The Effect of Earnings Announcement on Share Prices in Ghana: A Study of Ghana Stock Exchange

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Abstract

In an efficient market, information is as plentiful and inexpensive, and the market is expected to immediately absorb any information released to the public. This paper examined the effect of earnings announcement on GSE by analyzing changes in share prices for the period from January 2010 to June 2013. The study population was all the listed companies on GSE and 10 companies were selected for the study. Abnormal returns during an event window of 21 days were determined using the event study methodology by employing the market model on data collected about selected companies. Inferential and descriptive statistics were used to test for significant effect of earnings announcement on share prices. The results obtained indicate that the abnormal returns around the earnings announcement were not significant at a 5 % margin of error and the insignificant cumulative average abnormal returns surrounding the event date are inconsistent with EMH. This suggests that the Ghana stock market does not efficiently adjust to earnings information. It is concluded that earnings announcement depicted no major effect on share prices of companies at the time of the announcement as well as immediately after the announcements.

Keywords: earnings announcement, share prices, event study, confounding effect, efficient market hypothesis, abnormal returns, market returns, platykurtic

1. Introduction

Information plays a key role in every aspect of corporate businesses and in the contemporary financial market. Information is a key factor used to determine the efficiency, the effectiveness and the strength of the market. Information released to the general public by firms directly or indirectly has a major influence on investors' perceptions of the business hence its value. Both individual and institutional investors attach great importance to information in the selection of portfolios of equity securities, bonds and other investments. It is therefore expected that upon release of information on earning, a market should immediately absorb the information and adjust the value of the firm accordingly.

Earnings announcement is an official public statement of a company's financial performance or profitability for a specific time period, typically quarterly, half annually or yearly. It is when a company publicly releases its financial information or statements showing its performance in the forms of profit and loss statement, balance sheet and cash flow statement for a specific period of time. Companies listed on a stock market for example Ghana Stock Exchange (GSE) are legally required to announce their earnings every quarter. Earnings provide critical information to shareholders and/or investors as far as the company's past performance is concerned, and are used extensively in forecasting future performance and valuations of equity (Mlonzi et al, 2009).

Capital markets react to various corporate announcements, and one such significant announcement is the earnings announcement. The value-relevance of earnings announcements has been an important topic in financial accounting over the last four decades (Booth et al. 2011). Management uses earnings information to inform both shareholders and investors about the state of health of a firm. That is, earnings announcements provide a yardstick that can be utilized by the market to assess the wealth and profitability of a firm. Financial managers also would want to look to the market both for reliable signals or information to guide investment and financing decisions, and also for the market's assessment of how well they are performing in existing activities.

A number of empirical researches have been carried out on the impact of the earning announcement on share prices. Furthermore, some studies have sought to establish the value of the information in forecasting future financial performance, while others have attempted to measure its impact on share prices (Ball & Brown, 1968; Booth et al., 2011). However, the impact of the earning announcement can fairly be measured in a market devoid of information bias. That is, if the market is efficient, then any new information released is instantaneously reflected in the share price (Fama, 1970). Besides, unless people are confident that share prices accurately reflect the value inherent in companies, they will be reluctant to use the markets. In other words, people need reassurance that the valuation of financial assets genuinely reflects company's earnings prospects.

On these fundamental issues, finance theorists look for reassurance at the degree of efficiency manifested by financial markets in absorbing new information about the economy in general and about the prospects of individual firms in particular. An efficient market is, therefore, one in which prices fully reflect available

information. It is where information is plentiful and inexpensive, and it is quick to circulate. In an efficient market, security prices reflect in totality all publicly available information thus eliminating any opportunity to make excess profits from available information because it is already captured in the market prices (Fox & Opong, 1999; Fama, 1970). Security prices respond very rapidly to new information in efficient market therefore it should be impossible for investors to make abnormal returns. However, with different information announcement at different time frames, it is possible to envisage different degrees or levels of efficiency. Asset prices exhibit *Weak Form Efficiency* if they always reflect all information about past events, including their own past movements and *Semi-Strong Form of Efficiency* if they always reflect all publicly available information including the data in weak form. The *Strong Form of Efficiency* is the highest level of market efficiency whereby asset prices reflect all public and private information both published and the unpublished.

Efficient Market Hypothesis asserts that, if prices are efficient in these forms, it should not be possible to use information to earn abnormally high returns. More generally, efficient markets attract more investors, which translate into increased market liquidity (Osei, 1998); whiles stock market inefficiency may affect consumption and investment spending and therefore influence the overall performance of the economy.

Various research studies have revealed that market efficiency depends upon timely and freely availability of information. Efficient Market Hypothesis (EMH) also claims that investors cannot get abnormal returns from the market if publicly available information is used. Various studies have tested the different forms of market efficiency in which impact of disclosure of information relating to dividend announcement, earnings announcement, stock repurchase announcement and merger or acquisition were investigated, yet the investigation of the impact of such information on stock prices remained an issue of key importance. According to Alford et al. (1993), the varying accounting standards and information environments across markets are likely to impact differently on the manner in which stock markets in different regions and countries react to information.

Relatively, few studies on informational efficiency have been conducted in developing African markets as compared to the developed economies. In developed markets such as the United States, Britain and Japan, where the markets impound information and incorporate such information almost immediately, efficient market hypothesis has been the subject of considerable research by economists and the outcome of these researches is a strong consensus on the validity of the weak and semi–strong forms of the EMH (Fama 1970). Though the number of similar studies in Africa is limited, the results of EMH studies in the emerging markets in Africa have mixed conclusions (Ayadi 1983, 1984; Dickinson & Muragu 1994; Omole 1997; Matome 1998; Osei 1998; Osei 2002; Adelegan 2004).

There are a number of reasons why the evidence documented for developed markets may not apply to Africa's emerging markets. Developed markets are highly sophisticated, closely regulated and considerable amount of resources is devoted to securities research and analyses as compared to emerging markets, which are characterized by a relatively large number of poorly informed and unsophisticated investors, low liquidity levels, weak legal, regulatory and institutional framework, and operational bottlenecks (Osei 2002). The lack of understanding of the operations and mechanisms of the capital markets, and the poor state of communication to facilitate information flow also makes capital markets in Africa less efficient as evidenced in a study by Asamoah (2010), where he examined the effect of the dividend announcement on share price behavior on the Ghanaian stock market. He concluded that there is weak information efficiency in Ghana.

Given the scanty research on emerging capital markets in Africa, and their potential to provide significant portfolio diversification benefits (Harvey 1994), the need for further research on the efficiency and responsiveness of markets in Africa to information disclosures has become deeply imperative. Also with limited study undertaken in the context of the EMH to explain the performance of the Ghana Stock Exchange, there is, therefore, the need to investigate the effect of the earnings announcement on the stock market price movement in Ghana. Investors, policy makers, regulators and researchers attach much significance to study on share price adjustment to earnings announcements. The proposed study would help to conclude whether shares listed on GSE is sensitive to earnings announcement or not. A study to ascertain the level of efficiency in Ghana Stock Exchange is of great importance and relevance.

The general objective of the study is to investigate the effect of the earnings announcement on the share prices and also to test the level of efficiency of Ghana Stock Exchange. Two specific objectives to achieve this are:

To investigate whether an earnings announcement are quickly and adequately reflected in stock prices;

To investigate whether there are any significant effects on share prices (whether positive or negative) related to the public announcement of earnings.

Hypothesis

In order to address the research objective, the following hypotheses were formulated.

H_0: Earning announcement does not affect share prices. Thus, the Ghanaian stock market does not react

efficiently to earning announcements in terms of price adjustments.

H_1: Earning announcement does affect share prices. Thus, the Ghanaian stock market reacts efficiently to earning announcements in terms of price adjustments.

This study is set out to determine the impact of earnings announcement on share prices in Ghana. This study therefore, will serve to fill the research gap in Ghana by assessing the informational efficiency of the Ghana stock market with respect to firms' earnings information releases. The study would help to conclude whether shares listed on GSE are sensitive to earnings announcement or not. The study will draw policy recommendations for improving upon the performance of the GSE to boost investors' interest and confidence in GSE.

A study of share price adjustment to earnings announcements is of significance to investors, policy makers, regulators and researchers. Investors and portfolio managers, keen on increasing their portfolio returns, would be interested in identifying opportunities for profit making by trading around earnings disclosure dates in emerging markets. Again, the study is very significant because it will add to the existing literatures on stock market efficiency in Ghana.

Lastly, evidence from analyzing stock price reaction to earnings announcements in a developing market will throw more light on whether the theory of efficient markets is supported or contradicted by empirical findings. This is of significant interest to researchers. The study covered companies listed on the Ghana Stock Exchange. A total of 36 companies across all industries in Ghana were considered. The study identified earnings announcement dates, studied GSE daily trading information and share prices for the period between January 2010 and June 2013.

Like every study, the study had some limitations, which open the way for further research in this area. Firstly due to time constraints and unavailable of some relevant market information, only a limited sample size was examined. Also the reliability of the study could have been improved if other measuring tools had been applied; that is, instead of using only the market model for measuring required returns, methods such as the CAPM and/or Fama and French Three Factor Model for required returns could have been used particularly given the criticism leveled against the market model. Again the study used 21-day event window which did not appear to be able to demonstrate when rectification or price recovery would occur.

2. Literature Review

This section provides reviews of theories and empirical works on efficient market hypothesis, and earnings and share prices. This section reviews some empirical studies that have been conducted on the impact of earnings announcement on stock prices. The chapter also discusses some of the market anomalies and critics of efficient market hypothesis as well as the pre-earnings and post-earning announcement effects on share prices.

2.1 Theoretical Review

The conceptual framework on which this study was based is the Theory of Efficient Market. Market efficiency has been defined in many ways in many contexts, and all maintain that capital asset prices are expected to adjust (positively or negatively) to information announcements at any particular time.

> An 'efficient' market is where there are large numbers of rational, profit 'maximisers'/investors actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value (Fama, 1965; Karz 2011).

Fama further explains that an efficient securities market is one in which prices of securities "fully reflect" the available information. He states that with given information the capital market reaction will be instantaneous and unbiased noting that: the information item is equally and instantaneously available to all market participants; and that information is costless and that there are homogeneous expectations of all participants.

It is believed that securities markets are extremely efficient in reflecting information about individual stocks, and about the stock market as a whole. The accepted view is that when information arises, the news spread very quickly and is incorporated into the prices of securities without delay. Thus, neither *technical analysis*, which is the study of past stock prices in an attempt to predict future prices, nor even *fundamental analysis*, which is the analysis of financial information such as company earnings, asset values, etc., to help investors select "undervalued" stocks, would enable an investor to achieve returns greater than those that could be obtained by holding a randomly selected portfolio of individual stocks with comparable risk (Malkeil 2003).

Market efficiencies can be *externally efficient or internally efficient.* According to West (1975), *external efficiency* implies that a market's equilibrium conditions are such that trading decisions based solely on existing

information do not yield expected returns in excess of expected equilibrium returns, and *internal efficiency* refers to a well-equipped real-world securities market that establishes price levels that are right in the sense that they fully reflect available information as well as provide the types of transaction services buyers and sellers deserve at prices as low as possible given the costs of providing those services. Thus, if the market is efficient, it should not be possible to use information to earn abnormally high returns.

Fama (1970) again highlights that information content of any announcement can be affected by three factors namely:

> The expectation of the capital market as to the content and timing of the information.
>
> The implications of the release for the future distribution of security returns.
>
> The credibility of the information source.

These, Osei (2000) explains that, in general terms the greater the uncertainty as to the content and timing of corporate information released, the higher the potential for the release to cause a revision in security prices. Also, the larger the relative revision in expected cash flows or returns, the larger the security price revaluation implication of the release. And the more credible the source of the information released, the larger the revaluation expected.

A market is efficient if all relevant available information is quickly reflected in the market price, and a market is efficient with respect to publicly available information if it is impossible to make an economic profit by trading on the basis of the information set (Jensen et al. 1979; Ross 1987). The efficiency tests, therefore, consist of measuring the ability of the market to anticipate new information and the speed with which it adjusts to such data (Khoury 1983). This means that no arbitrage opportunities, after costs, and after risk premium can be tapped using ex ante information as all the available information has been discounted in current prices (Frimpong & Oteng-Abyie 2007).

A fundamental question concerning capital markets is their efficiency. Allocational, operational, and informational efficiencies are the types of market efficiency described in the financial markets literature (Frimpong & Oteng-Abyie 2007). Yet, it has been highlighted that capital markets with higher informational efficiency are more likely to retain higher operational and allocational efficiencies (Müslümov *et al,* 2004).

