STOCK MARKET REACTION TO EARNINGS ANNOUNCEMENTS

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Abstract

This paper is a study of the efficient market hypothesis and the stock market's reaction to earnings announcements. The method used is based off the Woolridge and Snow (1990) methodology in determining abnormal returns around an event. The Abnormal returns will reflect the efficiency of the market. A large abnormal return indicates an inefficient market and a small or non-existent abnormal return indicates an efficient market. The study explores how abnormal returns can be generated in an inefficient market and attempts to give evidence to support the efficient market hypothesis.

KEYWORDS: (Earnings, Efficiency, Abnormal Returns)
ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED UNAUTHORIZED AID ON THIS THESIS
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CHAPTER I

INTRODUCTION

The Stock Market has been the source of great wealth for many people as well as the source of poverty for many. Any individual or corporation can use the stock market's performance as an indicator of one's success. The majority of companies are trying to use their stock market value to gain a competitive edge and gain overall worth of the company. While individual investors are constantly checking the value of their stocks to find out if they have made a good decision about their investments. A vast amount of information is required to be made public by every company that is publicly traded. Some of this information is easier to read than others; and some of it is more useful to the individual to determine which stocks to invest in. This paper will look exclusively at the quarterly earnings release and determine if the stock market reacts efficiently to news about a company's earnings the previous quarter.

The stock market has become ever more important to the success of both the individual investor as well as the company as a whole. The stock market allows for companies and individuals to finance large projects that allow for increased assets an
d higher future returns. The individual investor is able to use the stock market to support their everyday living or possibly help save for retirement or future children's educations. With the increased access of the stock market via the internet have allowed the individual investor to have access to what was once privileged information.\(^1\) Trading and selling stocks is now easier than ever with just the click of a button an individual can make millions of dollars or loose millions of dollars. The ease of trading stocks and selling stocks has increased the number of households that have at least something invested in the stock market to about half.\(^2\)

As more Americans and individuals worldwide invest in the stock market it becomes increasingly necessary for companies to maintain a steady growth rate and continue to draw investors and increase their values. The question on many investors’ minds is if the current price of the stock reflects all of the available information. According to the famous Efficient Market Hypothesis (EMH), all available public information is reflected in the current price of the stock.\(^3\) This study will evaluate this hypothesis and try to prove the market’s inefficiency in regards to earnings announcements. If the hypothesis is found to be true than the investor is reacting rationally and the stock of the company is currently at its true market value. However, if this hypothesis does not hold up then the company’s stock is either undervalued or overvalued which disproves the widely accepted EMH.


\(^2\) Ibid.

The purpose of this study is to determine if the stock market reacts efficiently to the release of the quarterly earnings announcement. The study will be conducted over a three year period of time from 2004 through 2007. Each company does not announce consistently on the same day, the abnormal returns for individual days will be evaluated as well as the stock market as a whole to truly see if the market reacts efficiently. The difference between an announcement made on a Monday and a Friday will be evaluated to determine if companies wait to release bad earnings to delay poor abnormal returns.

Previous research has been done on the stock market’s reaction to earnings announcements; the idea however is still one that creates much controversy in how companies and individuals should invest. Many of the previous studies, such as a study done by Mendenhall in 2002, looked at annual earnings announcements versus the quarterly announcements. This large period of time between announcements may cause the market to react less efficiently because of other factors that may be attached to the annual earnings announcements.\(^4\)

Other than the EMH the theory of delayed reaction to news in the stock market can also be explained by the overreaction theory. This theory states that investors use the information available and overreact to the news. If a company seems as though they are going to report a bad earnings announcement then the price of the stock will fall below the true market value. The stock price will then climb back up to the true market value after some period of time.\(^5\)

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\(^4\) Richard R. Mendenhall, "How Naïve is the Market's use of Firm-Specific Earnings Information?" *Journal of Accounting Research* 40, no. 3 (06 2002): 841-863.

The biggest area of information missing in market behavior is that many of the theories include irrational behavior, unlike the EMH in which it is assumed that all investors are acting rationally. This implies that when an investor is trying to maximize their utility they act rationally. The biggest problem is that there is irrational behavior in the stock market that is not accounted for in the EMH. A type of irrational behavior is described by Yong Wang as “herd behavior” saying that investors follow what other investors before them have done without using their own intuition of instincts. Other types of irrational behavior in investing include overconfident investors in which an investor overestimates their own knowledge and does not take public information, such as earnings release, into account in their investments. While over the years there have been numerous studies about the efficiency of the market pertaining to earnings release there is still more research that needs to be completed so that these theories can be proven or disproved.

The methodology of this study will consist of an empirical study of the stock price seven days before and seven days after a quarterly earnings announcement. This is similar to many other studies done before, however instead of looking at three days before and after an event there will be one week’s worth of stock price changes before and after each individual event. The calculations will closely resemble those of Woolridge and Snow (1990). Abnormal returns will be calculated on a given event day by finding the difference of the return of a security on day t and the return of the SPY stock market on day t. The S&P 500’s exchange traded fund SPY, which closely resembles the S&P 500 index, will be used to indicate the daily return on the stock.

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7 De Bondt and Thaler, Does the Stock Market Overreact?, 793.
market. The abnormal returns will be calculated for the week before the event as well as the week after the event occurs. Along with average abnormal returns the cumulative abnormal return for each time period per announcement will also be calculated and evaluated.

Earnings release dates have been acquired through markethistory.com while historical prices have been found through Yahoo Finance’s page. The stock prices that will be used are the daily closing price for the seven days prior to the event, the day of, and the seven days after the event, for a total of fifteen days for each event. This is to allow enough time to evaluate the reaction to the announcement. This will allow a conclusion about efficiency to be made accurately.

The results of the study were very different than the expectations. In regards to the cumulative abnormal return around earnings announcement dates as well as the expectations for announcements made on Mondays and Fridays. For earnings announcements made on Mondays the abnormal return was very similar to that of announcements made on Fridays. In both instances the market was efficient, meaning that there were minimal or zero abnormal returns available for the particular stocks on the day in question. The results were similar across all companies for all days of the week during the period studied, 2004-2007.

Chapter II will be a review of the literature that is relevant to the study. Many studies have been done both proving and disproving the EMH. It is impossible to read all articles ever written a substantial amount, both supporting and disproving the theories have been reviewed.
Chapter III will discuss the theory of the EMH in greater detail, including a description of the weak form, semi-strong form, and the strong form. The chapter will also discuss the methodology used in the study in greater detail.

Chapter IV will explain what the data was as well as describe the exact process of the study. The results of the data tests and analysis will also be mentioned and briefly discussed.

Chapter V will restate the purpose of the paper. The conclusions made from the results stated in chapter IV in greater detail.

Since there have been many other studies done about the efficiency of the stock market regarding earnings announcements there is not expected to be any new results. However, the results found in this study will either back up the EMH or continue to fuel the fire in the debate of the efficiency of the stock market.
CHAPTER II

LITERATURE REVIEW

The efficient market hypothesis is the most empirically supported theory in economics. Throughout the years there have been arguments against the inconsistency of the hypothesis, but when all of these pieces of evidence are put together and studied as a whole there is enough evidence to review carefully the acceptance of the efficient market theory.\(^1\) The definition of an efficient market is when "a market with respect to information set $X_t$ if it is impossible to make economic profits by trading on the basis of information set $X_t."^{2}\) The efficient market theory has three parts to it, the weak form, semi-strong form and the strong form. The strong form is an ideal situation where the market is treated as a logical completion of the hypothesis. The weak and semi-strong forms are forms that can be found in markets throughout the world.\(^3\) If the market was truly efficient the price reaction to earnings announcements would be factored into the price of the stock immediately after the announcement is made. Price reactions can come

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\(^2\) Ibid.
\(^3\) Ibid.
in the form of either increased volatility and or price spikes. The time it takes for a stock to recover from an overreaction is also very important when discussing market efficiency. The generally accepted efficient market theory has been supported by many studies however there are still many studies that contradict the efficiency of the market.

