

THE PENNSYLVANIA STATE UNIVERSITY  
SCHREYER HONORS COLLEGE

DEPARTMENT OF FINANCE

ANALYZING IMPACT OF FORECAST REVISIONS ON QUARTERLY  
EARNING ANNOUNCEMENTS

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Spring 2011

A thesis  
submitted in partial fulfillment  
of the requirements for  
a baccalaureate degree  
in Finance  
with honors in Finance

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ABSTRACT

ANALYZING IMPACT OF FORECAST REVISIONS ON QUARTERLY EARNING  
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The accuracy of sell side research analysts has always been put into question. While the market has an understanding of the inaccuracy of research analysts, it is still subject to behavioral biases that can lead to over-optimism and over-pessimism in the marketplace. This thesis attempted to find a trading strategy to take advantage of possible overreaction in the equity markets. While the study failed to find a successful trading strategy, analysis did find that during an earnings announcement, stock prices will move in the opposite direction of stock price movement and EPS estimate changes throughout the quarter if they were large magnitude changes (greater than 8%) about 2/3 of the time. This suggests that options could be a useful portfolio hedge prior to earnings announcement, providing a cheap form of insurance against adverse price movements. It also confirmed that analysts exhibit a positive bias in their EPS forecast estimates. Finally, the thesis suggests re-conducting the analysis utilizing a highly specified data set, such as small-mid capitalization stocks with low analyst coverage.

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## Chapter I: Introduction

Research analysts on Wall Street have always been criticized due to the accuracy of their forecasts, or lack thereof. An important source of information for capital market participants, it has been shown that analysts have a tendency to overreact and are subject to behavioral biases, much like any other person. Debondt and Thaler [1] found this assertion to be true, when analyzing the behavior of research analysts. They concluded that research analysts have similar tendencies to undergraduate students and cannot escape certain behavioral biases. Given that, sell-side research is an important piece of information for price discovery, understanding how the market interprets research notes, could also help develop an understanding of the expectations and sentiment related to a stock.

Earnings announcements have been shown to be a catalyst for price discovery in the capital markets [7]. Earnings announcements occur every quarter and will typically provide new information for market participants or help confirm what is already known. Earnings announcements can also be associated with extreme volatility, if a company does not meet the expectations set forth by the market. Most analysis related to analyst forecasts and extreme price movements in a stock have focused on the long-term repercussions, while few have focused on the short-term effects. None have focused on how it might impact the movement of a stock on the day a company announces earnings.

Analyzing how research analysts change their earnings per share forecasts and how the market interprets these changes (subsequent price movement due to forecast changes) between one earnings announcement and the next could provide some relevant data in predicting how a stock will react on the day it announces earnings. In this thesis, I will analyze stock price movement during earnings announcement and see if there is any

relationship to how analyst forecasts and market sentiment changes throughout a quarter to determine if there can be a relevant trading strategy developed by exploiting these factors. Also, insider trading prior to earnings announcements and post earnings announcement drift immediately after earnings announcements will be explored.

The following section provides a basic overview of Wall Street, the equity markets and the role of research analysts in the equity markets. In Chapter III, previous studies pertaining to research analyst forecasts and market sentiment are analyzed in order to develop a framework for the hypothesis. In Chapter IV, motivations for the research and the development of the hypothesis from prior studies are portrayed. Chapter V provides the data and methodology, while Chapter VI analyzes the data and summarizes the main findings of the thesis and the possible implications of it for market participants. This section also discusses how the findings in this thesis relate to some of the previous studies analyzing analyst forecasts. Finally Chapter VII summarizes some of the main conclusions, while also analyzing how the study could be improved in the future, based on the findings from this thesis.

## Chapter II: Wall Street

August 12<sup>th</sup> 2010 after market close: Cisco Systems Incorporated (CSCO) announces quarterly earnings-per-share (EPS) of \$0.43 versus analyst expectations of \$0.42. This seems to be good news. Upward EPS revisions by analysts over the past quarter have probably caused market expectations for CSCO to rise.

August 13<sup>th</sup> 2010: The market has a different interpretation of this news story. Cisco Systems' stock trades down 9.99%, erasing billions of dollars in shareholders wealth in a single day. Questions abound related to Cisco. The company's future outlook does not meet the market's expectations. Were the analysts too rosy with their predictions? How does a company worth more than some small countries lose 10% of its value in one day? Will it recover?

The capital markets play a vital role in any economy, providing liquidity and capital to individuals and corporations that normally would not have access to these resources needed to preserve and grow wealth, as well as growing and maintaining some of the largest corporations in the world. Drastic events like the one above help portray the state of the economy and give the world a better understanding of everything that is going on within it. The example is just a small, but important, portrait of daily capital market activity. The realm of the world known for controlling capital market activity, at least in the United States of America, is known as Wall Street. Gaining a strong understanding of Wall Street is vital to not only understand why CSCO's stock reacted the way it did, but also to see if there is anything to learn from it and possibly profit from it in the future.

## Wall Street

Wall Street has always played an important role in society: allocating capital, providing liquidity, developing advisory services, helping thousands of people and businesses improve their lives in providing services for wealth preservation, retirement saving and providing the necessary capital to foster and grow a business. Known for much criticism, Wall Street provides services that are necessary to maintain and improve the health of the economy and society.

Larger firms that help provide these services to institutions and individuals such as, Goldman Sachs, Morgan Stanley, JP Morgan, Bank of America Merrill Lynch and Citigroup, are vital to fully functional capital markets. Without them, the flow of capital, or lack thereof, would trigger instantaneous negative economic impacts across the globe. Understanding the entire financial system deeply is impossible for one single person to do, given the breadth and nature of various products, ranging from the most simple stock to complex financially engineered structured products. This thesis focuses primarily on the equity (stock) market, in an effort to gain an understanding of the stock market, the services that Wall Street provides to the stock market, and determining if there can be a profitable trading strategy rendered based off earnings announcements, much like the example highlighted above with Cisco Systems.

There are numerous functions that Wall Street provides in the equity markets, most of which can be broken down into three primary categories:

- **Investment Banking:** Investment banking provides capital raising and business advisory services to corporations around the globe in an effort to help businesses

grow and reach new heights. In the equity markets the main capital raising service it provides is an initial public offering (IPO), where a company will sell ownership, shares, in exchange for capital (money) to grow the business. From an advisory standpoint, investment bankers provide advice on whether a company should buy back stock or issue dividends, paying out income to shareholders.

- **Sales & Trading:** Sales and trading is essential to price discovery of financial assets and linking buyers and sellers of financial products, thus providing liquidity in financial markets that is essential for fully functioning financial markets. In the equity markets salesman and traders help link buyers and sellers of shares of stock, while also taking speculative positions of their own based on their future expectations of a company. In doing so, they help determine the price of the shares of stock, which are traded daily and are monitored by billions of individuals a day.
- **Asset Management:** Asset management comprises of numerous functions including wealth preservation and retirement solutions, mutual fund management and investment strategy. It also encompasses numerous alternative investment strategies such as hedge funds and private equity funds. All of these services allow investors to put their money to work by investing in both public and private financial products, investments and businesses. In the equity world, asset managers are the individuals who are buying and selling stocks on a daily basis, utilizing the salesman and traders highlighted above. They are the individuals who would be most exposed to the Cisco story revealed at the beginning of the thesis. Typical investment vehicles used for equities include mutual funds and hedge funds, each of which has a different and unique strategy to attempt to turn a profit in the markets.

The combination of all these services provides the fuel that is necessary for fully functioning financial markets. They all work together to help allocate capital and provide liquidity to develop solutions for institutions and individuals.

### **What is a Stock?**

In order to fully understand the inner workings of the stock market, it is vital to define exactly what a stock is and the role that it plays in the world of finance. A stock, more commonly referred to as equity, represents residual ownership in a business or company, after deducting all company liabilities from its assets. Essentially, a share of stock represents ownership in a company and has the benefits of voting rights, as well as participating in the successes or failures of a company (price of a stock going up or down) in exchange for capital that a company uses to finance its operations or investments to grow.

Once a company issues ownership or stock in its company during the IPO process with the help of investment bankers, these shares of stock can be freely traded as market participants debate and determine the value of the company in a free market environment. The value of these stocks, or prices, fluctuate on a daily basis, as news about the overall economy and company itself are released, affecting how the market perceives the future prospects of the business. Stock prices in the market are determined based on future expectations of a business, specifically related to its income, cash flow and returns to shareholders. Fluctuations in the prices of a stock, offer investors an opportunity to capitalize on the appreciation of stock prices, should the company continue to improve and execute upon its stated strategies and goals. The appeal of possible appreciation of capital is what will drive investors to make investments in the shares of these companies.

Betting against a stock is also a possibility. Known as shorting, this is when someone borrows stock from someone else and sells it on the open market. This is the opposite of going long, or when someone is betting that a company will do well in the future. The co-existence of long and short equity trading can help facilitate trading strategies, much like the one that will be explored in this thesis. Determining what stocks to be long and be short is an extremely complicated process and is not done without the help of numerous individuals, including research analysts, who help set market expectations, much like the \$0.42 in earnings-per-share that was expected of Cisco Systems on August 12<sup>th</sup> 2010.

### **Role of Research in Financial Markets**

Not everyone has the time or the expertise to analyze the fundamental aspects of a business and its future prospects. These jobs are typically filled by research analysts, who will cover specific industries and provide commentary on a certain sector of stocks due to their expertise, time to dedicate to analyze information and their access to management. Research, typically under the sales and trading umbrella of Wall Street, aids in the price discovery process by writing reports after extensive qualitative and quantitative analysis of a company and its future business prospects. Within written research reports, will typically be estimates of the future financial condition of a company based on future growth prospects, economic and business outlook. After analyzing a business and making estimates, analysts will make recommendations on whether or not they believe a stock should be bought or sold.

All of these estimates and predictions that are developed are synthesized and interpreted by the market to further the price discovery process. In doing so the market now

has summarized quantitative metrics that can be used to develop an opinion of the future prospects of a business. One of the most important quantitative metrics that research analysts provide is earnings-per-share (EPS) estimates. This is simply the net income of a company in a given year divided by the number of shares outstanding. These estimates help define the typical market sentiment behind a stock and the mean of these estimates is what a company is judged against when announcing quarterly earnings, as seen in the Cisco example.

While it is impossible to boil down the future prospects of a business to one number, how these estimates change throughout a quarter can show how market sentiment for a company is changing. Increased market sentiment, might set higher expectations for future growth initiatives and while they may be hard to quantify, qualitative expectations are always there. The movement of these estimates throughout a quarter of business operation can have a significant impact on the perception of the stock to market participants. Analyzing how these estimates change throughout a quarter can help determine market feelings and maybe even predict future stock price movements, which is what the crux of the thesis is about.