According to Fama and Samuelson (1965), under the efficient market hypothesis stock market prices must always show a full reflection of all available and relevant information and should follow a random walk process. Successive stock price changes (returns) are therefore independently and identically distributed. Based on the information set, Fama (1970) categorized and further expanded market efficiency into three definitions depending on the information set that is fully reflected in the security prices. The three types of efficient markets are *weak-form, semi-strong-form, and strong-form efficient*; if the set of information includes past prices and returns only, all public information, and any information public as well as private, respectively.

Weak-form of Efficient Market Hypothesis

The weak form of capital market efficiency means that prices reflect all historic price information. Prices exhibit weak form efficiency if they always reflect all information about past events, including their own past movements. This is the least rigorous form of EMH and it confines itself to just one subset of public information, namely historical information about the share price itself. It follows from this that every movement in the share price in response to new information cannot be predicted from the last movement or price. In other words, the future price cannot be predicted from a study of historical prices. If a market is weak-form efficient, there is no correlation between successive prices, so that excess returns cannot consistently be achieved through the study of past price movements.

Semi-Strong form of Efficient Market Hypothesis

In semi-strong form prices reflect all *publicly* available information and all past information. At this level, the market quickly digests the publication or announcement of relevant new information by moving the price to a new equilibrium level that reflects the change in supply and demand caused by the emergence of that information. A market is semi-strong efficient if all relevant *publicly available* information is quickly reflected in the market price. If a market is semi-strong efficient, the current market price is the best available unbiased predictor of a fair price, having regard to all publicly available information about the risk and return of an investment.

Strong form of Efficient Market Hypothesis

Finally, Fama (1970) defined strong-form efficiency as having absolutely all information, including insider information, reflected in security prices. In its strongest form, the efficient market hypothesis says a market is efficient if all information relevant to the value of a share, whether or not generally available to existing or potential investors, is quickly and accurately reflected in the market price. It explains that if the current market price is lower than the value justified by some piece of *privately* held information, the holders of that information will exploit the pricing anomaly by buying the shares until the price stabilizes and reaches an equilibrium level where there will be no incentive to continue buying. If a market is strong-form efficient, the current market price

is the best available unbiased predictor of a fair price, having regard to all relevant information, whether the information is in the public domain or not. In a theoretical sense, strong from of efficiency is the most satisfying and compelling form of EMH.

Anomalies and Critics of Efficient Market Theory

The efficient markets theory reached its height of dominance in academic circles around the 1970s, and as recorded in streams of studies and articles, both theoretical and empirical in approach, almost unanimously tended to back up the findings of EMH. As Jensen (1978) wrote: 'There is no other proposition in economics which has more solid empirical evidence supporting it than the EMH.' As there are many empirical findings which demonstrate that the efficient market hypothesis generally holds, conversely, there are other works that contradict the efficient market hypothesis and find exceptions to its rule.

The intellectual dominance of the efficient-market revolution has been challenged by some economists who stress on psychological and behavioral elements of stock-price determination and econometricians who argue that stock returns are, to a considerable extent, predictable on the basis of past stock price patterns as well as certain "fundamental" valuation metrics (Malkeil, 2003). Most enduring critics say that efficient market hypothesis is based on counterfactual assumptions regarding human behavior, that is, rationality (Blume & Durlauf 2007).

Behaviorists also disagree with the claims of efficient market hypothesis and have offered another explanation for patterns of short-run momentum - a tendency for investors to underreact to new information. For example, Shiller (2000) describes the rise in the U.S. stock market during the late 1990s as the result of psychological contagion leading to irrational exuberance. According to Shiller (2003), the anomalies that had been discovered might be considered at worst small departure from the fundamental truth of market efficiency yet Grossman and Stiglitz (1980) also argue that perfectly informationally efficient markets are *impossibility* for, if markets are perfectly efficient, there is no profit to gathering information, in which case there would be little reason to trade and markets would eventually collapse.

Kenneth French at a 2001 roundtable discussion of capital market rationality argued that the question of market efficiency should be framed as a continuum instead of as a yes/no dichotomy as in most current studies (Doukas et al. 2002). This view is based on the observation that due to various market imperfections, it is impossible for perfectly efficient markets as described by the EMH to exist in reality (Grossman & Stiglitz 1980).

Again many alleged anomalies have been detected in patterns of historical share prices. The best known of these are the 'small firm' effect, the January effect and the value effect.

The 'small firm' effect: Banz (1981), in a major study of long-term returns on US shares, stated that shares in companies with small market capitalizations ('small caps') tended to deliver higher returns than those of larger companies. Banz's work was followed by a series of broadly corroborative studies in the US and the UK.

The January effect: It was also observed by Wachtel (1942), that small stocks have outperformed the broader market in the month of January, with most of the disparity occurring before the middle of the month. This was also confirmed by Keim (1983). Again, this was a discernible trend that under the EMH should have been arbitraged away.

The Value Effect: Other researches show that the so-called value firms, with high earnings relative to price, earn higher returns than predicted by the CAPM (Basu 1977). This effect can also be applied to high D/P (dividend-to-price) or B/M (book-to-market) ratios. But these effects as observed by Ball (1978) are rather likely to be caused by the CAPM being a model unable to fully capture security risk than the market being inefficient.

Critics give reasons to believe that there are opportunities in the stock market to earn above normal returns yet solid evidences have also been documented in favor of the hypothesis and it has been considered as a cornerstone of modern financial theory.

2.2 Empirical Review

Efficiency of Ghana Stock Exchange (GSE)

Young and emerging capital market like the GSE market has not been deeply researched in terms of its degree of efficiency in the academic field. Efficiency has deep implications for asset pricing, risk and returns on the exchange. Theoretically it is expected that a young emerging capital market such as the GSE would be weakly efficient at best. However, empirical evidence demonstrates that there is substantial negative share price reaction to earnings announcements on the small GSE market and it also shows the weak form of market is inefficiency.

Osei (2002) assessed Ghana Stock Exchange response to information by measuring abnormal returns over a 17-week event window when the annual earnings information is released. The study establishes that the market continues drifting up or down before and beyond the announcement week. He concludes that GSE is inefficient with respect to annual earnings information releases by the companies listed on the exchange. According to Frimpong, et al (2007) in their study to examine the weak-form efficient market hypothesis for the Ghana Stock Exchange using daily returns from the Databank Stock Index (DSI) over a 5-year period 1999-2004, it was found from their analysis that the GSE DSI returns series exhibit volatility clustering, an indication of inefficiency on

the GSE market. In conclusion they said the market is inefficient since the weak-form efficient market (random walk) hypothesis was rejected in the market.

Also Ayentimi et al (2013) gave a similar conclusion in a similar study where they examined the weak-form efficiency of listed firms on the Ghana Stock Exchange (GSE) using weekly closing stock prices on the GSE from January, 2007 to June, 2012. They highlight that the results of both the descriptive statistics of the weekly market returns and the normality tests show that returns from GSE did not follow the normal distribution. Other similar studies by Appiah-Kusi and Menyah (2003) confirm the inefficiency of GSE which means that some investors are able to predict the price of the security and get excess returns.

Earnings Announcement and Share Prices Movements

Earnings announcement is an official public statement of a company's financial performance or profitability for a specific time period, typically quarterly, half annually or yearly. It is when a company publicly releases its financial information or statements showing its performance in the forms of profit and loss statement, balance sheet and cash flow statement for a specific period of time. Whereas the earnings announcement is a legal requirement for every company listed on a stock market, earnings also provide critical information to shareholders as far as the company's past performance is concerned, and are used extensively in forecasting future performance and valuations of equity (Mlonzi et al, 2009). The primary role of reported earnings is to provide some predictive information about future earnings, and this information should at least be useful for both present and potential investors in making rational investment decisions regarding the company. For this reason, a company exhibiting high earnings is viewed more favorably by users of financial statements (including investors) than a company with low earnings (Barker & Imam 2008). Earnings also display management's competitiveness in profitably running a company and the ability to deliver value to shareholders. Hence, a reaction to earnings announcements is regarded as an interesting subject for analysis (Mlonzi et al. 2009).

Earnings, in particular, are an interesting phenomenon to observe, because they carry inside information about the company's future prospects (Aharony & Swary 1980). In an efficient market, if the announcement conveys vital information, then it is assumed that such information will be reflected by stock price movements (Hussin et al. 2010) as soon as the information is publicly released to the market. Stock prices always incorporate the best information about the fundamental values, and that prices change only because of good and sensitive information (Shiller 2003). Company earnings have been the subject of research for decades, and different angles have been explored to define the importance of company earnings (Mlonzi et al. 2009). Aharony and Swary (1980) argue that company managers use earnings as a signaling tool to convey information about the prospects of a company, and like dividends, if earnings convey useful information, this will be reflected in stock price changes immediately following a public announcement. Black (1980) adds to this by emphasizing that users of financial statements expect earnings to be a measure of value, rather than a change in value.

A study by Dey and Radhakrishna (2008) on earnings announcements concludes that institutional investors do not earn excess returns from trading before or after the announcements. The authors, however, found that individual investors do earn significantly weak positive excess returns just hours after the announcements, but they also suffer significantly negative excess returns on the day after the announcement. Louhichi (2008) in his study "*Adjustment of stock prices to earnings announcements: evidence from Euro next Paris*, provides evidence showing that an Intraday analysis of earnings announcements is more precise than the daily studies. The paper studied both the information content of accounting figures and the speed at which the new information is incorporated into stock prices with study sample size of 117 overnight announcements published by Reuters during the period 2001-2003. The paper examined market reaction just before and just after the event. In conclusion Louhichi contends that price reaction to earnings disclosures begins very quickly after information is released.

Classical studies on the effect of earnings information release on trading volume and variability of security return done by Beaver (1968) revealed that, stock returns are higher in the earnings announcement week than in the non-earnings announcement period. Using trading volume activity, Beaver measured weekly trading volume for a period over 17 weeks surrounding the earnings announcement week. In this study he controlled the possibility of non-earnings related factors inducing trading volume at the time of earnings releases, and the sample of non-December 31 fiscal year securities in order to minimize the effect of the December–January tax-induced trading volume. Also he restricted the sample to firms that had no dividend announcement in the week of the annual earnings announcement. The study showed a remarkable increase in trading volume in the announcement week. Using the security returns variability (SRV) measure, he again analyzed the variation in returns over the 17-week period and in his analyses; Beaver stated that security returns were found to be 67% higher in the earnings announcement week than in the non-earnings announcement period.

Chan et al. (2005) in the study of firm size and the information content of annual earnings announcements, provide Australian evidence concerning earnings announcements. They focused on the size effect of earnings and found that larger firms respond significantly more positively to earnings than do micro-capitalization, small

and medium-sized firms. This positive market response is attributed to the fact that larger firms could be releasing additional information following the annual earnings announcement. They further note that investors appear to regard earnings accompanied by dividends to be of higher quality.

Livnat and Mendenhall (2006) also concluded in their study *Comparing the Post–Earnings Announcement Drift for Surprises Calculated from Analyst and Time Series Forecasts* that after a firm announces earnings that exceed (or fall short of) a proxy for the market's expectation of earnings, subsequent abnormal returns tend to be higher (or lower) than normal for several weeks or even months. According to Bernard and Thomas (1989), new information exerts its full influence on the stock price within an hour after announcements. The studies highlight that useful earnings information happens within hours, suggesting that daily returns, as opposed to intraday returns, miss out on the usefulness of earnings information.

Research study performed by Ball and Brown (1968) in which actual earnings per share of each company were compared with earnings per share forecasted, it was found that about 85% of information content of annual earnings announcement was reflected in stock prices prior to the release of the actual earning figure. Brown and Kenelly (1972) also repeated the same test and their results were similar to those found by Ball and Brown.

As recorded by Ariff and Johnson (1990) in a study on shares listed on the Stock Exchange of Singapore, they discovered that price adjustment took place prior to the earnings announcement. They also found that prices reacted and adjusted more quickly to good news information than bad news information. The study concluded that the market is able to anticipate the changes in information content and behaves accordingly.