Earnings announcements have been studied intensely throughout their existence. There have been many articles written about how announcements inform investors where to invest. A study done by Buchheit and Kohlbeck (2002) shows evidence that earnings report creates an increased price reaction over the course of their study. This however is not consistent across all of the firms examined. A determining factor in the size of the price reaction was firm size. Smaller firms experienced smaller price reactions to earnings reports than larger firms. Moreover, smaller firms experienced decreasing price reactions to earnings announcements over time. The opposite held for larger firms.

What Buchheit and Kohlbeck did that many other studies did not was test a very large amount of firms. Whereas past studies used samples of approximately 1,000 firms, Buchheit and Kohlbeck studied over 2,100 different firms per year from 1975 to 1997. Only 1,000 firms met the authors’ criteria initially but by 1997 over 4,000 firms were included in the study. Throughout this testing period, Buchheit and Kohlbeck were able to make conclusions about earnings announcements and price reactions after and at the time of the announcement. They were able to conclude, like Beaver (1968), that the trading volume and return volatility increase at the time of earnings announcements. They were also able to conclude that in small firms the decrease in price reaction is easier

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4 Steve Buchheit and Mark Kohlbeck, "Have Earnings Announcements Lost Information Content?" *Journal of Accounting, Auditing & Finance* 17, no. 2 (Spring 2002): 137-153.
5 Ibid.
6 Ibid.
to detect than for large firms. This study showed that there has not been enough evidence to show that the earnings announcements have a direct impact on economic profits, this shows that the earnings announcements have not become increasingly useful over time.

While Buchheit and Kohlbeck looked into how useful the earnings announcements are, Mendenhall (2002) looked into if the common investor is being helped by the market’s use of firm-specific earnings information. Mendenhall found, like Ball and Brown (1968), that the “abnormal performance of stocks can last weeks or even months following a better (worse) than expected earnings announcements.” What Mendenhall was able to conclude is that investors are aware of the information that is available but do not use it to their advantage. However, it has been found that post earnings abnormal performance may be caused by “investors who underestimate (or ignore entirely) the implications of announcements for future earnings.” Mendenhall also found “investors underweight the implications of the first earnings announcements of this quarter’s earnings for future earnings levels.”

Buchheit and Kohlbeck looked at the price reactions to earnings announcements and Mendenhall studied how investors react to earnings announcements. Theresa Libby et al (2002) study the asymmetry between stock prices and the earnings announcements, and the difference between annual reports and quarterly earnings announcements. Libby et al. study how specialists react to changes in the information environment. The

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7 Ibid.
8 Ibid.
9 Richard R. Mendenhall, "How Naïve is the Market's use of Firm-Specific Earnings Information?" *Journal of Accounting Research* 40, no. 3 (06 2002): 841-863.
10 Ibid.
11 Ibid.
12 Ibid.
specialists adjust to these changes by adjusting the number of shares they are willing to purchase or sell at each given bid and ask price.\textsuperscript{14} Libby et al. also found from previous research that the information asymmetry caused by earnings announcements differs greatly depending if the announcement is a quarterly announcement or an annual report and whether the announcement was made during or after trading hours.\textsuperscript{15} The results of the study indicated that earnings announcements reduce the level of information asymmetry perceived by the specialist.

The study also discovered that the reaction is different for quarterly and annual announcements and if the announcement is made within or outside of trading hours. The level of information asymmetry lasts longer for quarterly announcements made outside of trading hours.\textsuperscript{16} What Libby was able to discover is that the specialist and other informed traders are trading on private information not yet widely available in the market. What this information does is allow the specialist to determine what the overall risk of the market is and set bid-ask spreads accordingly. In a higher risk market the specialist will set a wider bid-ask spread than in a lower risk market.\textsuperscript{17} This private information that only few of the investors have leads to an increase in information asymmetry before the earnings announcements and a decrease in asymmetry after the announcement because the information is now publicly available.\textsuperscript{18} In their research it was discovered that Yohn (1998) found that the bid-ask spread increases four days before the day of the earnings announcement and on the day of the announcement. It was also found that the effect lasts

\textsuperscript{14} Ibid.
\textsuperscript{15} Ibid.
\textsuperscript{16} Ibid.
\textsuperscript{17} Ibid.
\textsuperscript{18} Ibid.
only one day after the earnings are announced, the bid-ask spread then narrows back
towards its original starting point.\(^{19}\)

When an earnings announcement is made during the trading day the reaction time
is much faster than an announcement made outside of trading hours. It was found that the
market reacts to the information contained in the earnings announcement within the first
half-hour after the announcement is made.\(^{20}\) This, however, is not the case when an
announcement is made outside of trading hours. Market prices are “adjusted more
efficiently for earnings news released during trading hours.”\(^{21}\) The argument to explain
why this happens is that since in an outside trading hours announcement there is more
time for the uninformed investor to react and make more “noise” trades making it harder
for the market to react efficiently.\(^{22}\) Because of this idea the specialists tended to not
submit their full orders at the market opening following an overnight earnings
announcement. Instead they submit part of their order in the morning and then wait till
the market has fully reacted to the news and has leveled out at the appropriate market
price.\(^{23}\) The specialist reaction to earnings announcements, the use of earnings
announcements and the investor’s naivety of the information has been discussed now the
relation ship between earnings announcements and private information and liquidity will
be looked at through the research done by Furfine (2006).

Furfine has found that the investors are willing to participate in the market
because they believe the market to be reasonably efficient.\(^ {24}\) What Furfine found like

\(^{19}\) Ibid.

\(^{20}\) Ibid.

\(^{21}\) Ibid.

\(^{22}\) Ibid.

\(^{23}\) Ibid.

many other studies before is that there are two different types of information, publicly known and information specific to individual investors. Furfine also concluded that with a good earnings announcement the price of the stock will go up and that the opposite is true for a negative earnings announcement. The earnings announcement has been deemed the most visible form of public information. The announcements release a large amount of information to the public thus limiting the amount of private information that is available. Furfine defines private information as “all information about a given security price that is not known by all who trade it.” A conclusion, Furfine comes to is that the relationship between trading and price changes is a measure of the importance of private information in security price formation. He goes on to say that the release of major news should be accompanied by a reduction in the strength of the relationship between trading and price changes. The results of the study however did not show this hypothesis. The results indicated that even after earnings announcements, private information plays a significant role in price determination. Similar to the Libby research, Furfine believes that the marketmaker (or specialist) creates information asymmetry due to predictions about the amount of private information available. If the marketmaker believes there to be a lot of private information available then the bid-ask spread is large and the current market price of the stock is too low. The opposite is true if there is not much private information available then the bid-ask spread is narrow and the market price is too high. The earnings announcement is the most public of information but the timing of the announcement is also very important.