### **Valuation Methods**

In the end, just being able to say that a market participant likes one company and its stock because of its future growth prospect is not enough, there needs to be a theoretically quantitative value associated with these expectations. One of the main goals for all market participants is price discovery and being able to assign a value to the financial assets that are being traded. Assigning a potential value, based on the future prospects of a business, provides the basis for investment and capital flows into different

companies. There are numerous methods that are used to determine the potential value for a company in the equity markets. Research plays a vital role in the valuation process by providing the quantitative basis for these valuation methods.

- **Discounted Cash Flow (DCF):** A discounted cash flow model is one of the simplest valuation methods that can be used in equity valuation. It involves projecting the future free cash flow for a company and discounting those cash flows at a discount rate. Free cash flows are used because it is believed that this is the cash that will be available to a business to grow or to return value to shareholders. The concept of discounting relates directly to the time value of money, a basic tenet of finance, whose basic idea is that a dollar today is worth more than a dollar tomorrow. A discount rate takes into account the risks of achieving those future cash flows and the likelihood that they will be achieved. Dividing future cash flows by the discount rate brings the cash flows into present value, so that market participants can analyze what the cash flows are worth today. Once the cash flows are projected, discounted and aggregated, enterprise value is derived. Subtracting net debt (debt – cash) from enterprise value gives total projected equity value, which is divided by shares outstanding, to arrive at a projected equity value per share. While easy to understand, the main weakness of the DCF is that it is based on numerous predictions and projections of quantitative factors that can be nearly impossible to predict. Nonetheless, it is still a valuable valuation metric that is used in equity markets to predict the potential value of a share of equity for a company.
- **Dividend Discount Model (DDM):** The dividend discount model was one of the first equity valuation methodologies developed. The basis for this model is that the

value of a company is dependent on the amount of cash that it returns to shareholders. This is commonly referred to as a dividend, which is a payment of income to shareholders. The process involves projecting the future dividends of a company and discounting them at a discount rate, similar to the one utilized in the DCF model, and aggregating them to arrive at a value for the equity. While it makes sense, the DDM operates under the assumption that a company is only worth its future distributions to shareholders. But not all companies issue dividends, which is the main drawback to the valuation method.

- **Comparable Analysis:** Comparable analysis is a very popular valuation methodology because of how quickly it can be done and because of its simplicity. It involves comparing similar companies in an industry to each other to help determine value. Looking at common metrics within an industry, such as current stock price to earnings ratio (P/EPS) or enterprise value to EBITDA (earnings before interest, taxes, depreciation and amortization) allow for quick comparison of companies. Certain companies will have higher ratios due to better future prospects, strong management, being innovators in an industry or a penchant for strong financial performance. Regardless of the metric used, comparable analysis involves determining a normalized value for these ratios and applying them to a specific company to determine value. For example, projecting a company to earn \$4 in earnings per share (EPS) and assuming a normalized P/E ratio of 15 based on historical and industry trends, would yield a value of \$60 per share for a company, which was derived by multiplying the projected EPS by its normalized P/E ratio.

- **Sum-of-the-Parts:** The sum-of-the-parts is a common valuation methodology for companies that have numerous business units that span different industries. It comprises breaking apart the different business units in a company and determining future cash flows or earnings for each business unit and conducting a comparable analysis, similar to what was described above, for each unit. They are then summed together to arrive at a projected value per share.

Given these four valuation methodologies, it is easy to see, that being able project the future prospects of a company is of vital importance in being able to value a company. This is why research analysts can be very vital in the process of price discovery because their industry knowledge and expertise, along with quantitative skills allow them to project metrics that are used.

That being said, being able to accurately predict how much a company is going to earn in three, four or five years is an impossible task, which is why the accuracy of these projections is always in question. It is easy to see that analysts are not always right and that it might be possible to develop trading strategies to take advantage of these inaccuracies could yield profitable trading strategies. This can be done by analyzing some of the behavioral biases that analysts have been shown to exhibit. This thesis seeks to analyze a potential trading strategy, utilizing analyst estimates as an indicator of market sentiment, to see if investor psychology can play a role in helping to predict stock price movements on days of earnings announcements.

## Chapter III: Previous Studies

In an effort to understand how earnings forecasts impact market sentiment and subsequent stock price movement and reaction, it is beneficial to observe previous studies that have looked at some combination of the following: analyst estimates and the market reaction to them, stock price movement and market sentiment related to it and possible biases inherent within the research space, in order to gain an understanding of how a stock might trade in both the long and short term when subjugated to such market forces. In order to do this, it is important to look at some of the earliest work done on the various subjects and how the studies have evolved over time to show us what we do know. In doing so, we can hopefully gain an understanding of events similar to the one that occurred with Cisco Systems on August 13<sup>th</sup> 2010.

### *Analyst Bias*

Debondt and Thaler in *Does The Stock Market Overreact?* (1985)<sup>1</sup> found evidence for their overreaction hypothesis: “(1) Extreme movements in stock prices will be followed by subsequent price movements in the opposite direction. (2) The more extreme the initial price movement, the greater will be the subsequent adjustment.” They also found that this effect was more pronounced for losers than for winners. This was one of the first pieces of work done in relation to the psychology of the stock market to show that there is overreaction related to stock price movements. This also helps set the stage for a portion of the hypothesis for the thesis, which postulates that extreme price movements on a quarter-over-quarter basis can have some predictive value on short term price movement.

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<sup>1</sup> Werner F.M. De Bondt and Richard Thaler, “Does The Stock Market Overreact?” The Journal of Finance 28 December 1985: 793-805

In a follow up paper entitled *Further Evidence on Investor Overreaction and Stock Market Seasonality* (1987)<sup>2</sup> they found further evidence to support the overreaction hypothesis as well as evidence to suggest that “the earnings of winning and losing firms show reversal patterns that are consistent with overreaction.” This implies that earnings expectations play a role in determining the reaction to stock price movement and subsequent reversal after extreme price movements. It also begins to call into question the security analysts in the market who are setting these expectations and estimates for these companies. This study ties in another point of influence for the hypothesis, which aims to analyze whether earnings estimates can have predictive value.

Subsequently they studied security analysts and their tendencies in their paper *Do Security Analysts Overreact?* (1990)<sup>3</sup> and found that “the same pattern of overreaction found in predictions of naïve undergraduates is replicated in the predictions of stock market professionals. Forecasted changes are simply too extreme to be considered rational.” This study brought to light the fact that security analysts are indeed not perfect and that they are subject to overreaction to extreme stock price movements. This study confirms some of their previous thoughts on the issue and lends credence to the fact that utilizing their estimates and analyzing their patterns could have some value in predicting how a stock might trade on the day that it announces earnings.

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<sup>2</sup> Werner F.M. De Bondt and Richard Thaler, “Further Evidence on Investor Overreaction and Stock Market Seasonality” The Journal of Finance 28 December 1986: 557-581

<sup>3</sup> Werner F.M. De Bondt and Richard Thaler, “Do Security Analysts Overreact” The American Economic Review May 1990: 52-57

In a study conducted by Michelle Clayman and Robin Schwartz entitled *Falling in Love Again: Analysts' Estimates and Reality* (1994)<sup>4</sup> they found that analysts have an overestimation bias, which could be explained by analysts falling in love with their stocks . They found that estimates of full year earnings at the beginning of the year were 57.1% higher than actual earnings at the end of the year. This further showed that analyst predictions of earnings have biases to them that prevent complete objectivity. This was confirmed by Vijay Chopra in his paper *Why so Much Error in Analysts' Earnings Forecasts* (1998)<sup>5</sup>, where he confirmed that analysts EPS and EPS growth forecasts tend to be overly optimistic, but also found that their predictive ability was further diminished during an economic downturn: “their tendency to forecast in a narrow and comfortable range, and the business cycle can prove to be the bane of their forecasts. [...] Therefore, although the quality of forecasts has improved since 1992, it will deteriorate if and when the U.S. economy slows down and reverts to historical cyclical pattern.” This directly confirms positive bias in analysts' forecasts relative to actual company results, further suggesting that the movement of analyst estimates, especially during an economic downturn and subsequent recovery, might have some predictive value on prices, but first it is important to understand how the market reacts to such changes.

### *Market Sentiment*

In order to understand how the market interpreted these changes Michael Ho and Robert Harris in their paper *Market Reactions to Messages from Brokerage Rating Systems*

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<sup>4</sup> Michelle Clayman and Robin Schwartz, “Falling in Love Again: Analysts' Estimates and Reality” Financial Analysts Journal September 1994: 66-68

<sup>5</sup> Vijay Chopra, “Why so Much Error in Analysts' Earnings Forecasts?” Financial Analysts Journal November 1998: 35-42

(1998)<sup>6</sup>, examined the 3, 4 and 5 tiered rating structures of sell side research firms and concluded “that all rating systems exhibit a preponderance of upgrades to downgrades. The evidence further suggests that adding rating categories gives analysts “wiggle room,” which they use to avoid explicitly stating negative recommendations. [...] Prices react significantly to rating changes, and reactions to downgrades typically are larger than those to upgrades.” This study suggested a couple things: first, it confirmed the positive bias that security analysts have that Clayman and Schwartz found in 1994; second, it suggests that the market was aware of this positive bias to an extent and thus had a more profound reaction to downgrades.

In terms of analysts role in the price discovery process, since the information they provide is part of what the market considers when pricing a stock, Cristi Gleason and Charles Lee in their paper *Analyst Forecast Revisions and Market Price Discovery* (2003)<sup>7</sup> found a few interesting things:

“First, the market does not make a sufficient distinction between revisions that provide new information and revisions that merely move toward the consensus. Second, the price adjustment process is faster and more complete for “celebrity analysts” than for more obscure yet highly accurate analysts. Finally a substantial portion of the delayed price adjustment occurs around subsequent earnings-announcement and forecast-revision dates. Collectively these findings show that more subtle aspects of an earnings

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<sup>6</sup> Michael Ho and Robert Harris, “Market Reactions to Messages from Brokerage Rating Systems” Financial Analysts Journal January 1998: 49-57

<sup>7</sup> Cristi Gleason and Charles Lee, “Analyst Forecast Revisions and Market Price Discovery” The Accounting Review January 2003: 193-225

revision signal can hinder the efficacy of market price discovery, particularly in firms with relatively low analyst coverage, and that subsequent earnings-related news events serve as catalysts in the price discovery process.”