Foster et al. (1984) in their study on *Earnings Releases, Anomalies, and the Behavior of Security Returns*, gave evidence concerning the speed of response of stock prices to earnings announcements. In this study with a sample of 2053 firms (63000 firm-quarter observations) from 1974 to 1981, they found that price adjustments took place before the announcements were made to the public. Mendenhall (1991) also in a study on *Evidence on the Possible Underweighting of Earnings-related Information* found that stock price reaction to semi-annual earnings announcements yielded abnormal returns during both the pre-announcement and post-announcement dates, but Das, Pattanayak and Pathak (2008) found no evidence of significant abnormal returns around quarterly earnings announcements. The latter highlight that it could not be established that the share price drifts positively in the case of good announcements or negatively in the case of bad announcements, meaning that these announcements carry little information value for investors.

Bhana (1995/96) postulates in a study, *The share market reaction to earnings announcements: A test of the efficiency of the Johannesburg Stock Exchange,* that an asymmetry of response behavior exists with respect to positive and negative earnings announcements. The author argues that unfavorable announcements attract more attention in the market. Ball and Shivakumar (2008) after studying between 1,405 and 6,140 firms from 1972 to 2006 to determine the importance of quarterly earnings announcements in terms of share prices also found that quarterly earnings announcements lead to 1.2%-1.5% of total annual price volatility. They reported that earnings announcement is anticipated and also the announcements provide a modest but not overwhelming amount of information in relation to the market.

Interestingly, many studies have been conducted on the effect of earnings announcements on market reactions, but the findings are contradictory. For example, Cready and Gurun (2010) found that lower earnings results exhibit positive cumulative average abnormal returns (CAAR) and move market values higher. Hussin et al. (2010) from the study of market reaction to earnings announcements in the Malaysian stock exchange also found that earnings announcements affect the share prices with lower earnings leading to negative market reaction. However, these studies are silent on the state of the business cycle when the studies were conducted.

2.3 Theoretical Position of the Study

The literature has not yet produced an agreed-upon standard definition of efficient market; however, from the numerous studies on the efficiency of markets, empirical findings note that markets are efficient when any new information released is instantaneously reflected in the share prices. Therefore, this study adopts the version given by Fama (1970) which emphasizes on the speed and accuracy of price adjustment to new information. Specifically, this study infers market efficiency from the underlying stock price behavior, where a perfectly efficient stock market is one in which abnormal returns cannot be attributed to the information released into the public domain.

3. Methodology

This section defines the research methods used to conduct the study. It explains how the necessary data and information to address the research objectives and questions were collected, presented and analyzed. Reasons and justifications for the research design, research instrument, data sources, data collection techniques and analytical techniques used are given.

3.1 Research Design

The research was carried out as an event study. Event study methodology is the set of econometric techniques

use to measure and interpret the effects of an event on firms' securities. That is, it measures the impact of a specific event on the value of the firm. According to Bodie et al. (1999), an event study describes a technique of empirical financial research that enables an observer to assess the impact of a particular event on a firm's stock price. An event study would quantify the relationship between firm-specific event, like earnings announcement and stock returns.

Event study methodology is regarded as a powerful tool in the efficient market hypothesis research, and many researchers – namely Aharony and Swary (1980), Louhichi (2008), Kiger (1972), Das et al. (2008), Laidroo (2008), Bowman (1983), Cox and Weirich (2002), Osei (2002), Frimpong et al (2007), Varnas (2006), Asamoah (2010) and Mlonzi et al (2011) – have successfully utilized the tool where security prices respond to new information. Mushidzi and Ward (2004) assert that event study methodology is frequently used to determine whether there is a statistical difference between actual stock returns and required returns surrounding an event. MacKinlay (1997) also asserts that an event study methodology measures the impact of a specific event on the value of a firm. McWilliams and Siegel (1997) state that an event study is a tool that helps to assess the financial impact associated with an 'unanticipated event'. Das et al. (2008) argue that an event study assesses the significance of the economic event on the market value of a firm. Event studies are also employed to measure market efficiency and more importantly, it is used to back-test price data to determine the usefulness and reliability of the trading strategies or decisions.

Researchers such as Bowman (1983) and Brown and Warner (1985) provide a framework for conducting an event study, and this research adopted that framework for the research. The event study starts with the hypothesis on how a particular event affects the value of a firm and the concept of abnormal returns coupled with the notion that information is readily impounded into security prices is the central key of event study methods (Serra, 2002). Abnormal returns (excess of actual returns over normal returns) were calculated around the event date using the market model and used it to determine the level of the market's efficiency.

The purpose of the study is to investigate the stock price reaction to earnings announcements using companies listed on the GSE the period from January 2010 to June 2013. The earnings announcement dates and major events were identified by carefully studying the GSE daily trading information and companies' newsletters, and also the daily closing stock prices were analyzed to measure the impact of earnings announcements on stock prices.

3.2 Study Area and Population

Ghana Stock Exchange (GSE) is the study area. The population of the study was companies listed on the GSE. GSE was selected for the study because it is the only public company accredited in Ghana to co-ordinate stock dealing activities of companies and also as only unit in Ghana to facilitate the exchange of information including prices of securities listed for the mutual benefit of both listed companies and investors or clients. Also GSE recognized and commended as one of the best stock markets in Africa in 2008 during the global financial crisis when most stock markets around the world were not doing well.

3.3 Sample Selection and Sampling Procedures

Participants in this study consisted of all companies listed on the Ghana Stock Exchange. Purposeful and judgmental sampling method was employed for the study in order to select the target sample. Although there are 36 listed companies on GSE, due to the purpose of the study, some non-trading companies were eliminated and only active companies that have been listed and actively trading throughout the study period were selected. Further, all companies whose event dates (announcement dates) could not be obtained were eliminated from the study.

To eliminate the problem of confounding effects, all companies that had a major event during the event window were eliminated from the study too. Confounding effects occur when multiple noteworthy events occur on the same announcement dates making it impossible to determine the event that caused the after announcement stock price (Mc Williams et al. 1997). Confounding announcements that were considered included: dividends; capital expenditure projects; litigations; share splits; management change (including dismissal, retirement or hiring of key members of the executive management team such as the CEO and CFO); restructuring (whether financial, operational or otherwise); directors' share dealings; mergers and acquisitions; and any information or events released in the event window that could potentially affect the share price of a target security(Mlonzi et al. 2011). Since most companies announce their earnings and dividends during the same period, only companies which issued only earnings announcement were selected. This assisted in neutralizing the effects of dividend announcements. Companies which were suspended from trading at the GSE during the same period were also eliminated from the sample. Those that have one or more of the earnings announcement dates during the period under study missing during the same period were not considered. This criterion narrowed down the sample number of companies whose announcement dates were available for the period under study.

3.4 Data Types and Data Collection

The study used secondary data from the GSE relating to earnings announcements, daily share prices, daily traded

volumes and GSE share index covering all the days in the event window for the period from January 2010 to June 2013.. In the study, daily closing stock prices and date of earnings announcements for the period were collected.

The study considered an event window of 21 days focusing on 10 days before the event (t =-10) and 10 days after the event date (t =10) with the event day represented by t = 0. The 21 day period is considered to be sufficient for the estimation of the abnormal return of the model with a good level of accuracy based on previous studies that carried out research on a similar period. The event is the earnings announcement while the event date (t) is the date of the announcement and the event window includes the event date. The period around the event date was used to aggregate abnormal returns on the individual stock.

Due to the peculiar nature of the information environment in emerging stock markets, it is possible that the market reaction starts long before the actual announcements. The choice of an event window (of -10, +10) is made in order to capture this possible pre-event reaction. An estimation window at 120 days before each earnings announcement was set. The market model was used to calculate the daily abnormal returns since it is more widely used in empirical research and its assumptions are statistically and empirically reasonable (MacKinlay 1997).

3.5 Data Analysis and Presentation

To test for efficiency, the market model was used to calculate the daily abnormal returns. This was adopted because market model hypothesizes a linear relationship between stock returns and market returns which are used to calculate the abnormal returns. The abnormal return data were analyzed by Statistical Package for Social Sciences (SPSS). Data was analyzed by descriptive and inferential statistics and significance tested by T-test. The level of significance was set at 5%. The constants in the model were calculated over an estimation period of 120 days prior to the event window.

Actual return was calculated as:

$$R_{jt} = \alpha_j + \beta_j Rm_t + \varepsilon_{jt} \text{ --- (1)}$$

Where;

R_{jt} = the actual daily return on security j at day t

Rm_t = the daily market return at the GSE on day t

α_j = ordinary least squares intercept; the average rate of return of the stock when the market return is neutral

β_j = stock sensitivity to market return (the slope coefficient)

ε_{jt} = the error term for security j at day t

$Var\ \varepsilon_{jt}$ = σ^2

The normal return was calculated for each security for each day in the event window. For stock j and event day t, the normal return ER_{jt}, was calculated as:

$$ER_{jt} = \alpha_j + \beta_j Rm_t \text{ -- (2)}$$

The GSE Composite Index was used as proxy to calculate market return (Rm_t) and the logarithm of daily market return was used. Strong (1992) argues that logarithmic returns are preferred because they are theoretically better when linking together sub-period returns to form returns over a long time.

Market returns were computed as:

$$Rm_t = log\ (l_t / l_{t-1}) \text{ --- (3)}$$

Where:

L_t = is the All Share Index on day t

L_{t-1} = is the All Share Index on day $t-1$.

The daily share price return for each share in was also calculated using log-returns as:

$$R_{jt} = log\ (P_{jt} / P_{jt-1}) \text{ --- (4)}$$

Where:

R_{jt} = the share price return for security j for day t

P_{jt} = the share price of security j at the end of day t.

P_{jt-1} = the share price of security j at the end of day $t-1$.

The α_j and β_j were calculated for each share in the sample by regressing the share's daily log-function share price return against the daily market returns over 120 days prior to the event window.

Once the required return for security j in day t had been calculated, the abnormal return for each selection for each day in the event window was calculated. Abnormal returns were calculated for each security over the 21-day event period, t = -10 to +10 trading days, and any significant differences found between actual returns and required market returns were attributed to the information content of earnings announcements. The abnormal return is simply the actual return of security j in the same day less the calculated required return: Abnormal return was calculated as:

$$AR_{jt} = R_{jt} - E(R_{jt}) \text{ --- (5)}$$

Where:

AR_{jt} = the abnormal return of security j in day t

$E(R_{jt})$ = the expected share price return of security j in day t

R_{jt} = actual return of security j in day t.

These above-abnormal returns were summed and averaged cross-sectionally on day t as follows:

$$AAR_t = \sum_{j=1}^{N}(AR_{jt}/N) \text{---} (6)$$

Where:

N is the number of earnings announcements in the sample at day t.

The calculated abnormal returns were aggregated to draw an overall conclusion of the earnings announcement event. To accommodate a multiple period event window, the study made use of the Cumulative Average Abnormal Return (CAAR). The cumulative average abnormal returns ($CAAR_t$) for all firms in 21 days were then computed as the sum of the abnormal returns.

The cumulative average abnormal returns (CAAR) for t days (t=-10 to +10) were calculated by:

$$CAAR_t = \sum_{t=-10}^{+10} AAR_t \text{ ---} (7)$$

The procedure by Brown & Warner (1985) was followed in the statistical analysis to test the significance of the cumulative average abnormal returns in terms of the null hypothesis that such returns are equal to zero. It follows a t-distribution and is formulated as:

$$tAAR = \frac{AAR_t}{\sigma(AAR)/\sqrt{n}} \text{ ---} (8)$$

$$tCAAR = \frac{CAAR_{jt}}{\sigma(AAR)\sqrt{d}} \text{ ---} (9)$$

Where $\sigma(AAR)$ is the estimated standard deviation, d stands for the total number of days for which AAR is cumulative and n is number of earnings announcement in the sample on day t.

The significance level was set at a 5% margin of error to determine whether the CAAR differed statistically significantly from zero (H_0: CAARt = 0)

4. Analyses and Results

This section deals with the presentation, discussion and analysis obtained from the research. It presents the descriptive analysis of the study as well as the statistical analysis undertaken to test the research hypothesis. The general objective of the study is to investigate the effect of the earnings announcement on the share prices and also to test the level of efficiency of Ghana Stock Exchange of which some listed companies were used for the analysis. Therefore, the reactions of stock returns were checked by calculating Abnormal Returns (AR), Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) using the market model. T-statistic at 5% level of significance was used to test the significance of AAR and CAAR.

4.1 Socio-demographic Data Presentation

The sample firms were made of four institutions each from the financial and consumer goods industries and two companies from the energy/gas and oil industry. Five companies have been listed on GSE for over ten years and five companies over five years but less than ten years.

