g., IBM in the above example) for earnings announcement information:

You can click on other stock tickers that you are interested in following to identify their earnings' announcement dates. You may also want to consult the corporate website for the stocks you select to analyze. The investor relation section of a corporate website provides recent earnings' disclosures. We follow on with the IBM example:

Example: IBM (IBM) Source: Investor Relations on Corporate Web Site

For example: http://www.ibm.com/investor/events/

Upcoming events		Podcasts
Citi 2013 Global Technology Conference	04 Sep 2013 12:00 ET	→ IBM Podcasts
Deutsche Bank Technology Conference 2013	10 Sep 2013 11:50 ET	→ Introduction to Podcasts
IBM 3Q 2013 Earnings Announcement Preliminary Date	16 Oct 2013 16:30 ET	

Recent events	
IBM 2Q 2013 Earnings Announcement	17 Jul 2013 16:30 ET

What happened on July 17, 2013?

An earnings press release can be confusing because a company may reveal many different EPS measures. Consider IBM's June Quarter 2012 press release and observe how many different EPS IBM refers to including reporting both increases and decreases in these different EPS numbers!

IBM Reports 2013 Second-Quarter Results

ARMONK, N.Y.–(BUSINESS WIRE)–IBM (NYSE: IBM)

Raises 2013 Operating EPS Expectation by $0.20 to $16.90, Excluding $1 Billion Second-Quarter Workforce Rebalancing Charge

IBM (NYSE: IBM) today announced second-quarter 2013 diluted earnings of $2.91 per share, compared with diluted earnings of $3.34 per share in the second quarter of 2012, a decrease of 13 percent. Operating (non-GAAP) diluted earnings were $3.22 per share, including workforce rebalancing charges, compared with operating diluted earnings of $3.51 per share in the second quarter of 2012, a decrease of 8 percent. Operating (non-GAAP) diluted earnings per share was $3.91, an increase of 8 percent, excluding the impact of workforce rebalancing charges.

Second-quarter net income was $3.2 billion compared with $3.9 billion in the second quarter of 2012, a decrease of 17 percent. Operating (non-GAAP) net income was $3.6 billion, including workforce rebalancing charges, compared with $4.1 billion in the second quarter of 2012, a decrease of 12 percent. Operating (non-GAAP) net income, excluding the impact of workforce rebalancing, was $4.3 billion, an increase of 3 percent.

Total revenues for the second quarter of 2013 of $24.9 billion were down 3 percent (down 1 percent, adjusting for currency) from the second quarter of 2012.

How did the financial press report this announcement?

IBM earnings beat forecasts, sending shares up 3%

Published: Wednesday, 17 Jul 2013 | 5:55 PM ETBy: CNBC With Reuters

Johannes Eisele

 IBM reported second-quarter earnings Wednesday that exceeded analyst expectations, while revenue came in short of forecasts. The world's largest technology services company also raised its full-year outlook. IBM shares were last up nearly 3 percent in after-hours trade.

What is IBM's stock doing now? (Click here for the latest after-hours quote.)

Earnings excluding items rose to $3.91 per share from $3.51 per share in the year-earlier period.

Revenue eased 3 percent to $24.9 billion from $25.78 billion.

Analysts had expected the company to report earnings excluding items of $3.77 a share on $25.37 billion in revenue, according to a consensus estimate from Thomson Reuters.

International Business Machines said on Wednesday that excluding a $1 billion restructuring charge related to job cuts, non-GAAP earnings per share expectations were being raised to at least $16.90 from $16.70.

On a GAAP basis, earnings per share were $2.91, down 13 percent; net income was $3.2 billion, down 17 percent.

IBM also said that a "substantial second-half gain" it was expecting in its previous EPS outlook "will not likely be achieved" by the end of 2013.

IBM has been under pressure since coming up short on revenue and profit in the first quarter—its first earnings miss in eight years, which was seen as an ill omen for the IT industry. The company blamed currency headwinds in Japan and some deals its sales reps failed to close.