25 Ibid.
26 Ibid.
27 Ibid.
28 Ibid.
29 Ibid.
The announcement day varies from firm to firm and from quarter to quarter. The announcement can come within or outside of trading hours and before or after the Security and Exchange Commission (SEC) filing. Francis et al. (1992) studied the stock market response to the announcements when they are released during trading periods versus those released during nontrading periods. They were able to discover that the market reacts much faster to announcements made during trading periods and reaction time was longer for announcements made in nontrading periods. Francis et al. looked at the night trading market that occurs after the daytime market closes. They found that during the daytime the reaction is almost immediate whereas the nighttime announcement can take days to react. It was also discovered that most of the nighttime announcements contain more bad news for the firm and contained more big surprises than daytime announcements. The American Stock Exchange "explicitly sanctions after-trading-hour disclosures of big news events to provide a longer period of information dissemination." This is not true for the New York Stock Exchange, "the company manual does not contain any reference that encourages or discourages after-hour disclosure of big news events." Francis et al. found that the market responds faster to positive news than to negative news, and the response begins sooner for big surprises and lasts longer than the reaction to small surprises. A trading strategy that Francis et al. looked at was termed "chaotic traders," these are the traders that know new news is released but do not know the information or how to act with the information. The chaotic traders try to make quick

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31 Ibid.
32 Ibid.
33 Ibid.
profits from the information disclosures but this effect does not work when the announcements are made in the nontrading hours. The price of the stock however is affected by the overnight announcements. The opening price of the stocks is determined by a specialist who is “charged with maintaining fair and orderly markets in his assigned stocks i.e. smooth price sequences.”

Francis et al. were able to draw five significant conclusions regarding night announcements versus day announcements based on their study the difference between announcements made during trading hours and after trading hours. First, daytime announcements have more positive news than overnight announcements. Second, investors may delay or reduce the size of their opening orders. Third chaotic traders may not be active participants at openings following overnight disclosures. Fourth NYSE rules encourage specialists to avoid large deviations between prices. Fifth market reactions to overnight announcements may not be observed until after preannouncement orders clear at the open.

Francis et al. looked exclusively at how earnings announcements during the night trading market affect the daytime stock prices. Giannetti et al. (2006) studied the price movements, information, and liquidity in the night trading market. Giannetti et al. found that total night trading volume in 250 NASDAQ stocks averages about 4% of regular day session volume. They also found that since there are no providers of liquidity, like specialists on the NYSE, active during the night market, participants should expect

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34 Ibid.
35 Ibid.
poorer liquidity as a result of reduced market depth and widened bid-ask spreads.\textsuperscript{37} If during a night trade the price of a stock has an extreme movement the stock will reverse itself during the daytime trading period; however, it was found that 45\% of the reversals come before 9:30 a.m., the start of normal trading hours.\textsuperscript{38} Giannetti et al. found predictions “that in an efficient market, large changes due to public information disclosures are more likely to generate low trading volume and are less likely to be reversed.”\textsuperscript{39} Giannetti used a very small sample period from January 2000 to November 2000. They can use such a short time frame and still study the effects of price changes because in that time period “there were large stock-price changes in the period, so we can measure the degree of correction following such changes.”\textsuperscript{40} Giannetti et al. found results to conclude that smaller firms are associated with more overreaction than larger firms. They also found that a large loss at night is sometimes an overreaction and is corrected during the following day trading period. They finally concluded that “extreme stock-price movements at night are more likely to reflect mispricing, and therefore more likely to be reversed.”\textsuperscript{41}

While it has been found that waiting until after hours is a sign that the firm will report bad news there has also been a link found between if a firm waits to disclose earnings until after the SEC Filing date. While most firms announce their earnings to the \textit{Wall Street Journal} before the SEC filing date, there are some that wait. When a firm voluntarily delays the release of its earnings they on average have “lower return on assets

\textsuperscript{37} Ibid.
\textsuperscript{38} Ibid.
\textsuperscript{39} Ibid.
\textsuperscript{40} Ibid.
\textsuperscript{41} Ibid.
and higher leverage ratio than otherwise comparable firms.\\(^{42}\) The theory behind the voluntary delay is that the firm can delay the release of bad news as much as possible. The delay also causes the firm’s stock to have two different reaction periods. One period comes on the day of the SEC filing and the other comes on the day of the *WSJ* earnings release. The interesting part is that the market fails to recognize voluntary delay as a signal for bad news and adjust stock price accordingly.\\(^{43}\) “A firm is classified as a delayed firm only if its *WSJ* announcement is subsequent to the SEC filing.”\\(^{44}\) A study, by Hall and Stammerjohan (1997), found results that show firms that book significantly larger income-increasing discretionary accrual when the firm voluntarily delays public earnings announcements. This also was contrasted by findings that firms following the normal path have slightly income-decreasing, although not significant, discretionary accruals.\\(^{45}\)

If the market is truly efficient there should be no reaction to the latter release. If the market was efficient then the reaction should only occur when the information is made public the first time. It should not matter if the earnings announcement is made public after the SEC filing date because the information has already been made public.\\(^{46}\) During the study it was found that on average the firms that delay their earnings announcements are smaller than the firms that follow the normal reporting sequence, in terms of their market value, total assets, and net sales.\\(^{47}\)

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43 Ibid.
44 Ibid.
45 Ibid.
46 Ibid.
47 Ibid.
Similar to other studies it was found that firms exhibiting normal reporting sequences have significant abnormal market reaction for the five days before the *WSJ* announcement and the strongest reaction is on the day of the announcement. This also happens for the firms that delay their *WSJ* announcement until after the SEC filing date. The fact that the stock prices react so strongly even after the SEC filing date shows that the market is inefficient, and that the SEC filing is an ineffective tool for dissimilating earnings information. Results of this study allow for four final conclusions about delaying announcements to be made. The firms “are generally smaller, are experiencing decreasing earnings and operating cash flows, fail to meet market expectation of earnings, and suffer poor market return on their stocks.” The reaction and timing of the earnings announcement does not need to be discussed unless the reaction of the stock prices can be directly related to the announcements.

A popular view that many journalists, psychologists, and economists hold is that individuals tend to overreact to information. It has also been found to show that stock prices as a result also overreact to information. This causes a suggestion to use contrarian strategies when buying stocks. A contrarian strategy is buying past losers and selling past winners. This strategy is a way to generate abnormal returns if the stock prices are overreacting to the information received. The problem with this strategy as found by Jegadeesh and Titman (1993) is that within two years the returns begin to dissipate. The evidence still shows that past winners realize significantly higher returns than past losers.