This showed a couple things. Some pieces of information are more valuable than others, although it does not seem as though the market always interpreted it that way, as they gave more credence and put more weight on what the celebrity analysts had to say. But it also showed that *an earnings announcement can serve as a catalyst in the price discovery process*. They also suggested “that the price discovery process, at least as it pertains to analyst forecast revisions, is complex and protracted, and deserving of more scholarly attention.”

Gus De Franco and Ole-Kristian Hope further confirmed the role of research analysts in the price discovery process and their impact on the capital markets. Their findings were documented in the study *Do Analysts’ Notes Provide New Information?* (2009)<sup>8</sup>, where they found “strong evidence that analyst notes are informative for capital market participants. Specifically, we find both statistically significant and economically meaningful stock market reactions to analyst notes. This result holds after controlling for numerous major firm disclosures and previously documented analyst disclosures.” This just highlights the fact that the role that analysts play is very important and that the market does take into account what they have to say, even though they can be inaccurate at times. This

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<sup>8</sup> Gus De Franco, Ole-Kristian Hope “Do Analysts’ Notes Provide New Information” Journal of Accounting, Auditing and Finance August 2009: Forthcoming

thesis is an attempt to exploit these inaccuracies, by examining market sentiment through the movement of analyst estimates and stock price movement over a quarter.

### *Analyst Inaccuracy & Market Inefficiency*

In their paper, Jennifer Conrad, Bradford Cornell, Wayne Landsman and Brian Rountree, examined *How Do Analyst Recommendations Respond to Major News?* (2006)<sup>9</sup>. In doing so they found that analysts were just as likely to upgrade or downgrade after large positive movements in a stock price, but more likely to downgrade after negative price movements, indicating a confirmation bias of sorts. In regards to analyst reaction to earnings announcements they found that “58% of recommendation changes occur in the three days immediately following the earnings announcement,” meaning that there is a significant error in many forecasts prior to earnings, suggesting that there could be some information that could be gleaned from analyst forecasts prior to an earnings announcement.

In *Does Past Success Lead Analysts to Become Overconfident?* (2011)<sup>10</sup>, Gilles Hilary and Lior Menzly, found that “analysts who have predicted earnings more accurately than the median analyst in the previous four quarters tend to be simultaneously less accurate and further from the consensus forecast in their subsequent earnings prediction. [...]Our findings are consistent with an attribution bias that leads analysts who have experienced a short-lived success to become overconfident in their ability to forecast future earnings.” This over-confidence is consistent with the fact that analysts tend to have a positive bias, but it also helps prove another point. As the market absorbs the information

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<sup>9</sup> Jennifer Conrad, Bradford Cornell, Wayne Landsman and Brian Rountree, “How Do Analyst Recommendations Respond to Major News?” *The Journal of Financial and Quantitative Analysis* March 2006: 25-49

<sup>10</sup> Gilles Hilary, Lior Menzly “Does Past Success Lead Analysts to Become Overconfident?” February 2011

and predictions made by over-confident analysts, the lack of accuracy in these predictions can lead to market inefficiency in the short term. Earnings announcements are typically a time for new information to enter the market, or an opportunity to confirm or reverse previous predictions. Since over-confident analysts tend to be inaccurate after some time, the information they provide in the short term, could provide an opportunity to take advantage of possible market inefficiency.

Mei Feng and Sarah McVey found further evidence of possible inefficiencies in the market in the short-term due to analyst forecasts. In *Analysts' Incentives to Overweight Management Guidance When Revising Their Short-Term Earnings Forecasts* (2009)<sup>11</sup> they found that “analysts sacrifice their forecast accuracy by overweighting management guidance, they appear to benefit, on average, by subsequently gaining the underwriting business for their banks. Thus, while analysts wishing to please managers are optimistic in their long-term earnings forecasts, they take their cue from management when determining their short-term earnings forecasts.” It lends more credence to the fact that analysts can be influenced and that they have bias in their forecasts, creating inefficiency in the short-term.

Many previous studies on future price reactions to extreme price movements (DeBondt & Thaler) or analyst forecasts only observe how price moves in the long-term but not the short term. Given the possibility of analyst bias leading to inefficiency in the short term, it would be relevant to analyze stock price movement in the short term.

All of these papers confirm a couple things: security analysts are not always accurate in their projections; the market understands that there is a positive bias in analyst

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<sup>11</sup> Mei Feng, Sarah McVey “Analysts’ Incentives to Overweight Management Guidance When Revising Their Short-Term Earnings Forecasts” The Accounting Review December 2009

forecasts, which can make it hard to quantify the downside, lending to more credence for negative downgrades; economic downturns cause an even greater level of inaccuracy in analyst forecasts; earnings announcements and the days prior to it can serve as significant catalysts for stock price movement.

In their paper *When Are Analyst Recommendation Changes Influential* (2009)<sup>12</sup>, Roger Loh and Rene Stulz, found that only 12% of recommendation changes are influential, a change that affects the stock price significantly enough to be detectable, and that star analysts are more likely to make influential recommendation changes. They also found that impactful research tends to show through recommendation changes and not an earnings forecast. This is not surprising for a few reasons: the tendency for there to be a positive bias in forecasts means it is likely that many forecast revisions are skewed in the direction of current consensus, leading to very little impact; also, since many changes come after earnings, when there is greater transparency, changes within the quarter may not elicit impactful reactions from the market other than confirming current market sentiment, which may or may not be correct. The confirmation of current market sentiment, might lead to overestimation and over-optimism in the market that may be unwarranted, prior to earnings announcements.

In *Sell-Side Analyst Research and Stock Comovement* (2009)<sup>13</sup> Muslu, Rebello and Xu found facts about how stocks within an industry have correlated movements, particularly in relation to movement to sell-side research. They found that “compared to

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<sup>12</sup> Roger Loh, Rene Stulz “When Are Analyst Recommendation Changes Influential” Review of Financial Studies May 2009

<sup>13</sup> Volkan Muslu, Michael Rebello, Yexiao Xu “Sell-Side Analyst Research and Stock Comovement” December 2009

analysts covering only one stock in a pair, analysts covering both stocks are relatively more active and expect future earnings to be more correlated. Our results suggest that common coverage and increased activity by analysts with common coverage raises return correlation by increasing investor perceptions of shared exposure across stocks.” The basic précis is that the market extrapolates data that may not be 100% relevant to another company within the industry, creating a possibility for inefficiency in the short term. For example, if one company in an industry had their earnings estimates revised upward, for another company to co-move with it based on the fact that the entire industry may be better off, could be the wrong assumption. One company may have their earnings revised upwards because they are taking business away from other competitors. The possibility of this happening, while still causing a comovement within the two stocks, could be an inefficiency that the market develops, as they found that it increased investor perception of shared exposure.

While Loh and Stulz did not explicitly prove the value of earnings based estimate changes, Ambrus Kecskes, Roni Michaely and Kent Womack in *What Drives the Value of Analysts' Recommendations: Earnings Estimates or Discount Rate Estimate* (2010)<sup>14</sup> found that “both the initial price reaction and the drift after recommendation changes are between 50% to 200% bigger for earnings-based recommendation changes than for discount rate-based recommendation changes. Trading on earnings-based recommendation changes earns average risk-adjusted returns of over 3% per month over the period 1994-2007.” This was one of the first studies done that showed that developing a trading strategy based on

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<sup>14</sup> Ambrus Kecskes, Roni Michaely and Kent Womack, “What Drives the Value of Analysts' Recommendations: Earnings Estimates or Discount Rate Estimate” June 2010

changing analyst estimates can yield above average risk-adjusted returns, which is the goal of any institutional money manager.

Lynn Rees developed a model to predict whether or not a firm will meet its earnings forecast estimates and how the market will react to it in the paper *Equity Return Performance from a Prediction Model of Meeting or Missing Analysts' Forecasts* (2010)<sup>15</sup>. She found that a “prediction model applied to quarterly data in a recent time period is profitable.” In applying this strategy from 2003 – 2007 it generated returns in the range of 17–23%. She proves that a trading strategy can be based upon trying to predict the market reactions to earnings. However, the returns that she found existed over a three to six month time period. This thesis will aim to develop a trading strategy based on the movement of EPS forecasts and share price movement throughout the quarter and use it as a proxy for market sentiment, but the proposed strategy in the thesis would be very short term in nature and would focus on daily returns, as opposed to returns over a longer time horizon.

### *Market Response*

This was further confirmed in *Can Analysts Surprise the Market? Evidence from Intraday Jumps* (2010)<sup>16</sup>, by Daniel Bradley, Jonathan Clarke, Suzanne Lee and Chayawat Ornthanalai, found that “analysts’ recommendations are more likely to cause jumps than earnings announcements and market-wide events, while recommendations are about as likely to cause jumps as management guidance” further proving that the market does take

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<sup>15</sup> Lynn Rees “Equity Return Performance from a Prediction Model of Meeting or Missing Analysts’ Forecasts” The Journal of Investing Spring 2010: 52-66

<sup>16</sup> Daniel Bradley, Jonathan Clarke, Suzanne Lee and Chayawat Ornthanalai, “Can Analysts Surprise the Market? Evidence from Intraday Jumps” July 2010

into account analyst earnings recommendations and how they change throughout the quarter, as they can play as pivotal a role as when a company itself announces guidance.

It is also important to consider the effects of an improvement in earnings or positive profits. In their paper, *The Market's Reaction to Unexpected Earnings Thresholds* (2011)<sup>17</sup>, Herrmann, Hope, Payne and Thomas, found that reporting a profit or reporting an increase in earnings did not “elicit a differential response by investors,” showing that just a nominal increase in profits is not enough to elicit a market reaction. Instead, it is how a firm performs relative to its expectations that will determine how the market will engage in the price discovery process. It is these expectations and how they change over the quarter that will shape market sentiment.

A very interesting discovery was made by Hwang, Li & Tong in *Are Analysts Whose Forecast Revisions Correlate Less with Prior Stock Price Changes Better Information Producers and Monitors?* (2011)<sup>18</sup> when they observed analysts that make revisions in the opposite direction of prior stock price movement. Using a system entitled PPI, where a higher PPI means an analyst makes revisions opposite to that of recent stock price movement, found that “stock price impacts of forecast revisions issued by analysts with higher PPI are larger than those issued by analysts with lower PPI. [...] These results are consistent with the hypothesis that analysts with higher PPI are better information producers since they provide greater information value not only to investors, but also to managers and boards of directors.” This is another important point. Going against recent

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<sup>17</sup> Don Herrmann, Ole-Kristian Hope, Jeff Payne, Wayne Thomas “The Market's Reaction to Unexpected Earnings Thresholds” *Journal of Business, Finance & Accounting* March 2011: 34-57

<sup>18</sup> Chuan-Yang Hwang, Yuan Li, Yen Tong “Are Analysts Whose Forecast Revisions Correlate Less with Prior Stock Price Changes Better Information Producers and Monitors?” March 2011

stock price movement, especially if it is extreme in nature, could be very valuable, as it aids in the information and price discovery process. Since going against stock price movement, can provide better information, then looking at the direction of EPS changes in a quarter and stock price movements in a quarter in unison, could derive some predictive value on how a stock might react. As shown earlier, earnings announcements can be a catalyst for stock price movement. Using EPS and price movement throughout the quarter as a predictor of how analysts might act in the future, if both are moving in unison in extreme ways, then predicting future stock price movement, during a large catalyst event, to move in the opposite direction might yield a profitable trading strategy, essentially predicting the movement of analyst forecasts and performance relative to earnings expectations before the market absorbs them.