Source: http://www.cnbc.com/id/100893461

Note that in the above release that GAAP based earnings per share were down a significant 13% and net income was down 17%. However EPS with "extraordinary items removed" beat the consensus forecast. There is a large amount of latitude with respect to what is included in "Non-GAAP Earnings" whereas the accounting numbers are verifiable. As a result, in this project we will work with the verifiable accounting numbers which report Diluted EPS = 2.91, Net Income 3.2 billion and Sales Revenue 24.9 billion. This has the further advantage that academic empirical studies have demonstrated that the accounting statements and numbers predict the Post Earnings Announcement Drift (PEAD).

In the IBM example above the confusing array of EPS numbers released on July 17, 2012 along with headlines that "IBM beat EPS consensus forecasts" resulted in an after-hours trading spike upwards followed by a sliding stock price since then.

International Business Machines Corporation (IBM) - NYSE   + Add to Portfolio   f Like 585

182.16 ↓0.58(0.32%)   4:00PM EDT | After Hours : **182.16** 0.00 (0.00%) 4:33PM EDT - Nasdaq Real Time Price
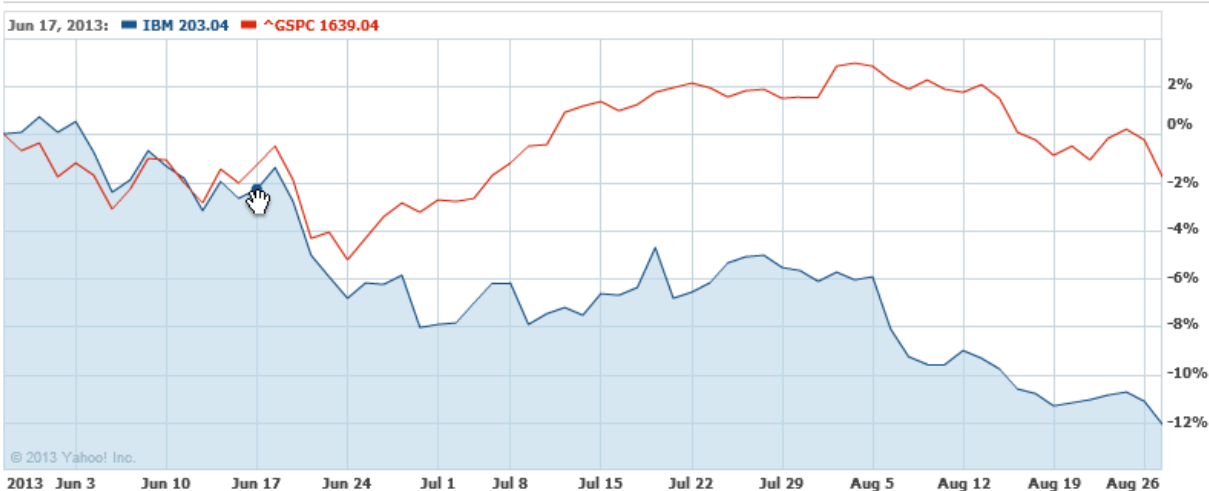
The little hand icon is July 17, 2012

In other words there has been a negative post earnings announcement drift for IBM *relative to the accounting models* but not relative to the "consensus analyst forecast."

Project Summary

In this project we will deal with reconcilable accounting data which is: the accounting net income, accounting sales revenue and accounting diluted EPS. These numbers can be verified from the financial statements that have been filed with the SEC. All the other "non GAAP" numbers are difficult to predict and verify because how they are computed can change from quarter to quarter.

We now focus upon how to forecast quarterly earnings forecast models based on the accounting data.

Quarterly Earnings Forecast Models

There are a variety of quarterly earnings forecast models that are well documented in the empirical accounting literature. We will cover two common ones in 1 and 2 below. These models both incorporate the seasonal properties that quarterly earnings and series exhibit and model 2 goes beyond seasonality to include trend and autocorrelation properties.