Table 4.1: Table showing the Socio-demographic Details of Selected Companies

No.	Company Name	Industry	Date Listed	Issued Shares (mil)
1	Benso Oil Palm Plantation Limited	Consumer Goods	16-Apr-04	34.8
2	CAL Bank Limited	Financial	5-Nov-04	548.26
3	Ecobank Transnational Incorporation	Financial	11-Sep-06	15,963.02
4	Fan Milk Ltd	Consumer Goods	18-Oct-91	118.71
5	Ghana Oil Company Limited	Energy/Oil & Gas	16-Nov-07	210.19
6	Produce Buying Company Ltd.	Consumer Goods	17-May-00	480
7	SIC Insurance Company Limited	Financial	25-Jan-08	333.89
8	Societe Generale Ghana Limited	Financial	13-Oct-95	195.65
9	Total Petroleum Ghana Limited	Energy/Oil & Gas	19-Jul-91	13.98
10	Unilever (Ghana) Ltd.	Consumer Goods	23-Nov-91	62.5

Source: Ghana Stock Exchange

4.2 Descriptive Analysis

This analysis is based on the secondary data which spans from January 2010 to June 2013, provided from the various listed companies and provided by GSE and Databank Ltd. A total of 10 earnings announcements during this time period were taken and their effect was investigated on selected firms which met the sampling criteria. Expected and actual returns for selected firms with respect to each specific earnings announcement were calculated to derive the abnormal returns, average abnormal returns and cumulative average abnormal returns of

event firms. Standard deviations along with values of t statistics were calculated on AAR and CAARS to determine their level of significance.

4.3 Data Analysis and Discussion of Findings

4.3.1 Companies Alpha and Beta Values

These are coefficients that explicate the relationship between the stock and the market. Beta is stock's sensitivity to market return (the slope coefficient) and measures the sensitivity of a particular stock to general market movements or returns. It measures the systematic risk based on how returns co-move with the overall market. From Table 4.2 below, the level of sensitivity is between -2.4% and 8.7 %. Beside GOIL, PBC, and TOTAL which betas are less than zero ($\beta<0$), all the event stocks betas are higher than one ($\beta>1$). These findings on the beta can be compared to that of Osei (2002). This means that the stock moves more than the market and in the same direction, an indication that most stocks are volatile and they are strongly influenced by daily market news or events. Those with beta less than zero generally move in the opposite direction as compared to the market.

Table 4.2: Table showing the alpha and beta value of each stock used to compute the abnormal

Stock	Alpha Values	Beta Values (%)
BOPP	-0.002	1.5%
CAL	-0.001	5.2%
ETI	0.000	7.7%
FML	-0.001	2.9%
GOIL	0.001	-0.8%
PBC	0.000	-2.4%
SG-SSB	0.000	3.5%
SIC	0.001	8.7%
TOTAL	-0.002	-0.6%
UNIL	0.002	6.6%

Source: Computed from Appendix I

The alpha values are approximately zero which implies the stocks neither outperform nor underperform the market.

4.3.2 Descriptive Analysis of the Average Abnormal Return (AAR)

Table 4.3 shows the descriptive statistics of stock average abnormal returns for the entire 21-day period. It can be observed that over the 21-day event window, the mean return is 0.21% (0.0021) the same as the AAR obtained on the event day (t=0). The median return is 0.11% (0.0011) and it is below the mean returns. It can further be observed that the degree and direction of asymmetry of the average abnormal returns are positively skewed which comes to confirm that the mean is greater than the median. The distribution of the AAR measured is platykurtic distribution meaning it is flatter than a normal distribution with a wider peak and the values of AAR are wider spread around the mean. The smaller standard deviation further confirms that the returns spread and are concentrated around the mean of AAR. These features simply show that the stock returns, deviate considerably from normality and with a mean of 0.0021, it explains that changes in share prices is insignificant.

Table 4.3: Table showing the statistical measure of AAR

Statistical Measure	Value
Mean	0.0021
Median	0.0011
Mode	0.0010
Skewness	0.8800
Kurtosis	1.2980

Source: Computed from Appendix II

4.3.3 Behavior of Abnormal Returns on and around Earning Announcement Day

Table 4. 4: Table showing the AAR and CAAR around earnings announcement date

Day	AAR	t-stat. AAR	AAR SD	CAAR	t-stat. CAAR	CAAR SD
-10	0.0390	0.3270	0.0120	0.0039	0.3270	0.0119
-9	0.0060	0.9050	0.0160	0.0045	0.5080	0.0208
-8	0.0320	0.3070	0.0090	0.0078	0.1840	0.0174
-7	-0.0650	0.1810	0.0140	0.0012	0.8400	0.0189
-6	0.0170	0.2020	0.0040	0.0029	0.6470	0.0195
-5	-0.0780	0.4020	0.0280	-0.0048	0.6810	0.0361
-4	0.0120	0.8210	0.0160	-0.0037	0.7830	0.0410
-3	0.0150	0.7390	0.0140	-0.0021	0.8900	0.0479
-2	0.0110	0.2090	0.0030	-0.0010	0.9480	0.0486
-1	-0.0240	0.5220	0.0110	-0.0035	0.8140	0.0451
0	0.0020	0.9570	0.0110	-0.0033	0.8170	0.0436
1	-0.0090	0.8900	0.0210	-0.0042	0.7870	0.0478
2	0.0290	0.7420	0.0270	-0.0013	0.9430	0.0576
3	0.0040	0.2960	0.0010	-0.0009	0.9620	0.0583
4	0.0980	0.0840	0.0160	0.0089	0.6710	0.0643
5	0.0110	0.8550	0.0180	0.0100	0.6080	0.0596
6	0.1580	0.1310	0.0300	0.0258	0.3430	0.0815
7	-0.0010	0.8340	0.0010	0.0257	0.3470	0.0818
8	0.0650	0.3240	0.0200	0.0322	0.3140	0.0955
9	-0.0220	0.5840	0.0130	0.0300	0.3560	0.0974
10	0.1380	0.2220	0.0330	0.0438	0.2770	0.1196

Source: Computed from Appendix II

Table 4.4 shows the average abnormal returns (AAR) and cumulative average abnormal returns average (CAAR) calculated for 10 earnings announcements over the 3 year period, starting from 2010 to 2013 using the market model. Second and fifth columns of table 3 show the resulted AARs and CAARs respectively. Corresponding t-test values and standard deviation for AARs and CAARs are given in third, fourth, sixth and seventh columns of the table.

4.3.3.1 Behavior of AAR on and around Earnings Announcement Day

It is observed that most of the AAR before and after the event date were positive except days -7, -5, -1, 1, 7 and 9 with AARs of -0.065, -0.078, -0.024, -0.009, -0.001 and -0.022 respectively. Interestingly, day-1 and day 1 are negative. It was also observed that the AAR before and after the announcement vary significantly except day -4 and -3, with the highest variation occurring after the event date, that is from day 2 to day 10. The variations surrounding the event day are moderate. The AAR on day -10 and -8 were the highest positive AAR before the announcement date. The lowest AAR occurs at day -7 and day -5, the highest at day 6 and day 10. The highest negative AAR occurred at day -5 and -7 and the highest positive AAR occurred at day 6 and 10, however, their values are statistically insignificant.

Between day -7 and day 3, the AAR is between - 0.078 on day 5 and 0.029 on day 2. The AAR declined to the lowest on day -5 with day 0 recording 0.002 which is equal to the mean. This phenomenon of low AAR on and surrounding the announcement day may be that, investors were uncertain or anticipated low earnings hence their confidence in the stock faded around the announcement days which caused the fall in the abnormal returns. The more positive returns after the event day but with days 1, 7 and 9 recording negative returns, confirms Dey and Radhakrishna (2008) study on earnings announcements where they found that individual investors do not only earn significant weak positive excess returns just after the announcements, but they also suffer significantly negative excess returns in the days after the announcement.

Figure 1. Graphical Representation of AAR for the 21- Day Event Window

Key: X axis- Event day; Y axis – AAR
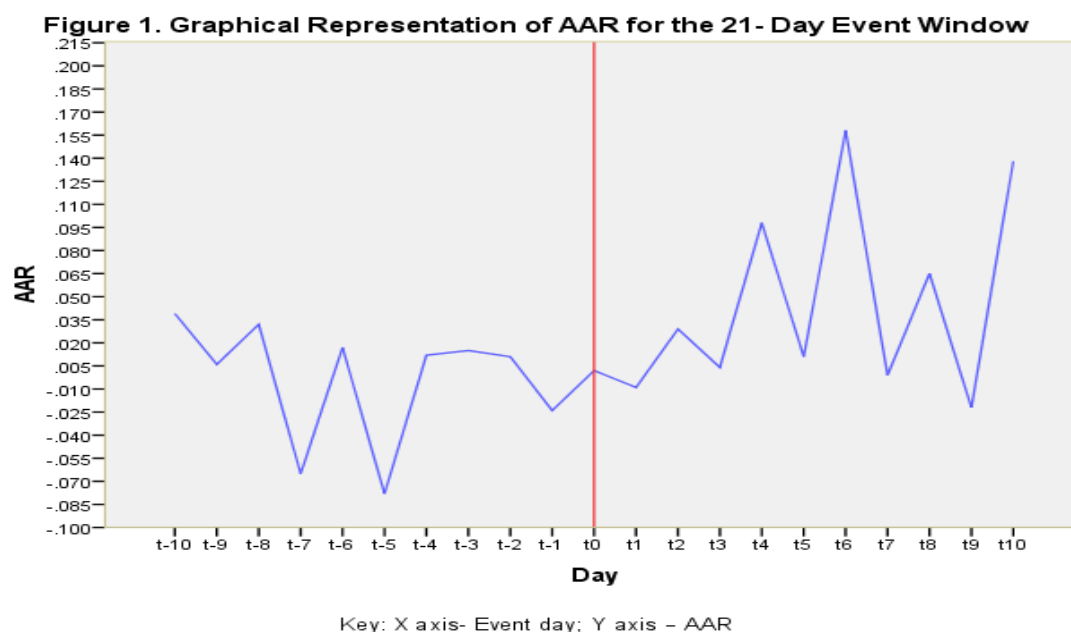
The AAR as shown in figure 1 has a wave like pattern. On day -10 and -8 the peaks were high but it started falling as the days close up to the event day. The lowest patterns occurred around the middle of the event window with high pattern at the beginning and the highest pattern at the end of the event window. The longest peaks (day 6, 8 and 10) occur after the event date and at the ending part of the event window. The pattern on and surrounding day 0 is moderate which started drifting upwards after day 2. Surprisingly, as depicted in figure 1, the returns positively grow with some drops again on day 7 and 9 but it catches up the increasing trend and accelerate the trend till day 10 with AAR of 0.138. The upward movement of the AARs after day 3 suggests the inability of the market to react immediately and fully to the earnings announcement. This movement of the AAR means that investors' behavior is similar before and after an event. That is, the positive AAR after day 3 could not be attributed to the effect of information contained in the earnings announcement made by the event firms. This further suggests that for GSE, the information contained in the earnings announcement inefficiently reflects in the stock prices after the announcement date.

4.3.3.2 Behavior of CAAR on and around Earnings Announcement Day

To further clarify and draw conclusions on the effect of the earnings announcement on share prices, CAAR for all the 21 days were computed from the AAR. A careful observation of results presented in Table 4.3 and figure 2, reveals that the CAAR on the days preceding the announcement were low with positive CAAR at the beginning of the event window. CAAR became negative as the days approach the event date. CAAR calculated are negative from 5 days prior to the event date until 3 days after the announcement. The negative CAAR decreased from -0.0048 on day -5 to -0.0033 on day 0, slightly increased to –0.0042 on day 1 and decreased to -0.0009 on day 3. This is different from the behavior of CAAR at the start of the event window. However, the CAAR starts rising after day 3 till day 10. The falling trend of CAAR on days closer to the event date could be interpreted to indicate that a few days before the earnings announcement date, the public seems to have anticipated the event probably through more timely information sources or leakage of inside information. This trend surrounding announcement disclosure also could be that because the AAR earned during this period was mostly low.

