

Nairobi Stock Exchange: A Review of Pricing Efficiency After Earnings Announcements

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Abstract

The purpose of this study was to determine the speed of price adjustment and the pricing efficiency of the Nairobi Stock Exchange market after earnings announcements. The study was guided by the semistrong-form sub-hypothesis of the efficient market hypothesis. Efficiency was measured by the speed of price adjustment after earnings announcements. The study targeted all the companies listed at the Nairobi Stock Exchange, utilizing a sample of 20 companies. Data consisted of the closing prices of the stocks on the day of announcement, and on the 1st, 3rd, 7th, 14th and 28th day before and after earnings announcements. Data was analyzed quantitatively for excess returns using a single factor market model. The study found that excess returns were realized both before and after the day of announcement. Excess returns did not approach zero within the 28th day window, which means that it takes more than 28 days for excess returns to cease. There was also evidence of the market anomalies of overreaction and underreaction. The study concludes that the Nairobi Stock Exchange is not semistrong-form efficient.

Key Words: Semistrong-form Efficient Market Hypothesis; Pricing Efficiency; Earnings Announcements; Speed of Price Adjustment; Excess Returns; Overreaction and Underreaction.

1. Introduction

For any economy to utilize scarce resources for development, it must have an efficient capital market (Fabozzi & Modigliani, 2009). A capital market brings together investors and sellers of capital securities and, therefore, enables corporations to raise long-term capital to finance a multitude of projects (Liaw, 2004). In its 1995 policy paper titled 'Restructuring Economies in Distress,' The World Bank noted that an efficient and effective capital market would result in greater resource mobilization and more productive investment (Thomas, Chhibber, Dailami & Melo, 1995). They emphasized the need to develop the non-bank financial sector, especially the capital and money market. Developing economies therefore need to develop efficient capital markets in order to mobilize savings from households and channel them to investments.

The most important concept of capital market efficiency is pricing efficiency. But Samuel and Yacout (1981) assert that the nature of emerging stock markets in terms of information availability is such that prices cannot be assumed to fully reflect all available information. It can also not be assumed that investors in emerging markets will correctly interpret the information that is released. As a result, the corporation in such markets has a greater potential to influence its own stock market price, and there is a greater possibility that its price will move about in a manner not justified by information available. Liaw (2004) also observes that emerging stock markets are characterized by high price volatility. As a result, investors earn high returns for investing in this highly volatile market, which contradicts the basic assumption underlying the efficient market hypothesis.

Governments have often tried to regulate capital markets in order to make them more efficient and to protect investors. In Kenya, the Capital Markets Authority (CMA) undertakes that role (CMA, 2009). The principal objective of the authority is to create, maintain and regulate a capital market in which securities can be issued and traded in an orderly, fair and efficient manner.

The efficient market hypothesis asserts that for a market to be efficient, prices must at all times fully reflect all available relevant information. Dixon and Holmes (1996) explain that a response to new information in terms of a price adjustment must be both almost instantaneous and of a direction and size which fully reflects the significance of the information. However, Ondari (2008) argues that share prices at the Nairobi Stock Exchange (NSE) tend to react to information in a manner that does not reflect the fundamentals underlying companies. Sometimes, there are extreme price movements, as was the case of CFC Bank in January, 2008 when its shares failed to trade for a week after price shot from Ksh. 110 to ksh. 900 in a day.

Kang'aru (2008) points to the same distortions, and suggests that the NSE adopts trading rules that could change how share price moves when a company releases important information.

An inefficient stock market can distort share prices, and consequently shareholder value, and hinder the wide participation of investors (Pandey, 2009). The semistrong-form sub-hypothesis of the efficient market hypothesis suggests that security prices adjust rapidly and accurately to the release of all public information, and therefore speculators cannot use this information to make returns in excess of the market return (Chandra, 2003). However at the NSE, there have been cases of prices reacting to new information and remaining unstable for many days, raising doubts about the market's ability to instantaneously and accurately reflect the correct significance of that information (Muiruri, 2009). For example, after Crown Berger released its half-year results on August 30, 2008, its share price fell from ksh. 38 to ksh.8. The price rose again and settled at around ksh.26 after about 45 days. Likewise, Eveready East Africa announced its half-year results on May 20, 2008 and its price fell from ksh.7.60 to ksh.4.85. After thirty days, its price settled around ksh.5.50.