Model 1:

The first model is the simplest and merely exploits the fact that quarterly earnings exhibit a significant seasonality component. For example, some firms exhibit stronger earnings in the quarter (e.g., Amazon with seasonal purchasing from their customers and also IBM's fourth quarter is their strongest quarter). As a result, the first simple model is a seasonal random walk:

1. $Q_{t+1} = Q_{t-3}$

That is, the earnings forecast equals the realized earnings four quarters before the current forecast date.

This simple model has been used in a number of empirical studies and it is a straightforward model for predicting quarterly earnings process.

Model 2:

This model includes additional well documented empirical findings associated with quarterly earnings processes. First, there is a significant autocorrelation term resulting from the previous quarter's seasonality first difference term. This autocorrelation has persisted over the decades (e.g., Bernard and Thomas (1990), Kothari, Lewellen and Warner (2006)). For example, the autocorrelations reported by Bernard and Thomas (1990) for the last four seasonal terms were 0.34, 0.19, 0.06 and -0.24 and later by Kothari et al (2006): 0.34, 0.18, 0.05 and -0.29 which is virtually unchanged! This is an important persistent property exhibited by quarterly earnings series. Second, there is a permanent component to annual earnings that has been documented in the literature since Foster 1977. Note that this model assumes that earnings have "permanent" and "transitory" components over time. The permanent component arises because the firm has the capacity to generate goods and services over time. The transitory component arises because in some periods it will sell more than in other periods.

For forecasting earnings the Box-Jenkins approach has been widely used by empirical researchers to forecast quarterly earnings (e.g., Watts (1975), Foster (1977) and Griffin (1977)). One model that has survived moving forward in time since 1977 is Foster's model:

2. $Q_{t+1} = Q_{t-3} + \alpha(Q_t - Q_{t-4}) + \delta$

That is, this model includes current and previous quarter seasonality terms plus a drift term.

**Example: Application of Models 1. and 2. to IBM**

Step 1: Get the data. Go to www.morningstar.com and bring up the quarterly earnings for IBM.
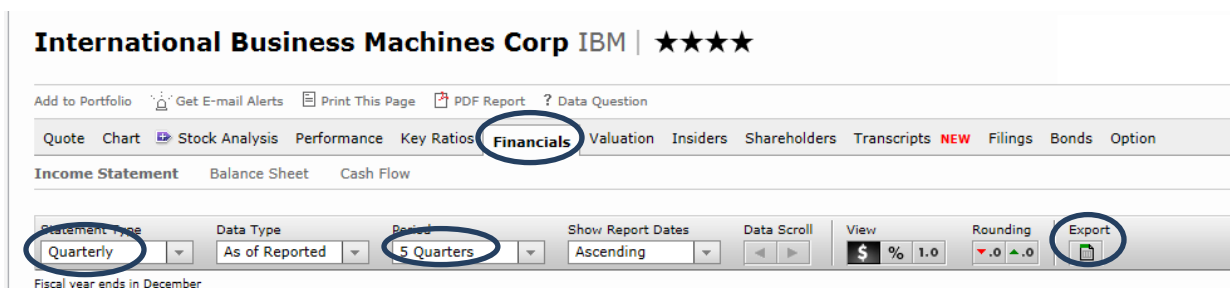

You can then click on "Income Statement" above and then click on Export, circled above, to export this as a .csv file readable by Excel which you can then save by adding "QtrlyData" or equivalent to your file name.

Repeat this step by selecting "Annual" instead of "Quarterly" and save adding "AnnData" or equivalent to your filename.