Figure 2. Graphical Representation of CAAR for the 21- Day Event Window
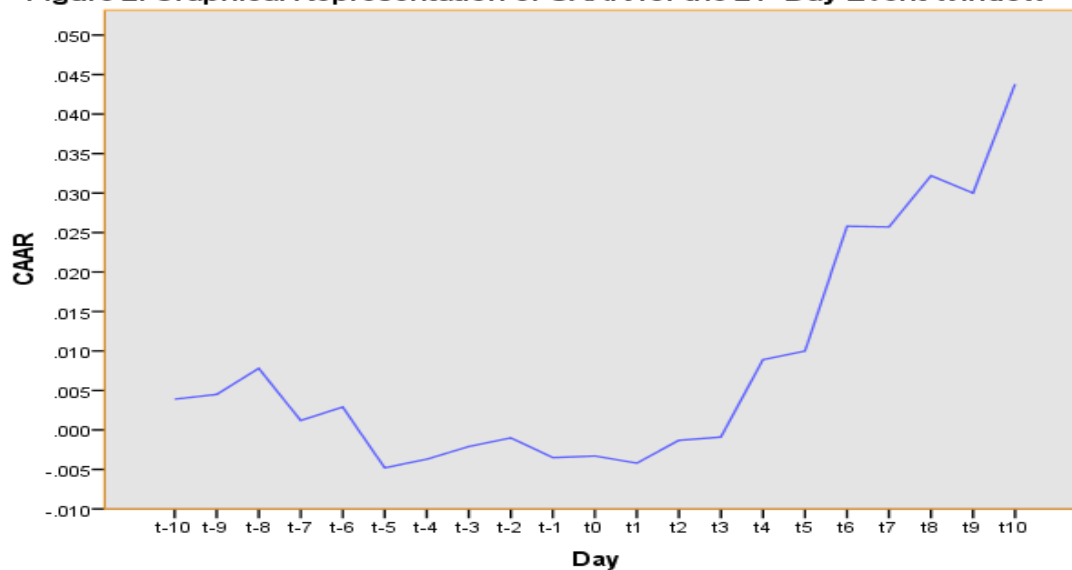
Key: X axis- Event day; Y axis – CAAR

The steadily rising of the CAAR after day 3 up to day 10 could imply that upon the announcement, public uncertainty and suspicion were cleared, restoring investors' confidence in the market leading to the recurrence of positive abnormal returns as reflected by the positive CAAR at the beginning of the event window. Also the rising of the CAAR could be attributed to the high positive ARR after the event date.

Looking at figure 2 above, it is indicated that the market did not adjust instantaneously and unbiasedly to earnings disclosures, because the behavior of CAAR after the event date once again indicates an incomplete reaction of the market to the announcement, meaning the positive abnormal returns occurred not by trading on the information contained in the earnings information released into the public domain. This result is consistent with results obtained in an earlier study in Ghana by Osei (2002), when he assessed Ghana Stock Exchange response to information by measuring abnormal returns over a 17-week event window when the annual earnings information is released. The study establishes that the market continues drifting up or down before and beyond the announcement week.

4.4 Summary of Findings

Table 4.4 shows that no significant abnormal returns were made both before and after earnings announcement and the movement of share prices is not influenced by the announcement.

The statistical features of AAR simply show that the stock returns are not influenced by specific event like earning announcement but it is sensitive to daily market conditions. The price adjustment prior to and after the public announcement of earnings could be attributed to other factors that influence the market. This trend of negative CAAR which began 5 days before the announcement and continued for a few days after the announcement may be due to information from such sources like newspaper articles and analysts' forecast or some investors may be privy to inside information. Also the CAAR p-values for the event window range from 0.1840 on day -8 to 0.9620 on day 3. Since the p-values during the event window are greater than 0.05 we have no statistical evidence to reject the null hypothesis (H_0). Therefore, at a 95% confidence level, it can be said that earnings announcement does not affect share prices in Ghana Stock exchange.

5. Conclusions and Recommendations

5.1 Conclusions

The study sought to investigate how GSE reacts toward earning announcement and to test the level of the market efficiency. It is realized that there is no major correlation between the share prices and earnings announcement. It is also observed that there is no significant reaction on the announcement day itself and also in the few days around it. Therefore, it is concluded that earnings announcement are not quickly and adequately reflected in stock prices and earnings announcements do not have any significant effects on share prices.

Also whiles the results are inconsistent with the efficient markets hypothesis (EMH) which states that the price reaction to new information must be instantaneous and unbiased, the behavior of share prices is found to be inconsistent with the semis strong form of the efficient market hypothesis.

5.2 Recommendations/ Policy Implementation

As a sequel to the conclusions and based on the findings, the following recommendations are proposed:

- Listed companies should be encouraged to ensure timely release of their financial statements. Timely release of financial information therefore is expected to help discourage unnecessary speculation by investors while it attracts investors, boosts liquidity and helps improve the informational efficiency of the stock market. Market regulators and policy makers need to impose or enforce strict penalties or sanctions on companies that delay the release of their results. This will maintain discipline and ensure availability of information

- The researchers recommend that the regulatory authorities should intensify efforts to ensure compliance with insider trading laws by market participants. The authorities need to strengthen their capacity to effectively monitor activities in the market, and to effectively deal with offenders.

- The stock market should also be encouraged to maintain modernized database of the various event dates in a way that make them easily accessible so as to aid in further event studies as opposed to the current way where a researcher has to search through so much information to extract the announcement dates.

- To improve liquidity of GSE, the market should be made attractive to attract large institutional and foreign investors to participate. Establishing relevant policies to enhance the efficiency of the stock market, and also making it possible for online trading would increase investor confidence and participation in GSE. Most institutional and international investors have greater security analysis capabilities; therefore, hooking them on board will help improve availability of quality and relevant financial information and the overall quality of the information environment in the GSE.

- Since liquidity can be enhanced when more firms are listed on the stock market. The government must encourage firms and provide them with some incentive to list on the stock market. Also State Corporation should be encouraged to be listed on GSE.

- The researchers were of the view that, since the GSE activities by themselves are beneficial to the economy; government must ensure they undertake policies to ensure macroeconomic stability since it is an important element that can boost investor confidence on the stock market and ensure firms to list on the market.

- Future research should consider a larger sample size and also broaden the scope of the research to cover more institutions as well. Also further studies should be conducted to establish the nature of the market reaction to good and bad news.

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APPENDIX I: GSE COMPOSITE INDEX

DATE	INDEX	DATE	INDEX	DATE	INDEX	DATE	INDEX
31-Dec-10	1,000.00	21-Mar-11	1,064.83	10-Jun-11	1,178.87	29-Aug-11	1,143.04
4-Jan-11	992.25	22-Mar-11	1,065.46	13-Jun-11	1,181.19	30-Aug-11	1,145.12
5-Jan-11	991.08	23-Mar-11	1,074.12	14-Jun-11	1,174.89	1-Sep-11	1,137.13
6-Jan-11	993.89	24-Mar-11	1,057.68	15-Jun-11	1,175.90	2-Sep-11	1,125.36
7-Jan-11	995.50	25-Mar-11	1,058.92	16-Jun-11	1,175.30	5-Sep-11	1,131.68
10-Jan-11	1,001.63	28-Mar-11	1,069.01	17-Jun-11	1,180.17	6-Sep-11	1,128.26
11-Jan-11	1,004.15	29-Mar-11	1,069.02	20-Jun-11	1,179.09	7-Sep-11	1,128.56
12-Jan-11	998.37	30-Mar-11	1,059.07	21-Jun-11	1,188.23	8-Sep-11	1,127.60
13-Jan-11	998.05	31-Mar-11	1,071.50	22-Jun-11	1,186.57	9-Sep-11	1,117.61
14-Jan-11	1,000.64	1-Apr-11	1,067.91	23-Jun-11	1,185.75	12-Sep-11	1,105.74
17-Jan-11	997.75	4-Apr-11	1,068.20	24-Jun-11	1,178.99	13-Sep-11	1,114.07
18-Jan-11	1,001.24	5-Apr-11	1,063.51	27-Jun-11	1,179.39	14-Sep-11	1,114.11
19-Jan-11	1,004.80	6-Apr-11	1,063.05	28-Jun-11	1,179.05	15-Sep-11	1,118.68
20-Jan-11	1,007.72	7-Apr-11	1,064.16	29-Jun-11	1,181.10	16-Sep-11	1,113.91
21-Jan-11	1,016.50	8-Apr-11	1,064.02	30-Jun-11	1,188.91	19-Sep-11	1,110.98
24-Jan-11	1,019.52	11-Apr-11	1,050.07	4-Jul-11	1,187.56	20-Sep-11	1,109.93
25-Jan-11	1,022.35	12-Apr-11	1,053.15	5-Jul-11	1,186.93	22-Sep-11	1,114.51
26-Jan-11	1,024.19	13-Apr-11	1,046.08	6-Jul-11	1,187.13	23-Sep-11	1,108.15
27-Jan-11	1,044.90	14-Apr-11	1,058.88	7-Jul-11	1,186.25	26-Sep-11	1,099.18
28-Jan-11	1,052.98	15-Apr-11	1,061.90	8-Jul-11	1,185.50	27-Sep-11	1,093.43
31-Jan-11	1,057.14	18-Apr-11	1,063.54	11-Jul-11	1,182.77	28-Sep-11	1,086.23
1-Feb-11	1,049.66	19-Apr-11	1,075.96	12-Jul-11	1,182.39	29-Sep-11	1,077.05
2-Feb-11	1,051.25	20-Apr-11	1,074.13	13-Jul-11	1,181.37	30-Sep-11	1,098.38
3-Feb-11	1,059.28	21-Apr-11	1,082.02	14-Jul-11	1,175.04	3-Oct-11	1,095.87
4-Feb-11	1,059.38	26-Apr-11	1,089.83	15-Jul-11	1,174.09	4-Oct-11	1,066.62
7-Feb-11	1,050.35	27-Apr-11	1,090.76	18-Jul-11	1,176.58	5-Oct-11	1,040.74
8-Feb-11	1,049.11	28-Apr-11	1,098.88	19-Jul-11	1,177.34	6-Oct-11	1,022.81
9-Feb-11	1,052.14	29-Apr-11	1,100.38	20-Jul-11	1,176.37	7-Oct-11	1,014.15
10-Feb-11	1,056.02	3-May-11	1,114.85	21-Jul-11	1,183.06	10-Oct-11	1,010.68
11-Feb-11	1,057.10	4-May-11	1,139.63	22-Jul-11	1,178.15	11-Oct-11	1,000.30
14-Feb-11	1,054.56	5-May-11	1,141.15	25-Jul-11	1,186.72	12-Oct-11	1,002.71
15-Feb-11	1,052.62	6-May-11	1,147.54	26-Jul-11	1,177.89	13-Oct-11	997.65
16-Feb-11	1,049.64	9-May-11	1,160.49	27-Jul-11	1,180.56	14-Oct-11	995.49
17-Feb-11	1,048.78	10-May-11	1,151.70	28-Jul-11	1,166.24	17-Oct-11	992.12
18-Feb-11	1,052.06	11-May-11	1,151.07	29-Jul-11	1,170.85	18-Oct-11	997.31
21-Feb-11	1,044.40	12-May-11	1,151.98	1-Aug-11	1,170.28	19-Oct-11	998.63
22-Feb-11	1,044.58	13-May-11	1,155.60	2-Aug-11	1,172.92	20-Oct-11	995.73
23-Feb-11	1,042.35	16-May-11	1,167.99	3-Aug-11	1,174.71	21-Oct-11	995.89
24-Feb-11	1,045.74	17-May-11	1,176.24	4-Aug-11	1,176.25	24-Oct-11	998.30
25-Feb-11	1,045.50	18-May-11	1,189.77	5-Aug-11	1,185.34	25-Oct-11	999.23
28-Feb-11	1,051.83	19-May-11	1,178.53	8-Aug-11	1,176.17	26-Oct-11	1,007.71
1-Mar-11	1,049.63	20-May-11	1,178.60	9-Aug-11	1,182.05	27-Oct-11	1,006.69
2-Mar-11	1,042.00	23-May-11	1,179.62	10-Aug-11	1,174.82	28-Oct-11	1,003.51
3-Mar-11	1,040.51	24-May-11	1,178.94	11-Aug-11	1,176.44	31-Oct-11	1,007.86
4-Mar-11	1,054.11	26-May-11	1,168.80	12-Aug-11	1,175.88	1-Nov-11	1,003.54
8-Mar-11	1,058.81	27-May-11	1,162.67	15-Aug-11	1,176.10	2-Nov-11	1,006.39
9-Mar-11	1,059.89	30-May-11	1,162.73	16-Aug-11	1,178.26	3-Nov-11	1,010.31
10-Mar-11	1,053.10	31-May-11	1,162.78	17-Aug-11	1,178.40	4-Nov-11	1,010.68
11-Mar-11	1,051.80	1-Jun-11	1,162.91	18-Aug-11	1,177.89	8-Nov-11	1,008.43
14-Mar-11	1,062.89	2-Jun-11	1,163.15	19-Aug-11	1,185.08	9-Nov-11	1,007.91
15-Mar-11	1,066.23	3-Jun-11	1,165.84	22-Aug-11	1,177.24	10-Nov-11	998.28
16-Mar-11	1,070.78	6-Jun-11	1,168.85	23-Aug-11	1,177.15	11-Nov-11	997.42
17-Mar-11	1,077.57	7-Jun-11	1,170.53	24-Aug-11	1,163.46	14-Nov-11	995.47
18-Mar-11	1,076.36	8-Jun-11	1,169.27	25-Aug-11	1,160.95	15-Nov-11	994.02
18-Mar-11	1,076.36	9-Jun-11	1,170.16	26-Aug-11	1,160.70	16-Nov-11	992.92