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48 Ibid.
49 Ibid.
50 Ibid.
52 Ibid.
However, the data shows that "announcement date returns in the 8 to 20 months following the formation date are significantly higher for the stocks in the losers portfolio than for the stocks in the winners portfolio." \[53\] Another theory that Jegadeesh considered was that individuals "underreact to information about a firm’s short-term prospects but overreact to the long-term prospects." \[54\]

The argument against the efficient market theory has struck hard times to prove the generally accepted theory incorrect. The evidence supporting the efficient market theory is very convincing and the study done by Joy et al (1977) no exception. Their data suggests that the information of earning announcements is fully impounded in stock prices prior to or almost instantaneously at the time of announcement. \[55\] This study looked at 102 firms that were chosen from all non-regulated industrial companies that were continuously listed on the NYSE from 1963 to 1968. The final sample was ninety-six firms that all had quarterly announcements that were obtained from the WSJ. \[56\] If the data and conclusions defined by Joy et al. is a good description of how the market behaves, then the ability to find opportunities to make an economic profit are few and far between. The market however has many relationships that cause a change in stock price. Eddy and Seifert (1992) looked at the relationship of dividends and earnings announcements to the change in stock prices. \[57\]

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53 Ibid.
54 Ibid.
56 Ibid.
The Eddy study looked at the announcement times of dividends and earnings. The joint announcement causes a larger reaction if both of the announcements are consistent, either positive or both negative.\textsuperscript{58} There is evidence to show that these announcements are perfect substitutes. If the announcements are perfect substitutes then the stock price reaction should not differ between the two announcements. When the announcements are substitutes it is redundant for one of the announcements to come soon after the other. Eddy did show that if the second announcement is made more than ten days after the first, the information provided is useful and causes a stock price reaction to occur.\textsuperscript{59} The difference between the earnings announcements and dividends is that the dividends are not expected to change from quarter to quarter, this means that any quarterly changes in dividends are unexpected and thus cause a stock price reaction. On the other hand the earnings announcements are supposed to report a change in earnings, hopefully positive. An unexpected earnings announcement is when the firm reports more or less earnings than predicted in the quarter before. Like many other studies, Eddy found that the return period starts at least one day before the date of the announcement is made. "With no prior leakage of announcements and with efficient markets, the five-day return should incorporate the joint effect of the two announcements."\textsuperscript{60} It was found that when the dividends and earnings announcements are made simultaneously there is a much greater reaction in stock price than when only one announcement is made. If however the announcements are contradictory to one another the reaction is less if made simultaneously than apart from one another.\textsuperscript{61}

\textsuperscript{58} Ibid.
\textsuperscript{59} Ibid.
\textsuperscript{60} Ibid.
\textsuperscript{61} Ibid.
The efficient market theory is an accepted theory throughout economics. The theory however is only a theory and has not been proven to work 100% of the time. The studies discussed above are a few examples of findings to disprove the efficient market theory. The earnings announcements in each of the studies did reflect a response and change in the stock price for the firms studied. In each case there was a delay from the time of the earnings announcement to the time of the price reaction. If the market is truly efficient then the reaction would be instantaneous this however is not true. The purpose of trying to disprove the efficient market theory is to show that there is a way to make an economic profit in a market in which the accepted theory is the efficient market theory. This is only a small sample of the literature and studies that have already been completed about the efficiency of the market. It would be impossible to discuss all studies done pertaining to the EMH.
CHAPTER III

THEORY

The purpose of this paper is to research if the stock market is efficient with respect to earnings announcements. Efficiency is defined as how well the price of the security reflects the information that is available. Eugene Fama, an originator and clear advocate of the Efficient Market Hypothesis (EMH), considers an efficient market as one in which prices fully reflect all available information on an unbiased level at all times. Since the birth of the EMH into the financial world it has been accepted by the majority of investors on the stock market. While there is much literature in support of the EMH the literature that opposes the hypothesis is discussed in the previous chapter.

The idea of overreaction is not specific to only the EMH. The overreaction theory also implies that the market will react in such a way that will allow for abnormal returns to be made. The overreaction theory as stated by DeBondt (1983) states that since people overweight recent information the earnings announcements will cause an overreaction in

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the market.\textsuperscript{2} If the market overreacts the chance to make abnormal returns increases. The overreaction theory is similar to the efficient market theory in that it explains how abnormal returns can be made. However, the overreaction theory, unlike the EMH implies that the market consistently overreacts whereas the EMH implies that the market is efficient and will not overreact.

The efficient market theory is the primarily accepted theory of stock market reaction time. Fama theorized that there are three different forms of the efficient market theory. The \textit{weak, semi-strong,} and \textit{strong} forms, each has special requirements for the market to be called efficient. The strong form contains both the \textit{semi-strong} and \textit{weak} form, likewise for the \textit{semi-strong} and \textit{weak} forms. Each form looks at a different amount of information and dictates, based on the stock market's adherence to the requirements if the market is efficient in the weak, semi-strong or strong forms. Based on the research done by Fama the efficient model stands up well with a few exceptions.\textsuperscript{3} If a market is truly efficient then the stock prices will "fully reflect" all available information.

Fama suggested that a market can not be efficient unless the current price of the stock incorporates all outside news and events that affect the stock market, these include: earnings announcements, product announcements, or other news relevant to the stock market or overall economy.\textsuperscript{4} The theory that the market is efficient has only been confirmed to happen if a number of sufficient conditions for capital market efficiency are met. These conditions include "\begin{enumerate}
\item[i)]there are no transactions costs in trading securities
\item[ii)]all available information is costlessly available to all market participants
\item[iii)] all agree on
\end{enumerate}\textsuperscript{5}

\begin{thebibliography}{9}
\bibitem{3} Ibid.
\bibitem{4} Ibid.
\end{thebibliography}
the implications of current information for the current price and distributions of future prices of each security."\textsuperscript{5} If all of these conditions are met the market is can be efficient. The definition of each form is discussed below in further detail beginning with the \textit{weak form} and ending with the \textit{strong form}.

\textit{Weak Form:}

The basis for the weak form of the EMH was the random walk model. The random walk model is an “extension of the general expected return or “fair game” efficient markets model in the sense of making a more detailed statement about economic environment.”\textsuperscript{6} The random walk theory suggests that current or future prices can not be based on past prices since each individual day is an independent event. This however does not hold true when the stock markets seem to move with momentum. Momentum denotes that the stock market moves in trends and us cyclical. This is the reason for the crashes and booms that the stock market regularly experiences.

The term random denotes a negative aspect of choosing which stocks to invest in. It is only used to show that stock prices should only react to new information. However, in a study done about timing of an earnings announcement evidence showed that the market react s to the same information if released at separate times.\textsuperscript{7} The study done by Chung et al. (2003) is discussed in the previous chapter.

The \textit{weak form} of the theory is the easiest for a market to achieve. For a market to be considered weakly efficient the price of the security must incorporate historical prices, trading volume data, rates of return, company news and other information.

\textsuperscript{5} Ibid.
\textsuperscript{6} Ibid.
\textsuperscript{7} Kwang-Hyun Chung, Rudolph A. Jacob, and Ya B. Tang, "Earnings Management by Firms Announcing Earnings After SEC Filing," \textit{International Advances in Economic Research} 9, no. 2 (05 2003): 152-162.
generated by the market. Unlike the strong form of the theory the weak form is easily achieved in reality. While the strong form is unachievable in reality and the weak form is easily achieved the semi-strong form seems to be the most supported form of the theory thus proving that it is also achievable in the real world market.

Semi-Strong Form:

The semi-strong form of the EMH means that current stock prices fully reflect all available public information. Since market information available in the weak form is all public then we can assume that the semi-strong form efficiency also contains weak form efficiency. The forms of public information that are not available in weak efficiency but are necessary for semi-strong efficiency include: price-to-earnings rations, dividend-yield ratios, price-book value ratios, stock splits earnings and dividend announcements as well as any political or economic news that impacts the markets.

The semi-strong form of the efficient market theory is similar but less extensive than the strong form. In the semi-strong form of the theory, as discussed by Fama, the market must adjust the prices efficiently to information that is obviously publicly available. The semi-strong form of the theory is based on the speed that the price adjusts to the news that is publicly available. The evidence that Fama found is in support of the semi-strong form of the theory and also shows that the strong form of the theory is an ideal situation that is in reality not achievable.