Alternatively and for a longer series of quarterly data you can go directly to the SEC filings using the FSA Module. For example, in the example below we use the data from March 2012 quarter and this was obtained from the FSA Module as follows (i.e., first enter the ticker, then select the appropriate 10Q (verify below that in this case select the 10Q with the date 24 April 2012 and the appropriate Statement which is the Consolidated Statement of Earnings (USD $) for IBM):
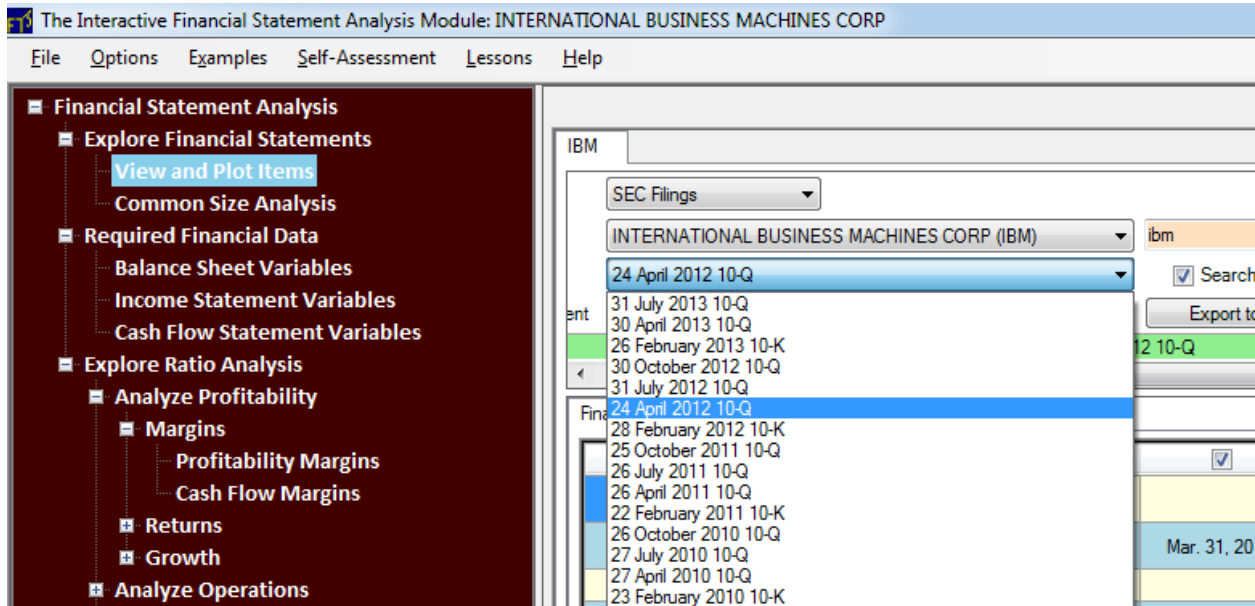
First, select the appropriate filing then select the statement (Consolidated Statement of Earnings) as follows:
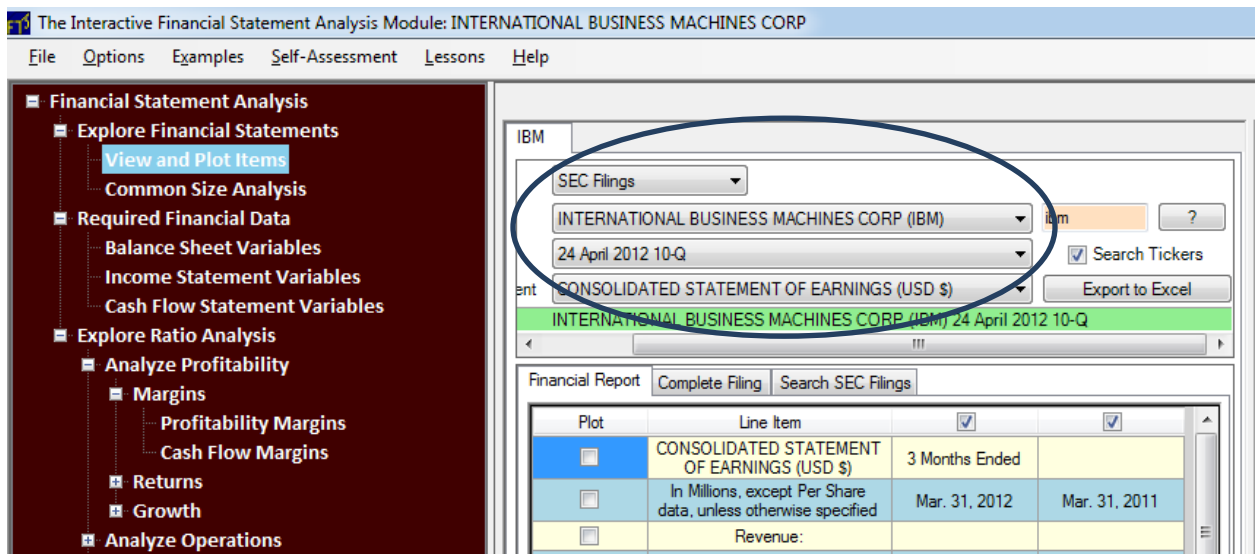
You can also export any of the above 10-Q or 10-K to excel by clicking on the Export to Excel button beside the circled part above.