What the more recent papers have shown is that analyst estimates have some type of value in the price discovery process for a stock. Combining this with previous studies, especially those that have found that analysts have a positive bias, causing price movements throughout the quarter and throughout the year, could lead one to believe that utilizing these estimates to observe large magnitude changes in EPS estimates in one direction, which would theoretically cause large magnitude price movement in the same direction, as the market digests new information, could eventually fall victim to what Debondt and Thaler first hypothesized in 1985, that “extreme movements in stock prices will be followed by subsequent price movements in the opposite direction.” In a day and age where information flows quicker than ever before, one time-events could serve as a catalyst for these price movements in the opposite directions. What better event for

subsequent price movement in the opposite direction, than an earnings announcement that shocks the market, much like the shock seen with Cisco on August 13th.

## Chapter IV: Motivations for Research & Hypothesis

Professionals can dedicate their entire careers attempting to outperform the expectations set forth by the overall return of the market as a whole and yet, fail miserably, regardless of intelligence, acumen and work ethic. Deriving predictive value in an industry that is seemingly impossible to predict, would be the upper hand an investor needs to achieve above average returns. While there are many possible strategies that could be explored and exploited to generate above average returns, very few have proven to be consistently successful.

*Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing* (2006)<sup>19</sup>, written by Hersh Sheffrin, develops a strong understanding of the work done in the field of behavioral finance. The book begins with a general overview of the different types of mistakes that investors, professionals and individuals make when conducting analysis and security selection. These mistakes can be characterized into two main categories and are: heuristic-driven bias, using rules of thumb and prior experiences to make future decisions; frame dependence, the way a problem is posed to someone will directly impact the decision they make when they are confronted with that situation again. This thesis will attempt to develop a short-term trading strategy that exploits the different biases that are inherent within the equity markets, using an earnings announcement as a catalyst for price movement.

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<sup>19</sup> Hersh Sheffrin, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing* (New York, Oxford University Press, 2006)

## **Basis of Hypothesis from Prior Studies**

As mentioned in the section above, there has been significant research done on the impact of research analysts in the equity markets and how the market interprets it. Below is a summary of the most important findings in the previous studies, followed by the impact that each of these findings has had on the development of the hypothesis:

- Extreme price movements in one direction tend to reverse
- Market participants have a tendency to overreact
- Earnings announcements serve as a catalyst for revision and price movement
- Performance relative to expectations, not just positive increases in earnings, drive how the market reacts to earnings
- Analysts tend to have a positive bias in their projections and the market has some type of understanding of this phenomenon
- Stock prices move after new reports are published, but the market does not do a good job distinguishing new information and movement towards the consensus
- Research from one company in an industry has impacted the movement of other companies in that industry (comovement)
- Forecast revisions that correlate less with prior stock price movement has been proven to provide better and more accurate information
- Trading strategies have been developed to take advantage of analyst forecasts

### *Overreaction*

A large part of the basis for the hypothesis is based on the fact that the market has a tendency to overreact. As DeBondt and Thaler found, this eventually leads to a price movement in the opposite direction. The basic assumption related to overreaction is that large magnitude stock price movement and changes in analysts EPS forecasts act as a proxy for market overreaction. The hypothesis attempts to predict the reversal of the stock price movement before it happens, using the proxies for gauging market sentiment.

### *Earnings Announcements*

The next large facet of the hypothesis builds on the fact that earnings announcements are a catalyst for price movement and changes in analyst forecasts. Given the large number of revisions that occur post-earnings, one could justify the belief that there could be short term market inefficiency before a company announces quarterly earnings. The hypothesis is built on the fact that the reversal patterns that DeBondt and Thaler observed for extreme price movement is realized on the day that a company announces its quarterly earnings. While DeBondt and Thaler observed the long-term impacts of the reversal in stock price movement, this thesis attempts to prove that earnings announcements bring the most new relevant information to the market.

### *Positive Analyst Bias*

The positive analyst bias could also be a cause for short term market inefficiency, as analysts might be reluctant to downgrade due to prior investment banking relationships, which prevents complete objectivity that is needed when analyzing a company. In disseminating this information to the market, it might wrongfully promote a positive bias in

the market and cause it to react more positively than it should. While the market is somewhat aware of this phenomenon, the thesis will analyze whether positive large price movements and large positive changes in EPS estimates are a greater indication of overreaction, due to the positive bias, increasing the possibility of reversal in price movement.

### *Market Sentiment*

Market sentiment is one of the main connecting points from prior research into the hypothesis for the thesis. It helps to connect overreaction and the fact that earnings announcements can be used as a catalyst for change. Understanding market sentiment is very important for determining the expectations for a stock, which is the ultimate determinants for future stock price movement. The proxy for market sentiment is stock price movement on a quarter-over-quarter basis. The main assumption behind this is that extreme stock price movement in the positive (negative) direction heightens (lowers) expectations in the short-term, causing the market to assign extremely high (low) expectations that the company will have trouble meeting (will meet with ease), due to the pervading market sentiment, which has overreacted in the wrong direction. Earnings announcements act as a catalyst to reverse market sentiment back to a more realistic viewpoint on the future expectations of a company.

### *Short-Term Market Inefficiency*

While previous studies have focused on the long-term impacts of the inaccuracy in analyst forecasts and extreme price movement in one direction, this hypothesis is developed on the basis of being able to take advantage of the market in the short-term. In

addition to the short-term phenomenon mentioned above, there are a few short-term market inefficiencies that the previous studies have highlighted to motivate the hypothesis.

First, the market does not do a good job in distinguishing between research notes that are informative, bring new information to the market, and notes that move toward the consensus. Moving towards consensus further perpetuates the current market sentiment about a company, heightening expectations to levels that are unattainable or lowering expectations below a threshold that normal business operations can easily outdo. The main assumption is that large magnitude price and forecast EPS changes in one direction indicate that analysts are moving toward the consensus. The market “buys-in” to this consensus view when stock price movement is in the same direction as the changes in EPS forecasts. When both occur, there is the possibility for short-term market inefficiency, as the market suffers from some of the behavioral biases described in *Beyond Greed and Fear*.

Second, research notes published about one company tend to cause a comovement in other companies within the industry. Companies whose earnings expectations are increased are very likely due to increased competition and one company taking market share away from the other. Comovement would indicate that all companies in the industry benefit, when it is likely that one company is benefitting at the expense of the other. The comovement causes short term market inefficiency, due to some of the behavioral biases that are inherent within the market, but can only be reversed when companies announce earnings because it could be the first indication of a possible reversal of competitive balance within an industry.

To connect these points above, it is important to remember that analyst forecasts that move away from the direction of recent stock price movement has been shown to be

more accurate in its prediction of future performance of a company. *Moving away from the consensus, especially when it is skewed in one direction, could result in more accurate predictions, even before the market realizes it.*

### *Trading Strategies*

It has been shown that trading strategies can be developed to exploit some of the inefficiencies in the market in the short-term. These strategies have been shown to generate positive returns. The hypothesis will attempt to develop a prediction for market sentiment and developing a trading strategy based on some of the behavioral biases that exist in an attempt to exploit these inefficiencies.

Essentially, the motivation and development of the hypothesis is based on five main intertwining factors: overreaction, earnings announcements, positive analyst bias, market sentiment, short term market inefficiency. The hypothesis develops a hypothetical trading strategy to exploit these five factors.

### **Hypothesis**

The hypothesis of this thesis is based on analyst biases and inaccuracies to examine if there is any predictive value in analyzing their forecasts. Prior studies have suggested that analyst forecasts have an impact on stock prices, with negative revisions being absorbed quicker and more efficiently, due to the market being aware of the positive bias of analyst estimates. One of the consequences of this is that analysts could convince the rest of the market to fall in love with the stock, which immediately heightens the expectations for a company and their future earnings.

Studies have also found that earnings announcements can be a catalyst for stock price movement and that analysts' have a tendency to make a large number of revisions after earnings announcements, suggesting that there is some type of error or bias in their predictions prior to earnings announcement. Combining the fact that the market has some type of "buy-in" into analyst estimate revisions prior to earnings announcements and that revisions to these estimates are typically made after earnings announcements, means that there could be a profitable trading strategy from observing large magnitude changes in EPS estimates, that would cause large price movements in the same direction, that eventually reverse, as Debondt and Thaler first suggested in 1985, with the earnings announcement being the catalyst for this reversal.

**Hypothesis 1:** Large magnitude changes in EPS forecasts throughout the quarter cause price movement reversal during earnings announcement. Shorting positively biased stocks and investing in stocks that have seen negative movement yields above average returns. Trading would occur at the end of the day prior to the earnings announcement

**Hypothesis 2:** Large magnitude changes in EPS forecasts and large magnitude changes in price movement in the same direction throughout the quarter cause price movement reversal during earnings announcement. Shorting positively biased stocks and investing in stocks that have seen negative movement yields above average returns. Trading would occur at the end of the day prior to the earnings announcement

**Hypothesis 3:** Observing the trading pattern of the stock 5 days prior to earnings announcement will show insider trading activity

**Hypothesis 4:** Observing the trading pattern of the stock 5 days after the earnings announcement will confirm post earnings announcement drift

EPS forecast changes and price movement changes throughout the quarter are considered to be of large magnitude if they are greater than 8% because average *annual* market returns since the Great Depression have been a little higher than 8%. For a stock price to move more than 8% in one quarter, especially given the large cap nature of the data set, would indicate extreme price movement in one direction and could indicate over-optimism or over-pessimism.

When observing the average EPS forecast projections of all analysts, if there is a strong revision bias in one direction which causes strong stock price movement in the same direction throughout the quarter, it is hypothesized that the stock price movement will reverse during an earnings announcement, with a higher likely-hood for negative revisions because the market is somewhat aware of the positive bias in analyst estimates. The hypothesis is large negative earnings revisions that cause large negative stock price movement throughout the quarter, leads to positive price performance during an earnings announcement and large positive earnings revisions that cause large positive stock price movement throughout the quarter, leads to negative price performance during an earnings announcement a significant amount of times, due to the market “buying-in” to analyst estimates throughout the quarter, leading to heightened expectations that are not met during the earnings announcement.