Strong Form:

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9 Ibid.  
12 Ibid.
The conditions stated above only happen in the ideal circumstances. In these ideal circumstances the market is efficient in the *strong form*. The *strong form* requires the market to "fully reflect" all available information. The *strong form* of the theory incorporates all information that can be known about a stock price is known by all of the investors at the time of the information released. In a strongly efficient market no investor has access to information that would allow them to make an abnormal return on any security.\(^{13}\) This would cause the search for a securities intrinsic value to be excessive since the price in the market is the intrinsic value of the security. This would be indicated by the average abnormal returns of all companies across the market being equal to zero in every instance no matter what the announcement or what the market is doing at the time.

What the market requires to be considered efficient in the *strong form* is for all investors to have a monopolistic amount of information about each firm.\(^ {14}\) For a group of traders to be able to earn abnormal returns on a consistent basis in *strong form* efficient market they have to know information that is not available to the public. This however, makes the *strong form* of the EMH invalid. Since the *strong form* implies that the price of the security already has all possible information factored into it. Four groups were studied and found to have consistent abnormal returns in a strong efficient market ideal. These groups were corporate inside trading, stock exchange specialists, security analysis and professional money managers.\(^ {15}\) These groups are the people that have access to the information before it is made public which negates the entire idea of market efficiency.

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\(^{15}\) Abdel K. Halabi, "Investment Analysis and Portfolio Management (Book)," *Accounting & Finance* 39, no. 3 (11 1999): 300.
For the market to be efficient in the *strong form* the assumption that nobody learns about information before it is made public has to be taken into consideration.

The information that is available to disprove the efficient market theory is limited. However it has been researched and confirmed by studies that investors generally overreact to news about a stock market. In a study done by De Bondt and Thaler (1985) they found that “individuals tend to overweight recent information and underweight prior (for base rate) data.”\(^{16}\) The base rate data mentioned above is the data that is previously available to the public before the announcement of news.\(^{17}\) This theory violates the weak form of market efficiency. When investors overreact to news in the market the market price then also overreacts and the price either spikes positively or negatively. With consistent overreaction, the reversal of prices should be predictable based on past studies and data, without the need for additional financial accounting.\(^{18}\)

Trends in company’s earnings have been found to impact the amount of overreaction to news. If a company consistently reports negative earnings the investors “become excessively pessimistic after a series of bad earnings or other bad news.”\(^{19}\) Since the past prices and trends of the market do have an impact on how investors react to new news, this is evidence of a weakly efficient market. If a market is efficient in the *weak form* then there is the possibility of *semi-strong* and *strong* efficiency. As discussed above the strong form of the EMH is not achievable except under ideal and unrealistic circumstances.\(^{20}\) This idea also works in the reverse direction; if the market is not

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17 Ibid.
18 Ibid.
19 Ibid.
efficient in the weak form then it cannot be efficient in the semi-strong form or the strong form. To show evidence that a market can be efficient in the semi-strong form all of the conditions for the weak form must be met as well as all of the additional conditions for the semi-strong form.
CHAPTER IV

DATA, METHODOLOGY

Data

The collection of the data is broken down in a number of steps. First, the sample size is determined. It was important to have a random sample of numerous companies from different industries to create credible results. Once the companies were determined, the quarterly earnings announcements for the last three years were found. Thirdly the stock prices for the week before and after each earnings announcement is found. The beta for each company is calculated for each pre-announcement period. Lastly the average abnormal return and the cumulative abnormal returns are calculated so that it was possible to determine if the market is efficient.

The dates of earnings announcements were gathered online from MarketHistory.com. The website catalogues company’s announcement dates for each quarter over the past three years. The daily close of each stock was used instead of the weekly stock price before and after to emphasize the lag period after an earnings announcement. These prices were gathered using Yahoo’s Finance webpage. The
historical prices for each company were listed and then organized so that analysis could be done. In addition to gathering the prices for each stock it was necessary to collect historical prices for the S&P 500’s exchange fund called spider (SPY). The use of the SPY fund was necessary to use as a comparison to the overall market’s performance on the day of the announcement. These were collected in the same manner as the other prices.

Methodology

This section will describe the method used for analysis in this study. The study examines whether an overreaction to earnings announcements in the stock market exists. To determine if earnings announcements have an impact on a firm’s value in relation to the rest of the stock market the method of analysis will follow that of Woolridge and Snow (1990).

To successfully complete a study of the efficiency of the market it is necessary to distinguish between a prediction study and an event study. In previous studies of the efficiency of the market there have been two types of studies, prediction studies and event studies. The type of study that will be used in this paper to determine if the market is efficient will be event studies.

An event study examines a certain event, in this case an earnings announcement, and looks at the time it takes for the stock price of that security to incorporate the new information disclosed in the announcement. An event study uses data from financial markets to predict the financial gains and losses associated with newly disseminated information. For example, the announcement of a merger between two firms can be
analyzed to make predictions about the potential merger-related changes to the supply and the price of the product(s) subject to the merger.¹

A prediction study is used to try and predict what future earnings and pricing will be based on time-series analysis of cross sectional distribution.² In a prediction study researchers use numbers such as the price to earnings ratio of past periods and the quarterly cash flows statements.³ In a prediction study past numbers are used to predict what the future numbers of the company will be. If the market proves to be efficient using a prediction study would be a good technique to look at trends in the market and could possibly allow for an individual or a firm to create abnormal returns.

By using an event study we will be able to use the previous data available for each of the companies chosen to make a conclusion about the efficiency of the market. In all of the papers looked at in support against the efficient market theory almost all were exclusively event studies. The size of the studies varied from a couple hundred firms to a couple thousand firms over and the time frame varied from one year to ten years. While the sample in this study will be a smaller sample than many of the other studies; this study will span the course of three years with each company having consistent quarterly announcements; allowing for a total of twelve announcements per company.

**MARA Approach:**

While there is no clear cut way to calculate abnormal returns on a stock, many methods have been created to try and calculate the returns as accurately as possible. The

² Abdel K. Halabi, "Investment Analysis and Portfolio Management (Book)," *Accounting & Finance* 39, no. 3 (11 1999): 300.
³ Steve Buchheit and Mark Kohlbeck, "Have Earnings Announcements Lost Information Content?" *Journal of Accounting, Auditing & Finance* 17, no. 2 (Spring 2002): 137-153.
method that was used by Woolridge and Snow (1990) will be used to calculate abnormal
returns for this study as well. The MARA approach is known as the market adjusted
returns approach.\(^4\) The return on day \(t\) for security \(i\) is calculated by the following
equation:

\[
\text{r}_{it} = \text{u}_{it} + \text{e}_{it}
\]

where \(r_{it}\) is the return for security \(i\) on day \(t\).\(^5\) The term \(u_{it}\) represents the expected return
for security \(i\) on day \(t\) and the final term is the stochastic error term, which is uncorrelated
over time and has an expected value of zero. The expected return is a large positive
number if the market is inefficient. The idea of this paper is that the expected return on
the day of an earnings announcement will be a large positive number. For this study the
equation can be rewritten as:

\[
\text{e}_{it} = \text{r}_{it} - \text{u}_{it}\]

In the new equation \(r_{it}\) represents the actual return of the stock on day \(t\). This is found by
the closing price of stock \(i\) on day \(t\). The term \(u_{it}\) represents the mean return for the stock
market on day \(t\). This is found by using the S&P 500 index's exchange fund called Spider
(SPY). This fund gives a very good indication of the overall value of the market. The
result of this equation is the abnormal or unexpected returns for the stock \(i\) on day \(t\) which
is shown as \(e_{it}\). The abnormal or unexpected return is the effect that the earnings
announcement had on the security on the day of and the days prior to and after the
announcement.