Step 2: Applying the Forecasting Models:

For this step open the quarterly .csv file you saved for IBM in step 1.

	A	B	C	D	E	F	G
2	Fiscal year ends in December. USD in millions except	2012-06	2012-09	2012-12	2013-03	2013-06	TTM
3	Revenue	25783	24747	29304	23408	24924	102383
4	Cost of revenue	13502	13016	14137	12730	12792	52675
5	Gross profit	12281	11731	15167	10678	12132	49708
6	Operating expenses						
7	Research and development	1587	1534	1580	1644	1548	6307
8	Sales, General and administrative	5837	5908	5921	5577	6680	24087
9	Total operating expenses	7424	7442	7501	7221	8228	30394
10	Operating income	4857	4289	7666	3457	3904	19314
11	Interest Expense	117	124	109	94	98	425
12	Other income (expense)	421	909	273	243	338	1765
13	Income before taxes	5161	5074	7830	3606	4144	20654
14	Provision for income taxes	1280	1251	1997	574	918	4740
15	Net income from continuing operations	3881	3823	5833	3032	3226	15914
16	Other		1				
17	Net income	3881	3824	5833	3032	3226	15914
18	Net income available to common shareholders	3881	3824	5833	3032	3226	15914
19	Earnings per share						
20	Basic	3.38	3.36	5.19	2.72	2.93	14.22
21	Diluted	3.34	3.33	5.13	2.7	2.91	14.09
22	Weighted average shares outstanding						
23	Basic	1149	1137	1125	1114	1101	1119
24	Diluted	1162	1149	1136	1124	1109	1130
25	EBITDA	4857	4289	9091	4853	3904	25711

You can ignore the TTM column and focus on the quarterly numbers in columns B-F.

Forecast Model 1:

This is straightforward to apply because the forecast earnings (Q_{t+1}) is the simple seasonal random walk model ($Q_{t+1} = Q_{t-3}$).

Similarly, we can apply seasonal random walk to revenues (Revenue$_{t+1}$ = Revenue $_{t-3}$).

The forecast for June 2013 equals the quarterly earnings in cell B17 above is $3,881 (or EPS = 3,881/1114 = $3.48 using the latest available March weighted average shares outstanding) and for revenue this would be cell B3 = $25.783 billion.

The forecast for September 2013 equals the quarterly earnings in column C17 above is $3,824 and for revenue this would be cell C3 = $24.747 billion.

June Realized Earnings and Revenue:

At the time of writing this project description the September earnings are not known but the realized net income for the June quarter was $3,226 which fell short of this model's forecast. Similarly, the realized June quarter Sales revenue was also down 24.924 billion.