This fully relates to prior studies done as it aims to exploit the overreaction that has been confirmed in the past. This overreaction is further confirmed by market sentiment moving in one direction, generally in a positive way due to positive analyst bias. These all

contribute to short term market inefficiencies that could come to the forefront during the earnings announcement, which acts as the catalyst for price reversal in the opposite direction.

If true, this research could be valuable in developing a trading strategy during earnings season. Given the extreme volatility during this time it would be extremely beneficial to have a proxy for predicting stock price movement during earnings season. This would be of great benefit to portfolio managers and asset managers. It would allow them to further hedge their bets and prevent volatility that can sometimes destroy even the best funds and money managers. It could also help analysts make better forecasts and speed up the price discovery process in the equity markets.

Below is a table that can be found in most research notes, showcasing the estimates of the analyst. An interesting thing to note is how close the firm estimates are to consensus estimates.

## Estimates (Feb)

(US\$)	2009A	2010A	2011E	2012E	2013E
EPS	2.88	3.15	3.30	3.60	3.95
GAAP EPS	2.39	3.10	3.30	3.60	3.95
EPS Change (YoY)	-7.7%	9.4%	4.8%	9.1%	9.7%
Consensus EPS (Bloomberg)			3.31	3.62	3.88
DPS	0.53	0.55	0.58	0.64	0.70

## Valuation (Feb)

	2009A	2010A	2011E	2012E	2013E
P/E	12.3x	11.2x	10.7x	9.8x	8.9x
GAAP P/E	14.8x	11.4x	10.7x	9.8x	8.9x
Dividend Yield	1.5%	1.6%	1.6%	1.8%	2.0%
EV / EBITDA*	5.5x	4.8x	4.9x	4.7x	4.5x
Free Cash Flow Yield*	3.9%	10.9%	10.1%	10.8%	11.4%

\* For full definitions of *iQmethod*<sup>SM</sup> measures, see page 6.

Figure 1: A table of analyst forecasts found in a Bank of America Merrill Lynch report on Best Buy Co., Inc. from January 2011

## Chapter V: Data & Methodology

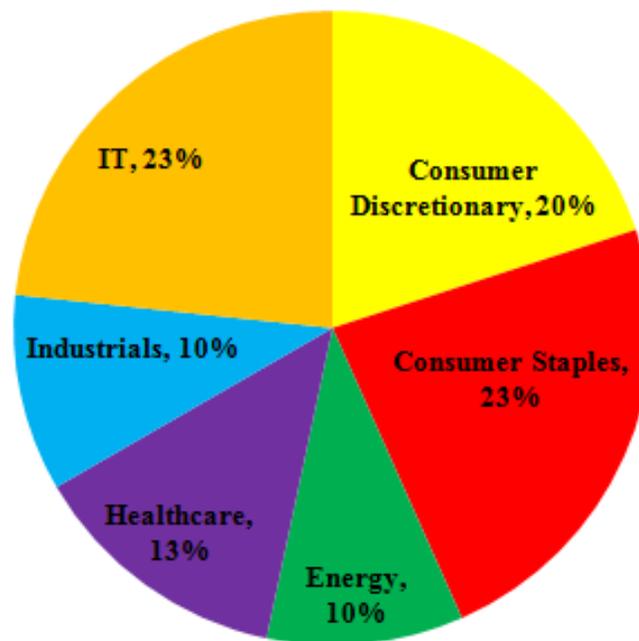
Data was taken from 30 different large market capitalization companies, from 6 out of 10 sectors in the S&P 500, utilizing FactSet Research systems. The companies are listed in Table 1.

**Table 1: Companies Selected**

<b>Company</b>	<b>Ticker</b>	<b>Sector</b>
Under Armour Inc.	UA	Consumer Discretionary
Amazon Inc	AMZN	Consumer Discretionary
McDonalds	MCD	Consumer Discretionary
Nike	NKE	Consumer Discretionary
eBay	EBAY	Consumer Discretionary
Best Buy Co.	BBY	Consumer Discretionary
Coca-Cola	KO	Consumer Staples
Walt Disney Co	DIS	Consumer Staples
Procter & Gamble	PG	Consumer Staples
General Mills	GIS	Consumer Staples
Wal Mart Inc	WMT	Consumer Staples
Altria Group	MO	Consumer Staples
Kraft	KFT	Consumer Staples
Exxon Mobil	XOM	Energy
Schlumberger	SLB	Energy
Chesapeake Energy	CHK	Energy
Abbott Laboratories	ABT	Healthcare
Teva Pharmaceutical Industries	TEVA	Healthcare
Beckton Dickinson	BDX	Healthcare
Johnson & Johnson	JNJ	Healthcare
Boeing	BA	Industrials
Union Pacific	UNP	Industrials
L-3 Communications	LLL	Industrials
Google Inc.	GOOG	IT
Intel Corporation	INTC	IT
Microsoft Inc	MSFT	IT
International Business Machines	IBM	IT
Dell	DELL	IT
Cisco Systems Inc	CSCO	IT
Oracle	ORCL	IT

Companies were analyzed in the following sectors: Consumer Discretionary, Consumer Staples, Energy, Healthcare, Industrials and Information Technology (IT). A breakdown of the number of companies in each sector can be found in Figure 2 below:

### **Company Sector Breakdown**



*Figure 2: Company Sector Breakdown*

For each company there were price and daily average analyst forecasts of full year forward earnings-per-share estimates data taken from December 3, 2008 to December 3, 2010. Earnings announcement dates were found on FactSet for the past 4 quarterly earnings announcements. If a company announced earnings before market open (BO), the percentage price delta on earnings announcement date was calculated using the formula  $P_T/P_{T-1} - 1$ , where:

$P_T$  is price at market close on earnings announcement day

$P_{T-1}$  is price at market close on day before earnings announcement day

If a company announced earnings after market close (AC), the percentage price delta on earnings announcement date was calculated using the formula  $P_{T+1}/P_T - 1$  where:

$P_{T+1}$  is price at market close on day after earnings announcement day

The reason that the price at market close on the day *after* earnings announcement day is used is due to the fact that the first chance the market has to react to the announced earnings is the day following the earnings announcement when trading commences.

The quarterly percentage delta in average analyst forecasts for full year forward earnings-per-share (EPS estimate), assuming earnings announcement before market open (BO) was calculated using the formula  $EPS_{T-1}/EPS_{E+1} - 1$  where:

$EPS_{T-1}$  is EPS estimate on the day before earnings are announced

$EPS_{E+1}$  is EPS estimate on the day after previous quarterly earnings announcement

The quarterly percentage delta in EPS estimate, assuming earnings announcement after market close (AC), was calculated using the formula  $EPS_T/EPS_E - 1$  where:

$EPS_T$  is EPS estimate on the day of earnings announcement

$EPS_E$  is EPS estimate on the day of previous quarterly earnings announcement

The percentage price delta since last earnings announcement, assuming earnings announcement before market open (BO), was calculated using the formula  $P_{T-1}/P_E - 1$  where:

$P_{T-1}$  is price at market close on day before earnings announcement day

$P_E$  is price at market close on day of previous quarterly earnings announcement

The percentage price delta since last earnings announcement, assuming earnings announcement after market close (AC), was calculated using the formula  $P_T/P_{E+1} - 1$  where:

$P_T$  is price at market close on earnings announcement day

$P_{E+1}$  is price at market close on day after previous quarterly earnings announcement

In order to analyze the effects of possible insider trading or post-earnings announcement drift, calculations for price movement five days prior to earnings and five days after earnings were calculated. Percentage price delta five days prior to earnings announcement, assuming earnings were announced before market open (BO), were calculated using the formula  $P_{T-1}/P_{T-5} - 1$  where:

$P_{T-1}$  is price at market close on the day before earnings announcement

$P_{T-5}$  is price at market close five days before earnings announcement

The percentage price delta five days prior to earnings announcement, assuming earnings were announced after market close (AC) was calculated using the formula  $P_T/P_{T-4} - 1$  where:

$P_T$  is price at market close on the day of earnings announcement

$P_{T-4}$  is price at market close four days before earnings announcement

The percentage price delta five days post earnings announcement, assuming earnings were announced before market open (BO) was calculated using the formula  $P_{T+4}/P_T - 1$  where:

$P_T$  is price at market close on the day of earnings announcement

$P_{T+4}$  is price at market close four days after earnings announcement

The percentage price delta five days post earnings announcement, assuming earnings were announced after market close (AC) was calculated using the formula  $P_{T+5}/P_{T+1} - 1$  where:

$P_{T+5}$  is price at market close five days after earnings announcement

$P_{T+1}$  is price at market close one day after earnings announcement

Data is shown in table 2 below:

**Table 2: Price Change Analysis**

<b>Ticker</b>	<b>Date</b>	<b>Before Open/After Close</b>	<b>Quarterly EPS Delta</b>	<b>Price Delta - Announcement Day</b>	<b>Price Delta - Since Last Announcement</b>	<b>Price Change 5 Days Prior to Earnings</b>	<b>Price Change 5 Days After Earnings</b>
INTC	4/13/10	AC	122.2%	3.29%	9.47%	1.42%	2.55%
AMZN	4/22/10	AC	50.6%	-4.30%	19.68%	5.57%	-1.32%
DELL	5/20/10	AC	22.2%	-6.77%	6.31%	-5.48%	0.37%
UA	4/27/10	BO	20.5%	-4.81%	36.88%	6.05%	0.99%
GOOG	4/15/10	AC	20.4%	-7.59%	8.23%	5.14%	-0.56%
BBY	3/25/10	AC	18.3%	1.17%	3.32%	4.07%	-1.37%
ORCL	9/16/10	AC	17.5%	8.36%	11.92%	1.24%	-1.31%
MSFT	10/28/10	AC	14.8%	1.46%	1.82%	3.56%	1.78%
AMZN	1/28/10	AC	13.4%	-0.49%	6.36%	3.79%	-7.55%
IBM	4/19/10	AC	12.8%	-1.92%	1.52%	2.48%	0.80%
INTC	7/13/10	AC	12.5%	1.67%	-10.67%	4.31%	1.36%
WMT	2/18/10	AC	11.5%	0.04%	0.51%	0.73%	1.23%
WMT	5/18/10	AC	11.2%	-1.24%	0.40%	2.33%	-5.20%
BBY	6/15/10	AC	10.9%	-0.99%	-10.66%	-1.13%	-4.11%
MSFT	1/28/10	AC	9.8%	-3.36%	1.67%	0.69%	-1.21%
NKE	9/23/10	AC	9.7%	2.45%	11.55%	0.53%	0.72%
BDX	11/4/10	AC	8.9%	-0.91%	13.74%	3.61%	0.94%
EBAY	4/21/10	AC	8.4%	-5.74%	8.95%	-2.56%	-3.19%
DIS	2/9/10	AC	8.4%	0.64%	-1.97%	-2.96%	2.76%
GIS	9/22/10	AC	8.1%	-1.34%	3.13%	-0.30%	2.02%
CSCO	5/12/2010	AC	8.0%	-4.53%	15.46%	4.90%	-4.97%
CSCO	11/10/2010	AC	7.9%	-16.21%	14.65%	1.16%	-5.41%
CSCO	2/3/2010	AC	7.5%	0.39%	-3.59%	2.44%	2.59%
GIS	12/17/09	AC	7.4%	-0.13%	8.81%	-0.03%	2.90%
MSFT	4/22/10	AC	7.2%	-1.37%	11.39%	2.35%	0.14%
UA	10/26/10	BO	6.3%	0.15%	25.32%	6.75%	-3.08%
BBY	12/15/09	AC	5.8%	-0.58%	7.70%	-3.49%	-2.03%
UA	1/28/10	BO	5.8%	-5.95%	-4.65%	2.08%	-1.41%
INTC	1/14/10	AC	5.4%	-3.17%	3.12%	3.12%	-4.28%
DIS	5/11/10	AC	4.9%	-1.76%	19.08%	1.19%	-3.99%
GOOG	1/21/10	AC	4.5%	-5.66%	6.03%	-1.16%	-2.86%
NKE	6/23/10	AC	4.2%	-3.99%	-2.87%	-2.75%	-2.99%
UA	7/26/10	BO	4.1%	2.16%	9.42%	12.68%	-1.75%
NKE	12/17/09	AC	3.7%	1.85%	-2.24%	-0.96%	1.29%
INTC	10/12/10	AC	3.5%	-2.68%	-7.44%	2.38%	-0.16%
DIS	11/11/10	AC	3.3%	5.07%	4.99%	-3.42%	-0.45%

CHK	8/4/10	BO	3.3%	2.79%	-5.78%	3.36%	-0.89%
ORCL	3/25/10	AC	3.1%	-1.34%	6.98%	3.37%	-0.90%
UNP	10/21/10	BO	3.1%	-0.62%	18.49%	-0.39%	0.20%
PG	1/28/10	BO	3.0%	1.43%	2.13%	1.62%	1.57%
CSCO	8/11/2010	AC	2.9%	-9.99%	-7.05%	-1.82%	4.92%
UNP	7/22/10	BO	2.8%	4.75%	-9.35%	-4.24%	3.19%
UNP	4/22/10	BO	2.8%	-1.01%	17.69%	-0.10%	-0.41%
MSFT	7/22/10	AC	2.7%	-0.12%	-16.54%	3.82%	0.85%
DELL	8/19/10	AC	2.6%	0.25%	-9.81%	0.25%	-2.65%
GIS	3/24/10	AC	2.3%	-1.43%	4.68%	-1.98%	-0.51%
ORCL	6/24/10	AC	1.6%	1.98%	-13.51%	-4.22%	-4.90%
DELL	11/18/10	AC	1.5%	1.68%	13.21%	1.83%	-1.19%
DIS	8/10/10	AC	1.2%	-3.03%	0.46%	1.32%	-1.34%
IBM	7/19/10	AC	1.1%	-2.50%	0.08%	-0.53%	1.47%
NKE	3/17/10	AC	1.1%	5.33%	10.03%	1.62%	-1.71%
BDX	1/28/10	AC	1.0%	-1.45%	-1.37%	1.86%	-0.88%
WMT	11/16/10	AC	1.0%	-0.90%	6.69%	-0.46%	-0.19%
LLL	1/28/10	BO	0.9%	-1.34%	15.71%	-1.27%	3.07%
AMZN	7/22/10	AC	0.8%	-1.00%	-16.40%	1.33%	-1.69%
SLB	1/22/10	BO	0.7%	-4.49%	4.77%	-4.18%	-0.94%
LLL	4/22/10	BO	0.7%	-0.83%	15.62%	1.58%	-2.90%
PG	4/29/10	BO	0.6%	-1.54%	2.42%	-0.66%	-0.06%
MCD	10/21/10	BO	0.6%	1.33%	10.74%	0.48%	-1.22%
NE	1/28/10	BO	0.6%	-1.83%	-4.33%	-2.56%	2.17%
ORCL	12/17/09	AC	0.6%	6.38%	6.32%	0.44%	2.51%
UNP	1/21/10	BO	0.6%	2.70%	1.51%	-5.54%	-2.51%
WMT	8/17/10	AC	0.5%	-0.31%	-3.81%	0.00%	0.87%
BBY	9/14/10	AC	0.5%	0.08%	-3.80%	9.51%	3.51%
TEVA	5/4/10	BO	0.5%	-1.67%	3.25%	0.55%	0.25%
KO	10/19/10	BO	0.5%	0.57%	10.95%	0.67%	1.11%
BDX	4/29/10	AC	0.5%	-0.30%	1.63%	-1.23%	-1.95%
GOOG	7/15/10	AC	0.4%	-6.97%	-10.20%	5.67%	5.48%
XOM	4/29/10	BO	0.3%	-0.77%	4.55%	0.92%	-3.63%
MCD	1/22/10	BO	0.3%	0.30%	6.22%	0.88%	-0.88%
IBM	10/18/10	AC	0.3%	-3.36%	12.86%	2.13%	1.31%
MCD	4/21/10	BO	0.3%	0.03%	10.96%	1.33%	0.24%
ABT	4/21/10	BO	0.3%	-2.41%	-1.56%	1.43%	-3.88%
MO	7/21/10	BO	0.2%	-0.51%	0.28%	0.80%	2.99%
TEVA	11/2/10	BO	0.2%	-0.60%	2.26%	-2.81%	-0.14%
TEVA	2/16/10	BO	0.2%	-1.22%	16.58%	3.41%	2.98%
MO	10/20/10	BO	0.2%	0.69%	15.60%	0.53%	1.12%
KO	7/21/10	BO	0.2%	1.58%	-2.26%	0.80%	1.79%
GIS	6/29/10	AC	0.2%	-3.74%	3.72%	-2.48%	2.59%
BA	10/20/10	BO	0.2%	3.35%	2.57%	-3.39%	-0.08%
JNJ	1/26/10	BO	0.1%	-0.68%	3.62%	-3.26%	0.48%
PG	10/27/10	BO	0.1%	0.35%	4.87%	-0.80%	1.49%
MO	4/21/10	BO	0.1%	1.37%	5.80%	0.05%	-2.52%

XOM	10/28/10	BO	0.0%	0.84%	8.83%	-0.98%	2.64%
ABT	10/20/10	BO	0.0%	-0.85%	8.61%	-0.58%	0.52%
LLL	7/27/10	BO	0.0%	-4.72%	-20.76%	4.83%	1.67%
LLL	10/28/10	BO	0.0%	0.15%	-2.60%	1.56%	2.85%
KO	4/20/10	BO	-0.1%	-1.54%	2.43%	0.55%	-1.36%
BA	7/28/10	BO	-0.2%	-1.89%	-7.47%	8.61%	3.30%
KFT	11/4/10	BO	-0.3%	0.70%	6.44%	-1.77%	-4.06%
KO	2/9/10	BO	-0.3%	2.58%	-2.63%	-4.36%	1.50%
TEVA	7/27/10	BO	-0.4%	-0.08%	-15.04%	-7.18%	0.22%
JNJ	4/20/10	BO	-0.4%	-0.06%	5.16%	0.53%	-1.86%
EBAY	10/20/10	AC	-0.5%	5.98%	22.54%	1.52%	7.67%
ABT	7/21/10	BO	-0.6%	2.55%	-8.32%	-0.79%	1.21%
PG	8/3/10	BO	-0.7%	-3.42%	-0.23%	-1.62%	0.73%
MCD	7/23/10	BO	-0.7%	-2.10%	1.48%	2.09%	-0.74%
CHK	5/5/10	BO	-0.7%	-1.91%	-13.98%	-0.42%	0.47%
JNJ	10/19/10	BO	-0.8%	-0.89%	9.01%	0.90%	1.09%
GOOG	10/14/10	AC	-1.0%	11.19%	17.69%	0.85%	1.75%
SLB	4/23/10	BO	-1.2%	6.60%	4.51%	3.62%	0.65%
KFT	2/16/10	BO	-1.2%	-0.41%	-7.86%	2.57%	-0.07%
KFT	8/5/10	BO	-1.3%	-0.30%	1.85%	2.20%	-0.27%
JNJ	7/20/10	BO	-1.3%	-1.66%	-9.73%	-1.54%	-1.43%
SLB	10/22/10	BO	-1.3%	5.38%	8.36%	-0.29%	2.97%
BDX	7/29/10	AC	-1.3%	1.87%	-11.56%	0.97%	4.08%
NE	4/22/10	BO	-1.6%	2.60%	0.41%	-1.05%	-1.03%
CHK	11/4/10	BO	-1.7%	-0.09%	-0.58%	4.59%	5.02%
KFT	5/6/10	BO	-1.9%	-1.82%	2.69%	-0.53%	4.07%
EBAY	7/21/10	AC	-2.3%	3.82%	-18.60%	-4.09%	0.48%
SLB	7/23/10	BO	-2.6%	-3.18%	-15.66%	8.15%	0.78%
XOM	7/29/10	BO	-3.6%	-0.94%	-11.29%	2.58%	3.94%
EBAY	1/20/10	AC	-5.1%	8.55%	-20.81%	-5.81%	-0.66%
BA	4/21/10	BO	-6.0%	3.85%	15.31%	-0.40%	-2.27%
MO	1/28/10	BO	-7.5%	0.10%	-19.88%	0.50%	-1.15%
ABT	1/27/10	BO	-10.7%	-1.06%	2.39%	-3.13%	1.00%
AMZN	10/21/10	AC	-10.8%	2.52%	38.78%	0.20%	-1.35%
IBM	1/19/10	AC	-12.7%	-2.90%	-6.08%	2.78%	-3.45%
CHK	2/18/10	BO	-16.0%	4.17%	18.15%	8.03%	-3.35%
NE	7/20/10	BO	-19.9%	4.50%	-28.10%	-4.39%	2.18%
NE	10/21/10	BO	-20.2%	-1.60%	9.17%	-1.82%	-0.03%
DELL	2/18/10	AC	-21.4%	-6.65%	3.36%	3.43%	-1.34%
XOM	2/1/10	BO	-33.3%	2.72%	-3.10%	-2.16%	-2.09%
BA	1/27/10	BO	-58.6%	7.31%	-19.29%	-4.14%	0.02%

## Chapter VI: Findings

The findings will analyze numerous scenarios, from the data above, in order to observe relevant trading strategies that could be developed by analyzing the movement of stock prices and EPS forecasts to predict price movement on earnings. Also, the movement of stock prices five days prior to earnings announcement will be analyzed to see if there is any possibility of insider trading prior to earnings. Price movement five days after earnings will be analyzed to test for post earnings announcement drift. Finally, removing the filter for large magnitude changes in EPS forecast and price movement to predict price movement on earnings announcement day will also be analyzed in the development of a possible trading strategy.