\(^5\) Ibid.
\(^6\) Ibid.
In this model the term $u_t$ is a function of the term beta. The beta is a measurement of the risk of the current market. This influences the return on any given day and would increase or decrease the abnormal return. The increase in abnormal return would indicate how beta is influential on a stocks market return. If the risk is higher the stock is less likely to have a high return, but if it does return positively it will be a higher positive return thus increasing the value of $u_t$.

**Beta:**

Beta is a value that indicates the systematic risk on a certain stock in relation to the entire stock market. Since historical betas are unable to be found each individual beta is needed to be calculated through regression analysis. The equation for the regression is similar to the Capital Asset Pricing Model equation (CAPM). The equation is as follows:

$$(r_{it} - r_{f,t}) = \alpha + \beta_i (r_{mkt,t} - r_{f,t})$$

In this equation the actual rate of return is used instead of using the expected rate of return as in the CAPM equation. In the beta equation $\alpha$ replaces the $r_{it}$ both are a constant so the change is insignificant. The rest of the terms remain the same.

These research methods have only shown what happens to a stock over the course of a day. If one stock makes an abnormal return on an earnings announcement day the entire stock market does not necessarily create abnormal returns as well. It is necessary to note that everyday certain stocks make abnormal returns but this does not mean that every day the stock market as a whole has abnormal returns. The definition and calculations for abnormal returns are discussed below.

**Abnormal Returns:**

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The method looked at only shows the impact of each individual security over the
course of one day. One abnormal return does not mean that the entire stock market
experienced abnormal returns on day t. To determine if firms were on average
overreacting to product announcements, the average abnormal return was calculated
using the following equation:

$$AR_t = \frac{\sum e_{it}}{n}$$

All of the announcements were organized around the day the announcement was made. In
this study the day of the earnings release is day 0. ARt represents the average abnormal
return for event day t and eit is the abnormal return for security i on day t. In this equation
the term n is the total number of announcements in the sample studied.

The next step in determining abnormal returns involves evaluating the effect of
the announcement over time. The CAR (cumulative abnormal return) equation indicates
if a security is impacted by an earnings announcement. The CAR equation is as follows:

$$CAR_n = \sum AR_t$$

where CARn represents the cumulative abnormal return as of day t. In this study, CARs
were looked at seven days before the announcement and seven days after the
announcement. ARt is the average abnormal return for day t. The CAR is significant in
this study because it provides an answer to the impact of earnings announcements on
stock prices. The null hypothesis being examined is CAR = 0. If this is true then the
information in the earnings announcement has no bearing on a firm’s stock price. On the
other hand if CAR ≠ 0 then the stock price either over or under reacts to the earnings
announcement.

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8 Ibid.
9 Ibid.
Length of Study:

By looking at quarterly announcements the study is able to have a shorter length of time in years but still gather enough data to make a credible conclusion about the efficiency of the market. While many of the other studies have more data points than this study, they primarily look at the annual earnings announcement of the company whereas this study will look at the quarterly earnings announcements of each company. Looking at the quarterly announcements will allow the study of how the company reacts from quarter to quarter throughout a year and a period of years. This will allow the study to have a total of twelve different events for each of the thirty-seven companies that I am looking at. The total number of events is in the median of previous studies reviewed prior to the beginning of this study.

To use an event study I have chosen the date of the earnings announcement for three years previous of this study. To try and show evidence that each event causes a change in the market I will look at the seven days prior to the announcement and the seven days after the announcement. The number that I will use to track the change in each company is the closing price for each day looked at. The closing price is the best number to use to view changes throughout the day. Looking at the price of the previous day and that of the next day the price change of the announcement day is easily detected if a change is present.

I predict that there will be an obvious change in the price of a stock on the day of the earnings announcement. Studies looked at noticed that there was a change in the price of the stock market. Those studies arguing in support for the efficient market theory show that the price of the stock market changes within a few minutes of the earnings
announcement.\textsuperscript{10} These studies however are contradicted by studies that show that the market does not react immediately and takes a few days to recover from the announcement.\textsuperscript{11}

Expectations:

While there will be an obvious change in the stock price change the day of the earnings announcement, I also believe that the stock price will take time to adjust back to a stable price. I also predict that there will be change in stock prices in the day prior to the announcement.

The changes prior to the announcements will be due to information becoming available before the announcement. The traders and investors who are able to discover the type of information, good earnings or bad earnings, before the release to the public will cause the price of the stock to fluctuate. While trading on the information before it is available is considered illegal in some studies it was still found to happen.\textsuperscript{12} Since the information is sometimes leaked before the official release date changes prior to the announcement day are expected. Many companies work very hard to limit the amount of information available before the announcement day.\textsuperscript{13}

The ability to discover the information before it is available to the public is what makes the efficient market theory important to study. If the market is truly efficient then it should not matter as to who knows what information or when the information becomes

available. The efficiency of the market is very important in determining how easily an abnormal profit can be created through knowledge of a company.

By using a similar style of study that many other researchers have used before me I am able to compare my results directly with the results of previous studies. I expect that my results will be similar to those that are against the efficiency of the market. I expect to see a two to three day lag in response in the stock prices after the announcement. For example, if a company announces bad earnings then the stock price will fall for two or three days and then rise back up to a stable price below the original price before the announcement.
CHAPTER V

RESULTS

In this study's sample of earnings announcements from 2004 to 2007, daily stock returns were generated from Yahoo Finance. While only the earnings announcements were studied there are many other types of announcements that would create a similar effect on the price of security i on day t. Since the exact time of the earnings announcements are unavailable the excess returns on the day of the announcement as well as the seven days prior to and after the announcement have been evaluated as well. Since only one type of announcement was studied, the day of the announcement was also evaluated. The difference between an announcements made on a Monday versus an announcement made on a Friday were evaluated to determine if there is a greater market reaction for an announcement made on the opening or closing end of the work week. Seems to me you may want to have a Results chapter which contains all the work from this point forward.

Results of the MARA Approach:
The results of the MARA approach were imitating the methodology used by Woolridge and Snow. The day of the announcement is used as day 0 while the seven days following were evaluated to study the entire effect of the announcement on the stock market as a whole as well as the security itself. The average of each company’s average abnormal return was used to evaluate if the company overall experienced abnormal returns after an earnings announcement. The average of each company was then calculated into an overall average abnormal return to determine if the market has an overall abnormal return based on earnings announcements. The average abnormal return for each company studied as well as the total average abnormal return is displayed in Table 1.

In Table 5.1 all of the average abnormal returns for each individual company are listed. If the EMH holds up in any of the forms, weak, semi-strong or strong the results will be close to or equal to zero. However if the results are not zero this is evidence that the EMH is not valid at least for this sample of the market. If the results are a large positive number then the stock is experiencing large abnormal returns concluding that the stock is under priced. The opposite is true if the results are a large negative number indicating that the security is currently overpriced.