In the Post Earnings Announcement Drift literature the expected or predicted earnings for IBM is provided from a forecast model such as model 1 or 2 and the "Unexpected" part of earnings is the difference between Actual Earnings and the earnings predicted from a model (e.g., model 1 or 2). As a result, IBM has negative unexpected earnings and thus under PEAD IBM is predicted to have a negative drift given Model 1 applied to the June quarter.

Forecast Model 2:

Forecast model 2 requires a little more work to apply and we will again refer to the same Excel spreadsheet.

$$Q_{t+1} = Q_{t-3} + \alpha(Q_t - Q_{t-4}) + \delta$$

The above model exploits two additional properties associated with quarterly earnings. These properties are autocorrelation (change in earnings are correlated over time) and a permanent component to earnings (the firm has the capacity to repeatedly produce goods and services over time.

Estimating the Permanent Component (δ) for IBM

Given we are interested in the permanent component we will estimated this from "annual" not "quarterly" earnings. Recall we also generated the annual financial data generated in Step 1. Opening this file in Excel provides the following:

	A	B	C	D	E	F	G
1	INTERNATIONAL BUSINESS MACHINES CORP (IBM) CashFlowFlag INCOME STATEMENT						
2	Fiscal year ends in December. USD in millions e	2008-12	2009-12	2010-12	2011-12	2012-12	TTM
3	Revenue	103630	95758	99871	106916	104507	102383
4	Cost of revenue	57969	51973	53857	56778	54209	52675
5	Gross profit	45661	43785	46014	50138	50298	49708
6	Operating expenses						
7	Research and development	6337	5820	6026	6258	6302	6307
8	Sales, General and administrative	23386	20952	21837	23594	23553	24087
9	Total operating expenses	29723	26772	27863	29852	29855	30394
10	Operating income	15938	17013	18151	20286	20443	19314
11	Interest Expense	673	402	368	411	459	425
12	Other income (expense)	1450	1527	1940	1128	1917	1765
13	Income before taxes	16715	18138	19723	21003	21901	20654
14	Provision for income taxes	4381	4713	4890	5148	5297	4740
15	Net income from continuing operations	12334	13425	14833	15855	16604	15914
16	Net income	12334	13425	14833	15855	16604	15914
17	Net income available to common shareholders	12334	13425	14833	15855	16604	15914
18	Earnings per share						
19	Basic	9.07	10.12	11.69	13.25	14.53	14.22
20	Diluted	8.93	10.01	11.52	13.06	14.37	14.09
21	Weighted average shares outstanding						
22	Basic	1360	1327	1269	1197	1143	1119
23	Diluted	1382	1341	1287	1214	1155	1130
24	EBITDA	22838	23534	24922	26229	27036	25711

Again ignore the TTM column and compute the changes in Annual Earnings in Excel (C16-B16), (D16-C16), E16-D16), F16-E16) and take the average. This is:

16	Net income	12334	13425	14833	15855	16604	15914
17	Net income available to common shareholders	12334	13425	14833	15855	16604	15914
18	Earnings per share						
19	Basic	9.07	10.12	11.69	13.25	14.53	14.22
20	Diluted	8.93	10.01	11.52	13.06	14.37	14.09
21	Weighted average shares outstanding						
22	Basic	1360	1327	1269	1197	1143	1119
23	Diluted	1382	1341	1287	1214	1155	1130
24	EBITDA	22838	23534	24922	26229	27036	25711
25	Differences		1091	1408	1022	749	
26	Average	1067.5					

Annual Drift (δ) = 1,067.5 (Average of annual earnings' changes).

However, this is the average for the entire year and thus when forecasting a particular quarter we only need part of this average. As a result, for the June quarter we first compute what proportion (approximately) is the June quarter relative to annual earnings. Our latest observation of this comes from June 2012 quarterly earnings divided by the 2012 annual earnings.