### **Analysis of Impact of Large EPS Forecast Changes**

First, I isolated data to only include large magnitude changes in EPS forecast, greater than 8% or less than -8%, since the last earnings announcement and analyzed the stock price movement on the day that earnings were announced. There were 30 total occurrences of large magnitude changes in EPS forecast, from the original 124 earnings data points calculated, which was 24.2%, showing that on average roughly one-fourth of companies undergo significant earnings revision throughout the quarter. This shows that there are enough occurrences of large magnitude changes to exploit, should the hypothesis prove to be correct.

Given this sample set, there were 21 large positive revisions and 9 large negative revisions. This further proves that analysts have a tendency to have a positive bias with their recommendations as they occurred twice as frequently as negative forecast revisions. Of the 21 positive revisions, 13 had price movement in the opposite direction on the day

that earnings were announced, or 62% of the time, with an average price movement of -3.38%. There were 8 occurrences with price movement in the same direction as the movement of EPS forecasts with an average move of 2.38%. Of the 9 negative revisions, 5 had opposite direction price movement on the day that earnings were announced, 56% of the time, with an average price movement of 4.24%. There were 4 occurrences with price movement in the same direction as the movement of EPS forecasts with an average move of -3.05%. Table 3 below summarizes these findings.

**Table 3: Earnings Reaction to Large Magnitude EPS Changes**

	# of Occurrences	Average Price Change
<b>Large Magnitude EPS Delta</b>	30	
Positive EPS Delta	21	
<i>Earnings Price Delta - Opposite Direction</i>	13	<i>(3.38%)</i>
<i>Earnings Price Delta - Same Direction</i>	8	2.38%
Negative EPS Delta	9	
<i>Earnings Price Delta - Opposite Direction</i>	5	4.24%
<i>Earnings Price Delta - Same Direction</i>	4	<i>(3.05%)</i>

Overall out of the 30 occurrences, 18 of them or 67% of the time, the price movement on the day that earnings was announced was the opposite direction of the movement of EPS forecasts throughout the quarter. Engaging in a trading strategy that would go long all large negative EPS delta and short all large positive EPS delta, with an initial investment of \$100 the day before the earnings announcement at market close, resulted in a return of 1.13% before fees and expenses. Given the existence of fees and expenses, this would likely result in an unprofitable trading strategy. It is also important to remember that only one of the quantitative factors was analyzed and that there will be increased analysis and filtering of data to arrive at a possible trading strategy. The results of

the trading strategy related to just changing EPS estimates on a quarter-over-quarter basis can be found in Table 4 below.

**Table 4: Investment Strategy Test #1**

Ticker	Quarterly Delta (EPS)	Price Change on		Value of \$100 Investment
		Earnings Date	Long/ Short	
INTC	122.16%	3.29%	Short	\$96.71
AMZN	50.64%	(4.30%)	Short	\$104.30
DELL	22.15%	(6.77%)	Short	\$106.77
UA	20.50%	(4.81%)	Short	\$104.81
GOOG	20.44%	(7.59%)	Short	\$107.59
BBY	18.30%	1.17%	Short	\$98.83
ORCL	17.55%	8.36%	Short	\$91.64
MSFT	14.82%	1.46%	Short	\$98.54
AMZN	13.39%	(0.49%)	Short	\$100.49
IBM	12.77%	(1.92%)	Short	\$101.92
INTC	12.53%	1.67%	Short	\$98.33
WMT	11.50%	0.04%	Short	\$99.96
WMT	11.20%	(1.24%)	Short	\$101.24
BBY	10.91%	(0.99%)	Short	\$100.99
MSFT	9.78%	(3.36%)	Short	\$103.36
NKE	9.72%	2.45%	Short	\$97.55
BDX	8.89%	(0.91%)	Short	\$100.91
EBAY	8.43%	(5.74%)	Short	\$105.74
DIS	8.39%	0.64%	Short	\$99.36
GIS	8.06%	(1.34%)	Short	\$101.34
CSCO	7.98%	(4.53%)	Short	\$104.53
ABT	(10.68%)	(1.06%)	Long	\$98.94
AMZN	(10.77%)	2.52%	Long	\$102.52
IBM	(12.66%)	(2.90%)	Long	\$97.10
CHK	(16.01%)	4.17%	Long	\$104.17
NE	(19.88%)	4.50%	Long	\$104.50
NE	(20.21%)	(1.60%)	Long	\$98.40
DELL	(21.44%)	(6.65%)	Long	\$93.35
XOM	(33.31%)	2.72%	Long	\$102.72
BA	(58.55%)	7.31%	Long	\$107.31
<b>Total Return</b>				<b>1.13%</b>

## **Analysis of Impact of Large EPS Forecast Changes and Stock Price Comovement**

The next aspect analyzed was how a stock would react during an earnings announcement when there were large magnitude EPS changes and price movement throughout the quarter in the same direction as the movement of the EPS forecasts. There were 22 occurrences where this happened, or 73% of the time, showing that in general, price movements have a tendency to move in tandem with the direction of EPS forecasts. Of these 22 occurrences, 18 were positive and 4 were negative, which is surprising because in the past it has been found that the market tends to put more weight on negative recommendations, but in this case more than half of the original pool of negative revisions were cut out. On the other hand, the majority of the positive revisions still remained after filtering out for quarter-over-quarter price movements that moved in tandem with EPS forecasts.

For the 18 positive comovement occurrences between QoQ change in EPS forecasts and price movement, 12 resulted in earnings reactions that were negative, or 67% of the sample size. This is comparable to what was seen when only the change in EPS forecasts was analyzed, but with a greater degree of occurrence, indicating that a comovement with the change in price throughout the quarter and the change in EPS forecasts, is useful to further filter possible reversal in price movement during an earnings announcement. Of these 12 occurrences, the average price movement was -3.58%. The 6 occurrences that were in the same direction had an average price change of 2.80%.

There were only 4 negative comovement occurrences between QoQ change in EPS forecasts and price movement, 3 of which resulted in earnings reactions that were positive, or 75% of the sample size. This was much higher than when only EPS forecasts were

analyzed, indicating that movements in price and EPS forecasts is more effective when it relates to negative price movement. That being said, there are only 4 data points, so more data would be necessary to further confirm this sentiment. The 3 reversals in price movement resulted in an average price movement of 4.84%. The 1 price movement that was in the same direction moved by -2.90%. The summary of these findings can be found in Table 5 below.

**Table 5: Earnings Reaction to Comovement in QoQ EPS & Price Delta**

	# of Occurrences	Average Price Change
<b>Same Direction QoQ EPS &amp; Price Delta</b>	22	
Positive Delta	18	
<i>Earnings Price Delta - Opposite Direction</i>	12	<i>(3.58%)</i>
<i>Earnings Price Delta - Same Direction</i>	6	2.80%
Negative Delta	4	
<i>Earnings Price Delta - Opposite Direction</i>	3	4.84%
<i>Earnings Price Delta - Same Direction</i>	1	<i>(2.90%)</i>

Overall, out of the 22 occurrences, 15 resulted in price movement reversal on the day earnings were announced. This was 68% of the time, which is comparable to what was found when only analyzing EPS forecast movement. Engaging in a trading that would short all positive large EPS changes and positive price movements throughout the quarter, while going long all negative large EPS changes and negative price movements throughout the quarter with an initial investment of \$100 at the end of the day on the day before earnings were announced resulted in a return of 1.72% before fees and expenses. Once again given the existence of fees and expenses engaging in this strategy would likely prove to be unprofitable. The results of this trading strategy can be found below in Table 6.

**Table 6: Investment Strategy Test #2**

Ticker	Quarterly Delta (EPS)	Price Change Since Last Earnings	Price Change on Earnings Date	Long/S hort	Value of \$100 Investment
INTC	122.16%	9.47%	3.29%	Short	\$96.71
AMZN	50.64%	19.68%	(4.30%)	Short	\$104.30
DELL	22.15%	6.31%	(6.77%)	Short	\$106.77
UA	20.50%	36.88%	(4.81%)	Short	\$104.81
GOOG	20.44%	8.23%	(7.59%)	Short	\$107.59
BBY	18.30%	3.32%	1.17%	Short	\$98.83
ORCL	17.55%	11.92%	8.36%	Short	\$91.64
MSFT	14.82%	1.82%	1.46%	Short	\$98.54
AMZN	13.39%	6.36%	(0.49%)	Short	\$100.49
IBM	12.77%	1.52%	(1.92%)	Short	\$101.92
WMT	11.50%	0.51%	0.04%	Short	\$99.96
WMT	11.20%	0.40%	(1.24%)	Short	\$101.24
MSFT	9.78%	1.67%	(3.36%)	Short	\$103.36
NKE	9.72%	11.55%	2.45%	Short	\$97.55
BDX	8.89%	13.74%	(0.91%)	Short	\$100.91
EBAY	8.43%	8.95%	(5.74%)	Short	\$105.74
GIS	8.06%	3.13%	(1.34%)	Short	\$101.34
CSCO	7.98%	15.46%	(4.53%)	Short	\$104.53
IBM	(12.66%)	(6.08%)	(2.90%)	Long	\$97.10
NE	(19.88%)	(28.10%)	4.50%	Long	\$104.50
XOM	(33.31%)	(3.10%)	2.72%	Long	\$102.72
BA	(58.55%)	(19.29%)	7.31%	Long	\$107.31
<b>Total Return</b>					<b>1.72%</b>

While none of the strategies yielded profitable trading, there are some important conclusions that were reached when analyzing both of these scenarios:

- Confirmation of positive analyst bias
- The market reacted more to positive forecast revisions than to negative forecast revisions

- There is little evidence to suggest a trading strategy that would be able to take advantage of the comovement of large magnitude EPS forecast changes and

The next thing to analyze would be the comovement of large magnitude EPS forecast changes and large magnitude price changes on a quarter-over-quarter basis. This would be the last factor to control for before determining that there may not be a profitable trading strategy that could be derived from analyzed the movement of EPS changes and price changes throughout the quarter.