DATE	INDEX	DATE	INDEX	DATE	INDEX	DATE	INDEX
17-Nov-11	989.32	8-Feb-12	993.80	30-Apr-12	1,056.10	19-Jul-12	1,019.00
18-Nov-11	989.61	9-Feb-12	994.34	2-May-12	1,055.23	20-Jul-12	1,016.70
21-Nov-11	989.25	10-Feb-12	995.69	3-May-12	1,047.80	23-Jul-12	1,016.89
22-Nov-11	984.76	13-Feb-12	994.51	4-May-12	1,047.80	24-Jul-12	1,018.10
23-Nov-11	985.04	14-Feb-12	997.03	7-May-12	1,052.51	25-Jul-12	1,018.16
24-Nov-11	982.87	15-Feb-12	998.45	8-May-12	1,059.64	26-Jul-12	1,022.04
25-Nov-11	982.17	16-Feb-12	998.46	9-May-12	1,053.61	27-Jul-12	1,021.17
28-Nov-11	983.62	17-Feb-12	1,006.44	10-May-12	1,053.65	30-Jul-12	1,021.81
29-Nov-11	985.83	20-Feb-12	1,008.07	11-May-12	1,050.34	31-Jul-12	1,027.78
30-Nov-11	987.26	21-Feb-12	1,009.89	14-May-12	1,048.38	1-Aug-12	1,030.89
1-Dec-11	985.35	22-Feb-12	1,009.51	15-May-12	1,048.50	2-Aug-12	1,034.21
5-Dec-11	985.94	23-Feb-12	1,010.33	16-May-12	1,042.51	3-Aug-12	1,036.23
6-Dec-11	978.85	24-Feb-12	1,011.36	17-May-12	1,041.30	6-Aug-12	1,037.51
7-Dec-11	975.45	27-Feb-12	1,010.25	18-May-12	1,046.94	7-Aug-12	1,033.60
8-Dec-11	975.38	28-Feb-12	1,015.61	21-May-12	1,037.92	8-Aug-12	1,026.95
9-Dec-11	972.50	29-Feb-12	1,016.47	22-May-12	1,039.28	9-Aug-12	1,026.73
12-Dec-11	964.59	1-Mar-12	1,028.11	23-May-12	1,038.29	13-Aug-12	1,028.35
13-Dec-11	964.14	2-Mar-12	1,030.76	24-May-12	1,035.37	14-Aug-12	1,029.37
14-Dec-11	964.20	5-Mar-12	1,026.84	28-May-12	1,029.56	15-Aug-12	1,030.58
15-Dec-11	964.21	7-Mar-12	1,027.28	29-May-12	1,031.38	16-Aug-12	1,030.47
16-Dec-11	940.04	8-Mar-12	1,028.69	30-May-12	1,023.49	17-Aug-12	1,030.50
19-Dec-11	940.14	9-Mar-12	1,029.58	31-May-12	1,022.95	21-Aug-12	1,023.45
20-Dec-11	940.62	12-Mar-12	1,031.12	1-Jun-12	1,022.80	22-Aug-12	1,024.43
21-Dec-11	941.11	13-Mar-12	1,029.02	4-Jun-12	1,024.23	23-Aug-12	1,028.23
22-Dec-11	966.40	14-Mar-12	1,028.22	5-Jun-12	1,023.43	24-Aug-12	1,027.97
23-Dec-11	967.01	15-Mar-12	1,035.68	6-Jun-12	1,023.50	27-Aug-12	1,032.34
28-Dec-11	967.01	16-Mar-12	1,032.99	7-Jun-12	1,020.31	28-Aug-12	1,025.18
29-Dec-11	970.03	19-Mar-12	1,039.61	8-Jun-12	1,018.84	29-Aug-12	1,027.35
30-Dec-11	969.03	20-Mar-12	1,040.84	11-Jun-12	1,027.33	30-Aug-12	1,034.82
3-Jan-12	969.25	21-Mar-12	1,038.58	12-Jun-12	1,029.90	31-Aug-12	1,025.90
4-Jan-12	969.24	22-Mar-12	1,038.00	13-Jun-12	1,027.31	3-Sep-12	1,028.83
5-Jan-12	968.08	23-Mar-12	1,039.11	14-Jun-12	1,030.45	4-Sep-12	1,035.81
6-Jan-12	980.27	26-Mar-12	1,038.67	15-Jun-12	1,031.49	5-Sep-12	1,036.20
9-Jan-12	978.48	27-Mar-12	1,040.06	18-Jun-12	1,032.19	6-Sep-12	1,043.13
10-Jan-12	970.71	28-Mar-12	1,045.51	19-Jun-12	1,024.03	7-Sep-12	1,035.97
11-Jan-12	975.42	29-Mar-12	1,045.55	20-Jun-12	1,025.80	10-Sep-12	1,036.48
12-Jan-12	975.15	30-Mar-12	1,046.88	21-Jun-12	1,034.59	11-Sep-12	1,035.31
13-Jan-12	974.63	2-Apr-12	1,048.72	22-Jun-12	1,032.83	12-Sep-12	1,036.78
16-Jan-12	969.66	3-Apr-12	1,055.57	25-Jun-12	1,032.99	13-Sep-12	1,036.39
17-Jan-12	970.81	4-Apr-12	1,055.25	26-Jun-12	1,033.26	14-Sep-12	1,036.39
18-Jan-12	970.35	5-Apr-12	1,060.45	27-Jun-12	1,035.25	17-Sep-12	1,039.61
19-Jan-12	971.33	10-Apr-12	1,060.31	28-Jun-12	1,041.64	18-Sep-12	1,042.76
20-Jan-12	976.97	11-Apr-12	1,060.31	29-Jun-12	1,045.48	19-Sep-12	1,040.45
23-Jan-12	977.87	12-Apr-12	1,059.82	3-Jul-12	1,038.40	20-Sep-12	1,039.94
24-Jan-12	974.43	13-Apr-12	1,061.21	4-Jul-12	1,040.70	24-Sep-12	1,042.47
25-Jan-12	969.73	16-Apr-12	1,061.21	5-Jul-12	1,030.66	25-Sep-12	1,040.02
26-Jan-12	974.48	17-Apr-12	1,060.69	6-Jul-12	1,032.13	26-Sep-12	1,041.61
27-Jan-12	973.01	18-Apr-12	1,056.41	9-Jul-12	1,028.01	27-Sep-12	1,043.84
30-Jan-12	974.10	19-Apr-12	1,049.82	10-Jul-12	1,033.68	28-Sep-12	1,047.72
31-Jan-12	974.53	20-Apr-12	1,048.22	11-Jul-12	1,025.37	1-Oct-12	1,044.27
1-Feb-12	981.65	23-Apr-12	1,055.30	12-Jul-12	1,025.77	2-Oct-12	1,044.43
2-Feb-12	978.15	24-Apr-12	1,056.74	13-Jul-12	1,022.63	3-Oct-12	1,044.43
3-Feb-12	980.14	25-Apr-12	1,065.57	16-Jul-12	1,020.88	4-Oct-12	1,038.28
6-Feb-12	979.73	26-Apr-12	1,055.89	17-Jul-12	1,021.52	5-Oct-12	1,034.63
7-Feb-12	991.69	27-Apr-12	1,055.79	18-Jul-12	1,024.84	8-Oct-12	1,042.37

DATE	INDEX	DATE	INDEX	DATE	INDEX	DATE	INDEX
9-Oct-12	1,042.55	31-Dec-12	1,199.72	20-Mar-13	1,686.04	11-Jun-13	1,892.62
10-Oct-12	1,044.12	2-Jan-13	1,198.34	21-Mar-13	1,723.93	12-Jun-13	1,898.98
11-Oct-12	1,034.43	3-Jan-13	1,198.29	22-Mar-13	1,742.26	13-Jun-13	1,909.04
12-Oct-12	1,036.16	4-Jan-13	1,199.32	25-Mar-13	1,743.46	14-Jun-13	1,908.67
15-Oct-12	1,035.03	7-Jan-13	1,198.95	26-Mar-13	1,741.33	17-Jun-13	1,908.77
16-Oct-12	1,038.21	8-Jan-13	1,205.74	27-Mar-13	1,727.68	18-Jun-13	1,904.70
17-Oct-12	1,041.49	9-Jan-13	1,209.12	28-Mar-13	1,733.47	19-Jun-13	1,906.81
18-Oct-12	1,049.71	10-Jan-13	1,212.31	2-Apr-13	1,737.16	20-Jun-13	1,893.02
19-Oct-12	1,046.06	11-Jan-13	1,216.96	3-Apr-13	1,739.55	21-Jun-13	1,900.10
22-Oct-12	1,061.35	14-Jan-13	1,220.26	4-Apr-13	1,756.04	24-Jun-13	1,891.94
23-Oct-12	1,053.81	15-Jan-13	1,223.13	5-Apr-13	1,753.67	25-Jun-13	1,874.67
24-Oct-12	1,067.11	16-Jan-13	1,226.37	8-Apr-13	1,740.81	26-Jun-13	1,877.65
25-Oct-12	1,069.95	17-Jan-13	1,227.49	9-Apr-13	1,743.21	27-Jun-13	1,880.26
29-Oct-12	1,079.92	18-Jan-13	1,231.93	10-Apr-13	1,758.92	28-Jun-13	1,880.26
30-Oct-12	1,109.50	21-Jan-13	1,234.27	11-Apr-13	1,762.17	2-Jul-13	1,887.63
31-Oct-12	1,116.27	22-Jan-13	1,235.98	12-Apr-13	1,763.50	3-Jul-13	1,884.20
1-Nov-12	1,131.16	23-Jan-13	1,240.57	15-Apr-13	1,769.46	4-Jul-13	1,887.90
2-Nov-12	1,143.06	24-Jan-13	1,254.68	16-Apr-13	1,770.56	5-Jul-13	1,884.93
5-Nov-12	1,144.90	25-Jan-13	1,270.80	17-Apr-13	1,772.59	8-Jul-13	1,883.77
6-Nov-12	1,146.94	28-Jan-13	1,274.32	18-Apr-13	1,768.23	9-Jul-13	1,880.95
7-Nov-12	1,148.85	29-Jan-13	1,282.59	19-Apr-13	1,778.07	10-Jul-13	1,888.25
8-Nov-12	1,155.65	30-Jan-13	1,283.39	22-Apr-13	1,777.23	11-Jul-13	1,897.66
9-Nov-12	1,152.88	31-Jan-13	1,270.72	23-Apr-13	1,787.68	12-Jul-13	1,910.98
12-Nov-12	1,155.16	1-Feb-13	1,281.34	24-Apr-13	1,782.98	15-Jul-13	1,906.48
13-Nov-12	1,149.02	4-Feb-13	1,292.02	25-Apr-13	1,795.03	16-Jul-13	1,907.79
14-Nov-12	1,151.69	5-Feb-13	1,312.42	26-Apr-13	1,797.03	17-Jul-13	1,900.64
15-Nov-12	1,154.36	6-Feb-13	1,312.58	29-Apr-13	1,800.98	18-Jul-13	1,904.38
16-Nov-12	1,152.76	7-Feb-13	1,319.89	30-Apr-13	1,800.66	19-Jul-13	1,908.21
19-Nov-12	1,153.07	8-Feb-13	1,327.80	2-May-13	1,799.91	22-Jul-13	1,903.24
20-Nov-12	1,152.68	11-Feb-13	1,333.16	3-May-13	1,808.94	23-Jul-13	1,905.64
21-Nov-12	1,146.10	12-Feb-13	1,361.12	6-May-13	1,833.13	24-Jul-13	1,907.00
22-Nov-12	1,144.66	13-Feb-13	1,359.08	7-May-13	1,839.55	25-Jul-13	1,904.01
23-Nov-12	1,139.67	14-Feb-13	1,385.40	8-May-13	1,827.33	26-Jul-13	1,918.06
26-Nov-12	1,137.29	15-Feb-13	1,396.93	9-May-13	1,828.43	29-Jul-13	1,921.06
27-Nov-12	1,139.74	18-Feb-13	1,401.55	10-May-13	1,830.48	30-Jul-13	1,931.22
28-Nov-12	1,138.97	19-Feb-13	1,413.72	13-May-13	1,832.49	31-Jul-13	1,936.29
29-Nov-12	1,139.19	20-Feb-13	1,426.28	14-May-13	1,832.10	1-Aug-13	1,942.20
30-Nov-12	1,133.47	21-Feb-13	1,433.01	15-May-13	1,835.76	2-Aug-13	1,944.92
3-Dec-12	1,142.61	22-Feb-13	1,447.69	16-May-13	1,839.41	5-Aug-13	1,953.29
4-Dec-12	1,140.77	25-Feb-13	1,454.04	17-May-13	1,842.96	6-Aug-13	1,959.00
5-Dec-12	1,141.08	26-Feb-13	1,455.49	20-May-13	1,838.10	7-Aug-13	1,965.55
6-Dec-12	1,139.69	27-Feb-13	1,458.60	21-May-13	1,848.12	9-Aug-13	1,975.39
10-Dec-12	1,139.69	28-Feb-13	1,482.26	22-May-13	1,851.04	12-Aug-13	1,975.38
11-Dec-12	1,138.98	1-Mar-13	1,513.44	23-May-13	1,852.36	13-Aug-13	1,973.07
12-Dec-12	1,145.69	4-Mar-13	1,532.53	24-May-13	1,859.33		
13-Dec-12	1,170.56	5-Mar-13	1,555.23	28-May-13	1,871.12		
14-Dec-12	1,191.16	7-Mar-13	1,567.96	29-May-13	1,867.31		
17-Dec-12	1,195.57	8-Mar-13	1,565.41	30-May-13	1,866.71		
18-Dec-12	1,191.16	11-Mar-13	1,578.93	31-May-13	1,884.26		
19-Dec-12	1,195.57	12-Mar-13	1,589.21	3-Jun-13	1,877.67		
20-Dec-12	1,190.03	13-Mar-13	1,597.56	4-Jun-13	1,877.69		
21-Dec-12	1,197.29	14-Mar-13	1,608.49	5-Jun-13	1,874.78		
24-Dec-12	1,186.72	15-Mar-13	1,641.03	6-Jun-13	1,868.05		
27-Dec-12	1,187.89	18-Mar-13	1,644.23	7-Jun-13	1,883.88		
28-Dec-12	1,188.28	19-Mar-13	1,662.60	10-Jun-13	1,882.11		