The June quarter accounts for an average of 3881/16604 or 0.2337 of the permanent component.

$$Q_{t+1} = Q_{t-3} + \alpha(Q_t - Q_{t-4}) + \delta$$

Secondly, for the autocorrelation term (how the change in the seasonality term is correlated over time) we will use a constant estimated from the empirical literature which is 0.306. If you had sufficient quarterly time series data you could attempt to estimate this per firm but since aggregate autocorrelations are stable using a coefficient that has been estimated from aggregate data is usually preferred.

Collecting the results from the above discussion we can forecast the quarterly earnings for IBM from model 2 as follows (Q_{t+1} = June 2013, Q_t is march 2013, Q_{t-4} is march 2012 (obtained from the 10-Q using the FSA module above) and Q_{t-3} is the June quarter 2012):

Q_{t+1} = 3,881 + 0.306*(3,032 − 3,066) + 0.2337*1,067.5 = $4120

Under this forecast rule it is again clear that IBM's June forecast falls well short of the predicted number and again a negative PEAD is predicted for IBM.

Summary of the Analysis to Date

Model 1 – the time series forecast ignoring trend information provided the forecast of $3,881 million for IBM. This the easiest to apply to a large number of stocks.

Model 2 – the time series forecast incorporating the positive trend terms for IBM yielded $4,120.

Applying this model requires one additional step over model 1. This is, to compute the average of the change in annual earnings (e.g., computed from the last 5-years above equals $1,067.5 for IBM) and the relative proportion of the forecast quarter's previous years quarterly earnings divided by the previous year's annual earnings (= 0.2337 for IBM). That is, both of these numbers are estimated for each stock you consider. Finally, for the first coefficient you can use the constant provided, 0.306 as is used above.

Final Results from the Above Phase 1 Description

From the latest June 2013 quarterly results IBM has unexpected negative quarterly earnings error regardless of whether we use model 1 or model 2 and the PEAD phenomena would predict a negative drift relative to the general market for this stock over the current quarter.

Beat the Consensus Analyst Forecast

In Phase I you are to apply the above analysis to a set of stocks and in order to compare across stocks it is usually to compute a "Standardized Unexpected Earnings" (SUE) number. In this phase you do not know what the next realized earnings are and therefore your predicted SUE is computed relative to the *consensus analyst forecast*. That is, in this project you will compute the SUE by dividing the difference between *your predicted earnings and the consensus forecast* by the absolute value of the consensus analyst forecast quarterly earnings.

SUE (Prior to observing the realized earnings) = Difference between your predicted quarterly earnings and the consensus analyst forecast divided by the absolute value of the consensus analyst forecast

You can then rank SUE's for the set of stocks you are working with and then select your final long and short portfolios. This provides the % unexpected earnings relative to the consensus analyst forecasts and then you can rank your sample of firms based on the % unexpected earnings from high to low.

The above provides an objective ranking that is free from personal bias. In practice analysts "tinker" introducing additional information into their forecasts – the most obvious being current information. You can do this as well if you want to modify your "objective" ranking but *you should be very careful if you do so that you are not introducing personal biases into your forecasts*.

Important Note on the Consensus Analyst Forecast: You can use any of the usual set of sites for getting consensus forecasts (e.g., Bloomberg, Morningstar, Reuters, Yahoo Investor, MSN Investor, Zacks, Earnings' Whisper and so on).

Summary: Applying Phases I and II to your sample of stocks

1. Each forecast needs to be made prior to the quarterly earnings announcement date.
2. Prior to the implementation phase of the project compute the SUE from your earnings forecast model relative to the consensus analyst forecast as described above in the section titled "Beat the Consensus Analyst Forecast." That is, you are ranking your stocks based upon your "predicted surprise."
3. If any of your stocks have a subsequent realized earnings announcement during the implementation phase of the project then record this information and compute the "realized SUE" for these stocks using your forecast and the realized quarterly earnings in the place of the consensus analyst forecast. This provides additional relevant information for you final report if this occurs.
4. You need to build a portfolio of stocks so that you diversify away unsystematic sources of risk associated with forecasting quarterly earnings. Ideally you would like approximately fifteen stocks in your portfolio but you will get the benefits from diversification with two or more stocks.
5. You can form your portfolio based upon the SUE rankings or you can determine your own rankings using additional criteria (e.g., current information) subject to the warnings about introducing personal biases into your forecasts.