Table 5.1

Average Abnormal Return (Over a 3 year period)

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Symbol</th>
<th>Average Abnormal Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Woodmark Corp</td>
<td>AMWD</td>
<td>-0.01439</td>
</tr>
<tr>
<td>Ann Taylor Stores Corp</td>
<td>ANN</td>
<td>-0.01471</td>
</tr>
<tr>
<td>Bob Evans Farms</td>
<td>BOBE</td>
<td>-0.01505</td>
</tr>
<tr>
<td>Company Name</td>
<td>Ticker</td>
<td>Daily Abnormal Return</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>The Bon-Ton Stores</td>
<td>BONT</td>
<td>-0.01543</td>
</tr>
<tr>
<td>CECO Environmental</td>
<td>CECE</td>
<td>-0.01796</td>
</tr>
<tr>
<td>Conn's</td>
<td>CONN</td>
<td>-0.01580</td>
</tr>
<tr>
<td>The Cato Corporation</td>
<td>CTR</td>
<td>-0.01591</td>
</tr>
<tr>
<td>ESCO Technologies</td>
<td>ESE</td>
<td>-0.01036</td>
</tr>
<tr>
<td>Focus Enhancements</td>
<td>FCSE</td>
<td>-0.01560</td>
</tr>
<tr>
<td>Fred's Inc</td>
<td>FRED</td>
<td>-0.01835</td>
</tr>
<tr>
<td>Genesco</td>
<td>GCO</td>
<td>-0.01571</td>
</tr>
<tr>
<td>Golar LNG</td>
<td>GLNG</td>
<td>-0.01707</td>
</tr>
<tr>
<td>Gerber Scientific</td>
<td>GRB</td>
<td>-0.01674</td>
</tr>
<tr>
<td>Hewitt Associates</td>
<td>HEW</td>
<td>-0.01533</td>
</tr>
<tr>
<td>H.J. Heinz</td>
<td>HNZ</td>
<td>-0.01347</td>
</tr>
<tr>
<td>Indevus Pharmaceuticals</td>
<td>IDEV</td>
<td>-0.01871</td>
</tr>
<tr>
<td>Isle of Capris Casinos</td>
<td>ISLE</td>
<td>-0.01570</td>
</tr>
<tr>
<td>Jack in the Box</td>
<td>JBX</td>
<td>-0.01296</td>
</tr>
<tr>
<td>51job</td>
<td>JOBS</td>
<td>-0.01659</td>
</tr>
<tr>
<td>Mento Graphics</td>
<td>MENT</td>
<td>-0.01741</td>
</tr>
<tr>
<td>Mitcham Industries</td>
<td>MIND</td>
<td>-0.01741</td>
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<tr>
<td>NAPCO Security Systems</td>
<td>NSSC</td>
<td>-0.01759</td>
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<tr>
<td>NU Horizons Electronics</td>
<td>NUHC</td>
<td>-0.01801</td>
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<td>Novavax</td>
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<tr>
<td>OmniVision Technologies</td>
<td>OVTI</td>
<td>-0.01694</td>
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<td>Phillips-Van Heusen Corp</td>
<td>PVH</td>
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<td>REX Stores Corporation</td>
<td>RSC</td>
<td>-0.01716</td>
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<td>SeaChange International</td>
<td>SEAC</td>
<td>-0.01822</td>
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<tr>
<td>Smithfield Foods</td>
<td>SFD</td>
<td>-0.01516</td>
</tr>
<tr>
<td>Sears Holding Corporation</td>
<td>SHLD</td>
<td>0.00182</td>
</tr>
<tr>
<td>The J.M. Smucker Company</td>
<td>SJM</td>
<td>-0.01223</td>
</tr>
<tr>
<td>Stein Mart</td>
<td>SMRT</td>
<td>-0.01695</td>
</tr>
<tr>
<td>Sonus Pharmaceuticals</td>
<td>SNUS</td>
<td>-0.01856</td>
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<tr>
<td>Argon ST</td>
<td>STST</td>
<td>-0.01531</td>
</tr>
<tr>
<td>Vimpel-Communications</td>
<td>VIP</td>
<td>-0.01192</td>
</tr>
<tr>
<td>Warner Music Group</td>
<td>WMG</td>
<td>-0.01720</td>
</tr>
<tr>
<td>The Wet Seal</td>
<td>WTLSA</td>
<td>-0.01879</td>
</tr>
</tbody>
</table>

The average abnormal return for all of the companies except one over the three year study is a small negative number. The only company that has a positive average abnormal return is the Sears Holding Corporation with an average abnormal return of .00182. This indicates that the market is possibly efficient at least in the weak form of the theory. The reason for this conclusion of market efficiency is because not one of the average abnormal returns is greater than .01. The only positive number in the sample is also the
result that is closest to zero. In a truly efficient market the average abnormal return for all companies would be equal to zero. This would indicate that the market is efficient in the strong form.

Since the majority of the average abnormal returns were negative this indicates that the majority of the stocks are in fact overpriced. What this indicates is that for these thirty-seven securities on average over the three year study were overpriced. The average abnormal return for the entire sample over the three year period was \(-0.01555\). This again confirms the idea that these securities are overpriced on average, however since the result is close to zero this shows that they are not overpriced by a large margin.

In addition to looking at the entire three year period for each announcement made the day of the announcement was also evaluated. The results of the average abnormal return for all announcements made on Fridays and Mondays over the three year period are \(-0.01549\) and \(-0.01575\) respectively. This again supports the idea that the EMH is applicable to the overall market. The close margin between Fridays and Mondays indicates that there is not a large difference in the average abnormal return, positive or negative, if the announcement is made at the beginning of the work week or at the end of the work week. For each day the seven work days before the announcement and the seven work days after the announcement were evaluated to determine the average abnormal return for the security for each earnings announcement. The average abnormal return for each individual Friday is graphed below in figure 5.1 to show that the majority of the average abnormal return for Friday is clustered around \(-0.015\). This supports the idea that while the securities are overpriced they are all overpriced by approximately the same amount indicating that the market is efficient even if the securities are overpriced slightly.
while there are a few outliers in the theory the majority of the securities are over priced by similar amounts. This indicates that although the market is slightly inefficient it is inefficient to the same extant across the entire stock market. The same applies to the announcements that were made on Monday. The numbers for Monday announcements were very similar to the results of Friday announcements. The results for announcements made on Mondays have a better $R^2$ at .2007 versus the $R^2$ of Friday announcements at .0975. This indicates that the Monday announcements are more regular than those made on Fridays.

The results of the average abnormal returns for announcements made are displayed below in figure 5.2. The initial hypothesis was that there would be larger
positive abnormal returns for announcements made on a Monday rather than announcements made on Friday. The idea behind this initial hypothesis is that a company will wait as long as possible to release bad earnings and would delay so that the impact on the value of the security would be less than it would be if released at the beginning of the work week. This however was not true; the numbers indicate that there was a larger positive return for announcements made on Fridays. While the difference between the two is only .00026, the miniscule difference indicates that there is almost no difference between if a company releases their earnings on a Monday or a Friday.