APPENDIX II: COMPUTATION OF ABNORMAL RETURNS

	Alpha	-0.002					Alpha	-0.001				
	Beta	0.015					Beta	0.052				
Day	BOPP	Mkt Index	Rmt	ERjt	Rjt	AR	CAL	Mkt Index	Rmt	ERjt	Rjt	AR
	1.4	1,216.96					0.27	1,185.50				
-10	1.4	1,220.26	0.0027	-0.0020	0.0000	0.001959	0.28	1,182.77	-0.0023	-0.0011	0.0364	0.037487
-9	1.45	1,223.13	0.0023	-0.0020	0.0351	0.037056	0.28	1,182.39	-0.0003	-0.0010	0.0000	0.001017
-8	1.45	1,226.37	0.0026	-0.0020	0.0000	0.001960	0.28	1,181.37	-0.0009	-0.0010	0.0000	0.001045
-7	1.45	1,227.49	0.0009	-0.0020	0.0000	0.001986	0.27	1,175.04	-0.0054	-0.0013	-0.0364	-0.035088
-6	1.45	1,231.93	0.0036	-0.0019	0.0000	0.001946	0.27	1,174.09	-0.0008	-0.0010	0.0000	0.001042
-5	1.46	1,234.27	0.0019	-0.0020	0.0069	0.008844	0.27	1,176.58	0.0021	-0.0009	0.0000	0.000890
-4	1.46	1,235.98	0.0014	-0.0020	0.0364	0.037334	0.28	1,177.34	0.0006	-0.0010	0.0364	0.037334
-3	1.46	1,240.57	0.0037	-0.0019	0.0000	0.001944	0.29	1,176.37	-0.0008	-0.0010	0.0351	0.036134
-2	1.46	1,254.68	0.0113	-0.0018	0.0000	0.001830	0.29	1,183.06	0.0057	-0.0007	0.0000	0.000705
-1	1.47	1,270.80	0.0128	-0.0018	0.0068	0.008634	0.28	1,178.15	-0.0042	-0.0012	-0.0351	-0.033875
0	1.47	1,274.32	0.0028	-0.0020	0.0000	0.001959	0.28	1,186.72	0.0072	-0.0006	0.0000	0.000623
1	1.47	1,282.59	0.0065	-0.0019	0.0000	0.001903	0.28	1,177.89	-0.0075	-0.0014	0.0000	0.001388
2	1.47	1,283.39	0.0006	-0.0020	0.0000	0.001991	0.27	1,180.56	0.0023	-0.0009	-0.0364	-0.035485
3	1.47	1,270.72	-0.0099	-0.0021	0.0000	0.002149	0.27	1,166.24	-0.0122	-0.0016	0.0000	0.001635
4	1.47	1,281.34	0.0083	-0.0019	0.0000	0.001876	0.28	1,170.85	0.0040	-0.0008	0.0364	0.037162
5	1.47	1,292.02	0.0083	-0.0019	0.0000	0.001876	0.28	1,170.28	-0.0005	-0.0010	0.0000	0.001025
6	1.6	1,312.42	0.0157	-0.0018	0.0847	0.086506	0.28	1,172.92	0.0022	-0.0009	0.0000	0.000883
7	1.6	1,312.58	0.0001	-0.0020	0.0000	0.001998	0.28	1,174.71	0.0015	-0.0009	0.0000	0.000921
8	1.7	1,319.89	0.0056	-0.0019	0.0606	0.062541	0.28	1,176.25	0.0013	-0.0009	0.0000	0.000932
9	1.7	1,327.80	0.0060	-0.0019	0.0000	0.001910	0.27	1,185.34	0.0077	-0.0006	-0.0364	-0.035768
10	1.81	1,333.16	0.0040	-0.0019	0.0627	0.064638	0.27	1,176.17	-0.0078	-0.0014	0.0000	0.001404

	Alpha	0.000					Alpha	-0.001				
	Beta	0.077					Beta	0.029				
Day	ETI	Mkt Index	Rmt	ERjt	Rjt	AR	FML	Mkt Index	Rmt	ERjt	Rjt	AR
	0.12	1,025.77					3.55	1,212.31				
-10	0.12	1,022.63	-0.0031	-0.0002	0.0000	0.000236	3.55	1,216.96	0.0038	-0.0009	0.0000	0.000889
-9	0.12	1,020.88	-0.0017	-0.0001	0.0000	0.000132	3.55	1,220.26	0.0027	-0.0009	0.0000	0.000921
-8	0.12	1,021.52	0.0006	0.0000	0.0000	-0.000048	3.55	1,223.13	0.0023	-0.0009	0.0000	0.000932
-7	0.12	1,024.84	0.0032	0.0002	0.0000	-0.000250	3.55	1,226.37	0.0026	-0.0009	0.0000	0.000923
-6	0.12	1,019.00	-0.0057	-0.0004	0.0000	0.000440	3.55	1,227.49	0.0009	-0.0010	0.0000	0.000973
-5	0.11	1,016.70	-0.0023	-0.0002	-0.0870	-0.086837	3.55	1,231.93	0.0036	-0.0009	0.0000	0.000895
-4	0.11	1,016.89	0.0002	0.0000	0.0000	-0.000015	3.55	1,234.27	0.0019	-0.0009	0.0000	0.000945
-3	0.11	1,018.10	0.0012	0.0001	0.0000	-0.000091	3.55	1,235.98	0.0014	-0.0010	0.0000	0.000960
-2	0.11	1,018.16	0.0001	0.0000	0.0000	-0.000005	3.55	1,240.57	0.0037	-0.0009	0.0000	0.000892
-1	0.11	1,022.04	0.0038	0.0003	0.0000	-0.000293	3.56	1,254.68	0.0113	-0.0007	0.0028	0.003485
0	0.11	1,021.17	-0.0009	-0.0001	0.0000	0.000066	3.56	1,270.80	0.0128	-0.0006	0.0000	0.000630
1	0.11	1,021.81	0.0006	0.0004	0.0000	-0.000048	3.6	1,274.32	0.0028	-0.0008	0.0112	0.012093
2	0.11	1,027.78	0.0058	0.0004	0.0000	-0.000449	3.72	1,282.59	0.0065	-0.0008	0.0328	0.033602
3	0.11	1,030.89	0.0030	0.0002	0.0000	-0.000233	3.72	1,283.39	0.0006	-0.0010	0.0000	0.000982
4	0.11	1,034.21	0.0032	0.0002	0.0000	-0.000248	3.77	1,270.72	-0.0099	-0.0013	0.0134	0.014639
5	0.11	1,036.23	0.0019	0.0001	0.0000	-0.000150	3.77	1,281.34	0.0083	-0.0008	0.0000	0.000759
6	0.11	1,037.51	0.0012	0.0001	0.0000	-0.000095	3.96	1,292.02	0.0083	-0.0008	0.0492	0.049928
7	0.11	1,033.60	-0.0038	-0.0003	0.0000	0.000291	3.95	1,312.42	0.0157	-0.0005	-0.0025	-0.001983
8	0.11	1,026.95	-0.0065	-0.0005	0.0000	0.000497	3.95	1,312.58	0.0001	-0.0010	0.0000	0.000996
9	0.11	1,026.73	-0.0002	0.0000	0.0000	0.000016	4.00	1,319.89	0.0056	-0.0008	0.0126	0.013418
10	0.11	1,028.35	0.0016	0.0001	0.0000	-0.000121	4.22	1,327.80	0.0060	-0.0008	0.0535	0.054367

	Alpha	0.001					Alpha	0.000				
	Beta	-0.008					Beta	-0.024				
Day	GOIL	Mkt Index	Rmt	ERjt	Rjt	AR	PBC	Mkt Index	Rmt	ERjt	Rjt	AR
	0.33	970.81					0.24	1,055.57				
-10	0.33	970.35	-0.0005	0.0010	0.0000	-0.001004	0.24	1,055.25	-0.0003	0.0000	0.0000	-0.000007
-9	0.32	971.33	0.0010	0.0010	-0.0308	-0.031764	0.24	1,060.45	0.0049	-0.0001	0.0000	0.000118
-8	0.33	976.97	0.0058	0.0010	0.0308	0.029818	0.24	1,060.31	-0.0001	0.0000	0.0000	-0.000003
-7	0.32	977.87	0.0009	0.0010	-0.0308	-0.031764	0.24	1,060.31	0.0000	0.0000	0.0000	0.000000
-6	0.32	974.43	-0.0035	0.0010	0.0000	-0.001028	0.24	1,059.82	-0.0005	0.0000	0.0000	-0.000011
-5	0.32	969.73	-0.0048	0.0010	0.0000	-0.001039	0.24	1,061.21	0.0013	0.0000	0.0000	0.000031
-4	0.32	974.48	0.0049	0.0010	0.0000	-0.000961	0.24	1,061.21	0.0000	0.0000	0.0000	0.000000
-3	0.32	973.01	-0.0015	0.0010	0.0000	-0.001012	0.24	1,060.69	-0.0005	0.0000	0.0000	-0.000012
-2	0.32	974.10	0.0011	0.0010	0.0000	-0.000991	0.24	1,056.41	-0.0040	0.0001	0.0000	-0.000097
-1	0.32	974.53	0.0004	0.0010	0.0000	-0.000997	0.24	1,049.82	-0.0063	0.0002	0.0000	-0.000150
0	0.32	981.65	0.0073	0.0009	0.0000	-0.000942	0.24	1,048.22	-0.0015	0.0000	0.0000	-0.000037
1	0.33	978.15	-0.0036	0.0010	0.0308	0.029743	0.24	1,055.30	0.0067	-0.0002	0.0000	0.000162
2	0.33	980.14	0.0020	0.0010	0.0000	-0.000984	0.24	1,056.74	0.0014	0.0000	0.0000	0.000033
3	0.33	979.73	-0.0004	0.0010	0.0000	-0.001003	0.24	1,065.57	0.0083	-0.0002	0.0000	0.000200
4	0.33	991.69	0.0121	0.0009	0.0000	-0.000903	0.25	1,055.89	-0.0091	0.0002	0.0408	0.040603
5	0.33	993.80	0.0021	0.0010	0.0000	-0.000983	0.24	1,055.79	-0.0001	0.0000	-0.0408	-0.040824
6	0.33	994.34	0.0006	0.0010	0.0000	-0.000996	0.24	1,056.10	0.0003	0.0000	0.0000	0.000007
7	0.33	995.69	0.0014	0.0010	0.0000	-0.000989	0.24	1,055.23	-0.0008	0.0000	0.0000	-0.000020
8	0.33	994.51	-0.0012	0.0010	0.0000	-0.001009	0.24	1,047.80	-0.0071	0.0002	0.0000	-0.000170
9	0.33	997.03	0.0025	0.0010	0.0000	-0.000980	0.24	1,047.80	0.0000	0.0000	0.0000	0.000000
10	0.32	998.45	0.0014	0.0010	-0.0308	-0.031760	0.24	1,052.51	0.0045	-0.0001	0.0000	0.000108