Phase II: PEAD Trading on your Forecasts

The objective of this phase is to draw upon your analysis of multiple stocks from Phase I and form two portfolios of stocks. Portfolio A is predicted to outperform a general market index and portfolio B is predicted to underperform the same general market index. You will take long positions in portfolio A stocks and short positions in portfolio B stocks using the RTFTS Client.

PEAD Based Trading Strategy

The pure PEAD based trading strategy breaks the population of stocks analyzed into deciles and then goes long the top 10% and simultaneously short the bottom 10%. Given your sample size you will

probably want to modify this to use quintiles (i.e., top/bottom 20%). For example if you have analyzed 40 stocks then your long portfolio will consist of 8 stocks and similarly for your short portfolio. This is because diversification is important and we are interested in aggregate behavior.

Practical Trading Note

Given the time constraints imposed upon a class project your implementation phase may include stocks that provided their realized earnings immediately prior to the start of the implementation phase. So practical considerations may imply that if the implementation phase starts on mm/dd/yyyy but a subset of stocks announced earnings prior to the starting "mm/dd" then you should still include these stocks in your implementation phase because you still predict that they will drift up (or down) during the current quarter. You can isolate these stocks when reporting your results. Similarly, only some of your stocks may report during the implementation phase which means that question 3 will only apply to a subset of stocks.

In other words you will need to apply some judgment when deciding how to implement your strategy within the time constraints of a course project.

Project Report

Report Requirements

Your presentation and report should answer the following questions.

Question 1 (Strategy and Returns): Describe briefly how you formed your long/short portfolios. This should include what practical issues you faced when implementing this strategy, the sample of stocks you considered, the final set of stocks selected, plus what if any, modifications to the ranking of stocks criteria you used. That is, what was your team's strategy for constructing your two portfolios A (stocks held long) and B (stocks held short) given the time constraints imposed by this project?

Question 2 (Market Risk): The performance of your long/short portfolios, are predicted to be independent of the general market. However, as a further measure of sensitivity to the general market record the beta of each of your stocks (you can use the RTFTS betas or any of the popular web finance sites such as Bloomberg, MSN Investor, Google Finance or Yahoo Finance to look up beta) and compute the beta of your two portfolios (set A stocks and set B stocks). What is your net portfolio beta (i.e., long stocks less short stocks weighted by the relative value proportion of each stock position in the portfolio). For example, if your long stocks have a portfolio beta equal to 1 and your short stocks have a portfolio beta equal to 1 then the combined portfolio if it is of equal value has beta equal to 0 which is market neutral. Otherwise your net portfolio will have some positive or negative beta.

Question 3 (Realizations): How did your portfolio perform? Here your analysis can cover multiple measures. These should include the following. First, did it make or lose money relative to the broad based benchmark such as the S&P500 index? Second, was it's return performance relative to a broad based market benchmark (such as the S&P 500) consistent with the net portfolio beta estimated in

question 2? Finally, and most importantly was it consistent with the predictions from the PEAD anomaly?

You should provide both numerical and graphical support for your analysis.

Question 4 (Depending on your stocks): In this project if your stocks announced their quarterly earnings during the implementation phase of the project then you were also required to record this information. What was the realized return performance of these stocks around this announcement period.

Question 5: Based upon your answers to questions 3 and 4 were your results consistent or inconsistent with the PEAD anomaly defined relative to time series forecast rules? Provide reasons in support of your answer. **Bottom line** who performed better – your forecasts using models 1 and 2 or the consensus analyst forecasts?