There was once again a large preponderance of data points that had positive EPS revisions along with positive price movement. 66% of these occurrences resulted in price movement on earnings that was opposite to the movements throughout the quarter. For negative EPS revisions and price movements, 100% (2 data points) of these occurrences resulted in movement on earnings that was opposite to the movements throughout the quarter. It seems as though large EPS movements in one direction coupled with large price movements in the same direction throughout the quarter is the best way to filter out data to predict how a stock might move when it announces earnings. However, as seen below, it seems like it is difficult to develop a trading strategy that takes advantage of this.

When looking at a trading strategy that attempts to short stocks whose EPS forecasts over the past quarter have seen a large increase, as well as a large increase in stock price, and going long stocks whose EPS forecasts over the past quarter have seen a large downward revision coupled with a large decrease in the stock price, with an initial investment of \$100 on the day before earnings are announced, yields a return of 2.33% before fees and expenses. The data for this trading strategy can be seen in Table 7 below.

**Table 7: Investment Strategy Test #3**

Ticker	Quarterly Delta (EPS)	Price Change Since Last Earnings	Price Change on Earnings Date	Long/ Short	Value of \$100 Investment
INTC	122.16%	9.47%	3.29%	Short	\$96.71
AMZN	50.64%	19.68%	(4.30%)	Short	\$104.30
UA	20.50%	36.88%	(4.81%)	Short	\$104.81
GOOG	20.44%	8.23%	(7.59%)	Short	\$107.59
ORCL	17.55%	11.92%	8.36%	Short	\$91.64
NKE	9.72%	11.55%	2.45%	Short	\$97.55
BDX	8.89%	13.74%	(0.91%)	Short	\$100.91
EBAY	8.43%	8.95%	(5.74%)	Short	\$105.74
CSCO	7.98%	15.46%	(4.53%)	Short	\$104.53
NE	(19.88%)	(28.10%)	4.50%	Long	\$104.50
BA	(58.55%)	(19.29%)	7.31%	Long	\$107.31
<b>Total Return</b>					<b>2.33%</b>

**Analysis of Potential Insider Trading**

When analyzing whether or not there could be some possible insider trading activity prior to an earnings announcement, the data once again came up inconclusive. For all 124 data points, the number of times that the price moved in the same direction during the 5 days prior to earnings announcement occurred exactly 50% of the time, with the exact opposite happening exactly 50% of the time, suggesting that there very little insider trading activity before earnings. In fact, for a negative reaction to earnings, there were a larger number of data points that showed positive price performance in the five days prior to earnings being announced, suggesting that there was no insider trading activity before earnings.

## **Analysis of Post Earnings Announcement Drift**

When analyzing post earnings announcement drift in the short term, there was no tendency in the 5 days post earnings announcement for prices to drift in the same direction. Prices moved in the same direction, as they moved on the day that they announced earnings, only 55% of the time. This suggests the post earnings announcement drift is more of a long-term phenomenon that occurs as the market slowly digests more information after an earnings announcement.

## **Analysis of Impact of EPS Forecast Changes & Price Movement**

When analyzing the entire data set (124 data points), regardless of the magnitude of change in EPS forecast and price movement, 57% of the time, earnings moved in the opposite direction of the movement of EPS forecasts and price movement throughout the quarter. Also, when looking at how the prices of the stocks responded to changing EPS forecasts, when there were positive revisions, 72.4% of the time, the stock price also went higher throughout the quarter, which highlights the fact that there is a positive bias in analyst estimates, but it seems like the market bought into their predictions. Conversely, for negative revisions in EPS forecasts, only 51% of the time did the stock price move in a negative direction. This does bring up an interesting implication about the market's interpretation of analyst forecasts. While past studies have found that one single forecast downgrade has a tendency to cause downward pressure on a stock, *if consensus is moving towards forecast downgrades, it seems as though the market is reluctant to buy into analyst forecasts, especially when comparing it to the market's reaction to positive forecast revisions*. Engaging in a trading strategy that took a long position in all data points that had negative EPS revisions, regardless of magnitude, and shorted all data points that had

positive EPS revisions with a \$100 investment the day prior to earnings being announced, yielded a return of 1.01% before fees and expenses. Given the existence of fees and expenses, it seems as though there is no profitable trading strategy to take advantage of the change in EPS forecasts and price movement throughout the quarter. That being said, there are some interesting implications that can come out of it.

While unsuccessful in identifying a trading strategy to take advantage of trends in the changing EPS forecasts and price movements for a company/stock on a quarter-over-quarter basis, the thesis' findings did confirm previous studies, while developing addendums to other studies. Overall, the main findings of the thesis are:

- Research analysts exhibit a positive bias in their EPS forecasts
- Earnings move in the opposite direction of large magnitude EPS forecast changes and price movement throughout the quarter 2/3 of the time
- A profitable trading strategy could not be obtained to exploit the changing forecasts and price movements, but exhibited positive returns before fees and expenses
- Given the data set, positive revisions resulted in positive stock price movement more often than negative revisions for negative price movement. A previous study has found that the market takes individual negative revisions into account, especially when it moves away from consensus, but if consensus is in the negative direction, then the opposite seems to happen
- There does not seem to be any insider trading activity or post announcement earnings drift in the 5 days prior and 5 days after an earnings announcement

### *Implications from the Findings*

While there were no direct strategies developed from the findings, thus proving the original hypotheses to be false, there are implications that can come out of the findings in the thesis.

Given the fact that earnings move in the opposite direction of large magnitude EPS forecast changes and large magnitude price movement, on a quarter-over-quarter basis, two-thirds of the time, it might help portfolio managers and asset managers to utilize options to protect or hedge their positions in certain stocks, if they feel as though there could be an extremely volatile movement on the day a company announces earnings. This would involve utilizing call options on stocks that have had large negative EPS revisions and large negative price movement throughout the quarter, which would allow for capitalization on a positive movement on the day that earnings are announced, but would come cheaper than buying the stock itself. Conversely, the strategy would also involve utilizing put options on stocks that have had large positive EPS revisions and large positive price movement throughout the quarter, which would allow portfolio managers to capitalize on a negative movement on the day that earnings are announced.

## Chapter VII: Conclusion

Sell side research analysts play an important role within equity markets, helping bridge the gap between company management and disseminating public information to help make financial forecasts that are used by the entire investment community. While relatively accurate, they are still prone to human error and biases. Prior studies have found that analysts have expressed over-optimism and a tendency to fall in love with their stocks, leading to inaccurate forecasts while being prone to confirmation and optimism bias.

This thesis attempted to develop a trading strategy that would be able to take advantage of some of these biases. While unsuccessful in developing this strategy, it did help to confirm what some of the prior studies have shown, while also adding some possibly important corollaries to past work. Large magnitude changes in EPS estimates and commoving large magnitude price changes throughout the quarter do have some predictive value in how a stock might react on the day it announces earnings, but not with enough certainty and with enough magnitude to implement a trading strategy that would generate abnormal above average returns.

While the hypothesis proved to be incorrect, there are definitely ways in which the study can be improved, simply by altering the data set used. The biggest factor that could be changed would be to analyze companies that are not considered to be large capitalization and have large analyst followings, like many of the biggest companies do. The basic tenet is to compile data using stocks that are less popular and flashy.

As seen in their study *Does Consumer Sentiment Contribute to Investor Sentiment: Glamour Brands and Glamour Stocks?* (2010)<sup>20</sup>, Billett, Zhang and Rego found that “glamorous brands (high customer sentiment) contribute to the glamour status in the stock valuations. However this contribution is not persistent across time: 1) it strengthens when overall market-wide sentiment is high, 2) it attenuates as the brand becomes more familiar with less information asymmetry, and 3) it varies with changes in customer sentiment across time.” This glamour status in the stock valuation, can cause comovement across smaller stocks in the industry, which can cause larger market inefficiencies for the smaller, less followed stocks in an industry. This phenomenon of comovement with smaller stocks in an industry was observed by Hameed, Yeung, Morck and Shen in their paper *Information, Analysts and Stock Return Comovement* (2010)<sup>21</sup>, where they found that “stocks followed by few analysts co-move significantly with firm-specific fluctuations in the prices of highly followed stocks in the same industry, but do not observe the converse. This effect is more prominent in industries where analysts follow fewer stocks. Earnings forecast revisions for highly followed stocks cause price changes in little followed stocks, but the converse is again not observed.” This suggests the study should be repeated with less popular stocks, both from a consumer popularity standpoint, but also an analyst coverage standpoint, as those would be the companies with the least efficient market, due to lack of analyst coverage and popular interest.

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<sup>20</sup> Matthew Billett, Zhan Jiang, Lopo Rego “Does Consumer Sentiment Contribute to Investor Sentiment: Glamour Brands and Glamour Stocks?” [AFA 2011 Denver Meeting Paper](#) May 2010

<sup>21</sup> Allaudeen Hameed, Bernard Yeung, Randall Morck, Jianfeng Shen “Information, Analysts and Stock Return Comovement” [AFA 2011 Denver Meeting Paper](#) March 2010

This excess comovement among smaller stocks was also seen by Israelsen in his paper *Does Correlated Analyst Coverage Explain Excess Comovement* (2010)<sup>22</sup>, where he found that:

“(1) Stocks with similar analysts tend to exhibit more excess comovement, controlling for industry, (2) This effect is strongest among "star analysts", (3) On average, when a stock enters the S&P 500 index, the same analysts that cover other S&P 500 stocks begin to cover the new stock, (4) Changes in excess comovement are larger for stocks with larger increases in correlated analyst coverage around this event, and (5) changes in the measure around analyst turnover following brokerage firm mergers are correlated with changes in excess comovement.”

The observation of this comovement and the changes it causes to smaller companies in similar industries leaves them vulnerable to the possibility of higher inefficiency in the short term.

It also would be easier to focus on one sector. For example, the Information Technology sector, had the highest number of large magnitude EPS changes accounting for 37% of the data points, 82% of which had the price movement on the earnings date to be opposite that of the movement of EPS changes throughout the quarter, which was higher than the averages observed throughout the thesis.

Overall the thesis suggests further research be done on smaller capitalization stocks, focusing on one industry, possibly the Information Technology sector, to see if there are any possible trading strategies that could be developed with different data.

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<sup>22</sup> Ryan Israelsen “Does Correlated Analyst Coverage Explain Excess Comovement” November 2010

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## *Academic Vita*

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