Figure 5.2
Average Abnormal Returns
(Monday)
The results that have been calculated in this study are an unbiased look at the market and its reaction to earnings announcements of firms. The methodology used in this study replicated the system of equations and calculated used originally by Woolridge and Snow. This method was found to be the most reasonable as well as the most effective in calculating abnormal returns for a company over a period of time encircling an event, such as an earnings announcement or a product release announcement. While the results were not exactly what was expected they were valid and allowed certain conclusions to be made about the EMH and its application to the current stock market. The following section will conclude the study and discuss the results and the expectations.
CHAPTER VI

CONCLUSION

The stock market will continue to fascinate the world and whether the market is efficient or not will continue to be a topic of great discussion. While some may argue that the market is efficient in the strong form of the EMH others will continue to argue that the market is completely inefficient. The purpose of this study was to add to the already vast amounts of research done on the topic of the Efficient Market Hypothesis. This study specifically looked at the effect of a company's earnings announcement and its effect on the security and the market as a whole. While there has been no direct evidence that disproves or proves the hypothesis there has been much research done and while each study has unique results many of them come to similar conclusions that the market is efficient to an extent and that there is still the availability for abnormal returns to be generated.

There are many different theories that can effectively describe what this paper has been researching and studying however the most pertinent one is the EMH. The EMH can be broken down into three distinctive categories: weak form, semi-strong form, and strong form. The market is efficient in the weak form if it is not possible to use past prices
and volume data to earn abnormal returns. This means that the current price of a security reflects past price and trading volume data. A market is efficient in the *semi-strong form* if it is not possible to use public information to earn abnormal returns. This form of the EMH indicates that the current price of a security reflects not only all past price and volume data but all of the publicly available information as well. Finally the market is efficient in the *strong form* if and only if the requirements for both the *weak* and *semi-strong* forms are met as well as if it is not possible to use any information, public or private, to earn abnormal returns. In the case of the *strong form* the current price of a security reflects all available information.\(^1\) There are two primary ways that investors select which stock to invest in. The first being technical analysis and the second being fundamental analysis. Technical analysis uses past information about patterns to predict the future value of a stock. Fundamental analysis attempts to calculate a firm’s intrinsic value and basing stock choice on a firm’s fundamental value.\(^2\)

The majority of the research that applies to this study is about the market and its inefficiency. In previous studies it was found that the market is not efficient and does overreact. The study that provided the bases of methodology, Woolridge and Snow (1990), found that on average the market overreacted by .30 percent. The next section will assess the results of this study in comparison to the results of Woolridge and Snow.

**Comparison with Previous Studies**

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As discussed above the methodology for this study was based off of the Woolridge and Snow (1990) study. The study provided valuable information and data analysis; however, was written nearly eighteen years ago, which allows for many changes in the financial world to have taken place. Over the course of the eighteen years the market has fluctuated and had many variable introduced that could effect the state of the financial markets, such as economic and foreign activities. This indicates that an updated version of this methodology is needed so that a more accurate description of the application of the EMH can be acknowledged. The purpose of this study was to mirror the approach taken by Woolridge and Snow (1990) with few modifications.

Woolridge and Snow:

The data used in this study differs from that in the Woolridge and Snow study. The Woolridge and Snow study uses joint ventures, research and development projects, capital expenditures and product/market diversification, while this study looks solely at earnings announcements. Both studies use an event study rather than a prediction study to calculate the average abnormal returns for a security.

The results for the Woolridge and Snow study were very different from the results calculated in this study. In the Woolridge and Snow study there were positive average abnormal returns and cumulative abnormal returns. This however was not true for this study. In this study the vast majority of companies on all days had a negative average abnormal return as well as a negative cumulative abnormal return. The sole exception was the Sears Holding Corporation, SHLD, which had an average abnormal return of .00182. This small number of positive returns was unexpected. The expectations were that there was going to be a large abnormal return the day of the announcement as well as
the three days following the announcement. Instead there was a negative return on days leading up to the announcement as well as the day of and the days following the announcement. This was not true for the Woolridge and Snow study. In their study they reported an abnormal return of .350 on the day of the announcement and a cumulative abnormal return of .640 on the day of the announcement. The previous study also showed evidence of a much greater movement of abnormal returns between day 0 and day 1.

From day -1 to day 0 the abnormal return in the Woolridge and Snow study increased by .05 while in this study the average change between day -1 and day 0 was zero. This indicates that the stocks in the Woolridge and Snow study on average have a much larger reaction to announcements than the stocks chosen for this study. This study seemed to have results that were not close to those of Woolridge and Snow. It is hard to make any conclusions about the EMH and its application to earnings announcement reactions since the data is so different from that of Woolridge and Snow. However from the results that were calculated in this study it can be determined that the market is efficient in regards to these thirty seven stock and their earnings announcements.

Another factor that may explain the difference in results is the different types of announcements and events that were studied across the two studies. This study looked at earnings announcements while the Woolridge and Snow study looked at different forms of events such as joint ventures. It seems that investors react differently to earnings announcements than to joint ventures, research and development, capital expenditures and product/market diversification.

The pattern of the CAR’s in the Woolridge and Snow study showed a decrease in abnormal returns in the ten days following the announcement. This study expected to
have similar results across the seven days after the earnings announcement. This was not true, there seemed to be almost no pattern for abnormal returns pre and post announcement day.

The expected decline in the abnormal returns post announcement day was to indicate that the market acknowledged its overreaction to the announcement and was working back down to the actual market value of security $i$. The correction for the overreaction follows the overreaction theory in that the market initially overreacted and over a period of time will correct the overreaction itself. This happens as the investors recognize the market’s initial overreaction to the announcement and realize the announcement was not truly representative of the stock’s value. The recognition results in a decrease of the stock’s price.3

**Implications**

Previous research about the EMH suggests that companies can consistently provide positive abnormal returns, implying inefficiency. This study shows that the majority of stocks will return a small negative abnormal return, implying that the market is efficient. 36 of the 37 companies studied in this study returned negative average abnormal returns. This study shows evidence of the market being efficient however there are several things that could be improved upon to make this study more effective as well as accurate.

The study could benefit from a larger sample. The sample size was picked at random for the most accurate representation of the market. However, the sample would have been a better representation of the market if it had been larger. An increased length

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of the study would also have been beneficial. The historical announcement dates for these companies could only be located for the past three years, 2004-2007. If the study could be expanded to five or seven years then there would be an even better representation of market trends and give a more accurate representation of the efficiency of the market.

The study could also have benefited from more announcements about earnings. The study could have included the SEC announcement dates, if different from company earnings announcement dates. This would have allowed the size of the sample to remain the same but would have approximately doubled the number of announcements studied.

To further benefit the accuracy of this study further research on calculating abnormal returns is also needed. Most studies pertaining to this area of research cannot be compared easily because most studies calculate abnormal returns differently. If more research on how to calculate abnormal returns was conducted then more studies would be able to be compared. If there was one calculation that was considered to be the best throughout the financial world the studies could all be compared and then a more accurate conclusion about the efficiency of the market could be made.

Other factors that affect the accuracy of this study include how information is gathered and how available it is to the general public. Most of the research done was before any investor could obtain the information. The previous studies were conducted when the investor had to know where to look for information about earnings announcements. Now with technology the average investor has all of the information that the large firms have at the same time. This allows for all investors to react to announcements much faster.
This study found that the market is efficient in regards to a company’s earnings announcement. The topic of efficiency in the market will continue to be of great debate until there is irrefutable evidence supporting or negating the Efficient Market Hypothesis. While this is only one study of thousands that look at the market’s response to an announcement there are many that support the findings of this study as well as many that support the idea that the market is inefficient. This study adds to the argument that the market is efficient and will hopefully be of use for future studies in the field of market efficiency.
Sources Consulted


Halabi, Abdel K. "Investment Analysis and Portfolio Management (Book)." *Accounting & Finance* 39, no. 3 (11 1999): 300.