	Alpha	0.000					Alpha	0.001				
	Beta	0.035					Beta	0.087				
Day	**SG-SSB**	Mkt Index	Rmt	ER*jt*	Rjt	AR	**SIC**	Mkt Index	Rmt	ER*jt*	Rjt	AR
	0.46	1,025.37					0.38	970.81				
-10	0.46	1,025.77	0.0004	0.0000	0.0000	-0.000013	0.38	970.35	-0.0005	0.0010	0.0000	-0.000959
-9	0.46	1,022.63	-0.0031	-0.0001	0.0000	0.000107	0.38	971.33	0.0010	0.0011	0.0000	-0.001087
-8	0.46	1,020.88	-0.0017	-0.0001	0.0000	0.000060	0.38	976.97	0.0058	0.0015	0.0000	-0.001505
-7	0.46	1,021.52	0.0006	0.0000	0.0000	-0.000022	0.38	977.87	0.0009	0.0011	0.0000	-0.001080
-6	0.46	1,024.84	0.0032	0.0001	0.0000	-0.000114	0.38	974.43	-0.0035	0.0007	0.0000	-0.000693
-5	0.46	1,019.00	-0.0057	-0.0002	0.0000	0.000200	0.38	969.73	-0.0048	0.0006	0.0000	-0.000580
-4	0.46	1,016.70	-0.0023	-0.0001	0.0000	0.000079	0.37	974.48	0.0049	0.0014	-0.0267	-0.028093
-3	0.45	1,016.89	0.0002	0.0000	-0.0220	-0.021986	0.37	973.01	-0.0015	0.0009	0.0000	-0.000869
-2	0.45	1,018.10	0.0012	0.0000	0.0000	-0.000042	0.37	974.10	0.0011	0.0011	0.0000	-0.001098
-1	0.45	1,018.16	0.0001	0.0000	0.0000	-0.000002	0.37	974.53	0.0004	0.0010	0.0000	-0.001038
0	**0.45**	**1,022.04**	**0.0038**	**0.0001**	**0.0000**	**-0.000133**	**0.38**	**981.65**	**0.0073**	**0.0016**	**0.0267**	**0.025035**
1	0.45	1,021.17	-0.0009	0.0000	0.0000	0.000030	0.36	978.15	-0.0036	0.0007	-0.0541	-0.054757
2	0.45	1,021.81	0.0006	0.0000	0.0000	-0.000022	0.35	980.14	0.0020	0.0012	-0.0282	-0.029348
3	0.45	1,027.78	0.0058	0.0002	0.0000	-0.000204	0.35	979.73	-0.0004	0.0010	0.0000	-0.000963
4	0.45	1,030.89	0.0030	0.0001	0.0000	-0.000106	0.35	991.69	0.0121	0.0021	0.0000	-0.002059
5	0.45	1,034.21	0.0032	0.0001	0.0000	-0.000113	0.36	993.80	0.0021	0.0012	0.0282	0.026986
6	0.45	1,036.23	0.0019	0.0001	0.0000	-0.000068	0.36	994.34	0.0006	0.0010	0.0000	-0.001048
7	0.45	1,037.51	0.0012	0.0000	0.0000	-0.000043	0.36	995.69	0.0014	0.0011	0.0000	-0.001118
8	0.45	1,033.60	-0.0038	-0.0001	0.0000	0.000132	0.36	994.51	-0.0012	0.0009	0.0000	-0.000897
9	0.45	1,026.95	-0.0065	-0.0002	0.0000	0.000226	0.36	997.03	0.0025	0.0012	0.0000	-0.001219
10	0.44	1,026.73	-0.0002	0.0000	-0.0225	-0.022465	0.38	998.45	0.0014	0.0011	0.0541	0.052943
	Alpha	-0.002					Alpha	0.002				
	Beta	-0.006					Beta	0.066				
Day	**TOTAL**	Mkt Index	Rmt	ER*jt*	Rjt	AR	**UNIL**	Mkt Index	Rmt	ER*jt*	Rjt	AR
	23	1,226.37					6.8	974.63				
-10	23	1,227.49	0.0009	-0.0020	0.0000	0.002005	6.8	969.66	-0.0051	0.0017	0.0000	-0.001663
-9	23	1,231.93	0.0036	-0.0020	0.0000	0.002022	6.8	970.81	0.0012	0.0021	0.0000	-0.002078
-8	23	1,234.27	0.0019	-0.0020	0.0000	0.002011	6.8	970.35	-0.0005	0.0020	0.0000	-0.001969
-7	23	1,235.98	0.0014	-0.0020	0.0000	0.002008	6.8	971.33	0.0010	0.0021	0.0000	-0.002066
-6	23	1,240.57	0.0037	-0.0020	0.0000	0.002022	6.9	976.97	0.0058	0.0024	0.0146	0.012216
-5	23	1,254.68	0.0113	-0.0021	0.0000	0.002050	6.9	977.87	0.0009	0.0021	0.0000	-0.002061
-4	23	1,270.80	0.0128	-0.0021	0.0000	0.002077	6.9	974.43	-0.0035	0.0018	0.0000	-0.001767
-3	23	1,274.32	0.0028	-0.0020	0.0000	0.002017	6.9	969.73	-0.0048	0.0017	0.0000	-0.001681
-2	23	1,282.59	0.0065	-0.0020	0.0000	0.002039	6.97	974.48	0.0049	0.0023	0.0101	0.007771
-1	23	1,283.39	0.0006	-0.0020	0.0000	0.002004	6.97	973.01	-0.0015	0.0019	0.0000	-0.001901
0	**22.43**	**1,270.72**	**-0.0099**	**-0.0019**	**-0.0251**	**-0.023154**	**6.97**	**974.10**	**0.0011**	**0.0021**	**0.0000**	**-0.002074**
1	22.43	1,281.34	0.0083	-0.0020	0.0000	0.002050	6.97	974.53	0.0004	0.0020	0.0000	-0.002029
2	22.43	1,292.02	0.0083	-0.0020	0.0000	0.002050	7.4	981.65	0.0073	0.0025	0.0599	0.057384
3	22.43	1,312.42	0.0157	-0.0021	0.0000	0.002094	7.41	978.15	-0.0036	0.0018	0.0014	-0.000414
4	22.45	1,312.58	0.0001	-0.0020	0.0009	0.002892	7.46	980.14	0.0020	0.0021	0.0067	0.004591
5	22.95	1,319.89	0.0056	-0.0020	0.0220	0.024061	7.46	979.73	-0.0004	0.0020	0.0000	-0.001972
6	23.5	1,327.80	0.0060	-0.0020	0.0237	0.025718	7.46	991.69	0.0121	0.0028	0.0000	-0.002801
7	23.5	1,333.16	0.0040	-0.0020	0.0000	0.002024	7.46	993.80	0.0021	0.0021	0.0000	-0.002140
8	23.55	1,361.12	0.0208	-0.0021	0.0021	0.004250	7.46	994.34	0.0006	0.0020	0.0000	-0.002036
9	23.55	1,359.08	-0.0015	-0.0020	0.0000	0.001991	7.46	995.69	0.0014	0.0021	0.0000	-0.002089
10	24	1,385.40	0.0192	-0.0021	0.0189	0.021043	7.46	994.51	-0.0012	0.0019	0.0000	-0.001922

APPENDIX III: AAR AND CAAR

DAY	BOPP	CAL	ETI	FML	GOIL	PBC	SG-SSB	SIC	TOTAL	UNIL	**AAR**	**CAAR**
-10	0.0020	0.0375	0.0002	0.0009	-0.0010	0.0000	0.0000	-0.0010	0.0020	-0.0017	**0.0039**	**0.0039**
-9	0.0371	0.0010	0.0001	0.0009	-0.0318	0.0001	0.0001	-0.0011	0.0020	-0.0021	**0.0006**	**0.0045**
-8	0.0020	0.0010	0.0000	0.0009	0.0298	0.0000	0.0001	-0.0015	0.0020	-0.0020	**0.0032**	**0.0078**
-7	0.0020	-0.0351	-0.0002	0.0009	-0.0318	0.0000	0.0000	-0.0011	0.0020	-0.0021	**-0.0065**	**0.0012**
-6	0.0019	0.0010	0.0004	0.0010	-0.0010	0.0000	-0.0001	-0.0007	0.0020	0.0122	**0.0017**	**0.0029**
-5	0.0088	0.0009	-0.0868	0.0009	-0.0010	0.0000	0.0002	-0.0006	0.0021	-0.0021	**-0.0078**	**-0.0048**
-4	0.0020	0.0373	0.0000	0.0009	-0.0010	0.0000	0.0001	-0.0281	0.0021	-0.0018	**0.0012**	**-0.0037**
-3	0.0019	0.0361	-0.0001	0.0010	-0.0010	0.0000	-0.0220	-0.0009	0.0020	-0.0017	**0.0015**	**-0.0021**
-2	0.0018	0.0007	0.0000	0.0009	-0.0010	-0.0001	0.0000	-0.0011	0.0020	0.0078	**0.0011**	**-0.0010**
-1	0.0086	-0.0339	-0.0003	0.0035	-0.0010	-0.0002	0.0000	-0.0010	0.0020	-0.0019	**-0.0024**	**-0.0035**
0	0.0020	0.0006	0.0001	0.0006	-0.0009	0.0000	-0.0001	0.0250	-0.0232	-0.0021	**0.0002**	**-0.0033**
1	0.0019	0.0014	0.0000	0.0121	0.0297	0.0002	0.0000	-0.0548	0.0020	-0.0020	**-0.0009**	**-0.0042**
2	0.0020	-0.0355	-0.0004	0.0336	-0.0010	0.0000	0.0000	-0.0293	0.0020	0.0574	**0.0029**	**-0.0013**
3	0.0021	0.0016	-0.0002	0.0010	-0.0010	0.0002	-0.0002	-0.0010	0.0021	-0.0004	**0.0004**	**-0.0009**
4	0.0019	0.0372	-0.0002	0.0146	-0.0009	0.0406	-0.0001	-0.0021	0.0029	0.0046	**0.0098**	**0.0089**
5	0.0019	0.0010	-0.0001	0.0008	-0.0010	-0.0408	-0.0001	0.0270	0.0241	-0.0020	**0.0011**	**0.0100**
6	0.0865	0.0009	-0.0001	0.0499	-0.0010	0.0000	-0.0001	-0.0010	0.0257	-0.0028	**0.0158**	**0.0158**
7	0.0020	0.0009	0.0003	-0.0020	-0.0010	0.0000	0.0000	-0.0011	0.0020	-0.0021	**-0.0001**	**-0.0001**
8	0.0625	0.0009	0.0005	0.0010	-0.0010	-0.0002	0.0001	-0.0009	0.0042	-0.0020	**0.0065**	**0.0065**
9	0.0019	-0.0358	0.0000	0.0134	-0.0010	0.0000	0.0002	-0.0012	0.0020	-0.0021	**-0.0022**	**-0.0022**
10	0.0646	0.0014	-0.0001	0.0544	-0.0318	0.0001	-0.0225	0.0529	0.0210	-0.0019	**0.0138**	**0.0138**

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