The main objective of this study is to assess the pricing efficiency of the NSE after earnings announcements. Although the efficient market hypothesis (EMH) assumes that capital markets are efficient, empirical tests from various markets have shown mixed results. Studies at the NSE, such as Dickson and Kinandu (1994), have found it efficient at the weak-form level. However, this market has not been tested for semistrong-form efficiency. Specifically, this study was designed to determine the speed at which prices adjust after earnings announcements and to determine the pricing efficiency of the NSE after earnings announcements.

To achieve these objectives, the study addresses the following questions:

1. How many days does it take for prices to fully adjust to earnings announcements?
2. Is the NSE efficient in pricing stocks after earnings announcements?

2. Literature Review

2.1 An overview of the stock exchange market

The financial market mainly consists of the capital and money markets. The capital market, also known as the securities market, is that part of the financial system that brings together lenders (investors) of capital and borrowers of capital (CMA, 2009). It deals with long-dated securities issued by publicly quoted companies and the government, such as shares and loan stock (Pike & Neale, 2012). The stock exchange market is the secondary market in which issued securities can be freely traded on a day- to- day basis.

The stock market plays a very important role in the economy (Liaw, 2004; NSE, 2014; Reilly & Brown, 2011). Its primary role is to provide a place where corporations can go to raise long-term capital to finance a multitude of projects. It transfers savings to investment in productive enterprises, as an alternative to keeping money idle. It also assists in rational and efficient allocation of scarce capital. In its secondary role, it provides an efficient mechanism for liquidating investments. People have an incentive to save when institutions exist where they can safely invest their savings and earn a return. There is also evidence that the stock market promotes higher standards of accounting, resource management and transparency in management of business. (NSE, 2014).

Around the world, stock exchanges grew in response to the demand for funds to finance investment and ventures in overseas trade (Arnold, 2008). From the investor standpoint, stock ownership has expanded drastically in the past decade as individuals have assumed greater responsibility in providing for their retirement (Liaw, 2004). In Africa, stock markets acquired a more significant role from the 1990s, following financial liberalization. This was mainly because of the higher interest rates associated with liberalization of the banking system, which encouraged firms to issue equity. However, they were in some cases imposed, explicitly or implicitly, as part of the financial liberalization package.

2.2 The concept of an efficient market

An efficient market implies a well-informed, properly functioning market (Pandey, 2009). Jones (2009) describes it as one in which the prices of all securities quickly and fully reflect all available information about the assets. The concept assumes that investors will assimilate all relevant information into prices in making their buy and sell decisions.

Efficiency of the capital market can be understood at three levels: the internal (operational) level, the external (pricing) level and the allocational level (Fabozzi & Modigliani, 2009; Arnold, 2008). Internal efficiency means that investors can speedily and reliably obtain transaction services as cheaply as possible, given the costs associated with giving the services. External efficiency means that prices at all times fully reflect all available information that is relevant to valuation of securities. At the allocational level, the interest is on whether the market efficiently allocates society's scarce resources where they can be most productive. Vast resources should go to fast growing industries and only small amounts to slow growth industries.

For Pike and Neale (2012), the most important concept of efficiency is pricing. Capital market efficiency depends on how quickly new information is reflected in share prices (Emery, Finerty & Stowe, 1998). If prices adjust quickly and fully to new information there will be no opportunities for sustained arbitrage, and stock prices will at all times reflect true shareholders' wealth. The EMH predicts that if the market is efficient, it will react fully and quickly to new information (in this case earnings announcements) through price adjustments.

Liaw (2004) distinguishes between a perfectly efficient and an economically efficient market. In a perfectly efficient market, prices always reflect all known information and they adjust instantaneously to new information. In an economically efficient market, prices might not adjust to new information right away, but over the long run, speculative profits cannot be earned after factoring in transaction costs. Economic efficiency is more relevant to this study. Jones (2009) argues that the capital market is not perfectly efficient, and it is not certainly perfectly inefficient. It is therefore a question of the degree of efficiency of the market. A perfectly efficient market will only exist under certain market conditions. First, all information relevant to the assessment of the firm's future earnings should be costless and widely available to market participants at approximately the same time. Second, there should be no transaction costs, taxes and other frictions that interfere with demand and supply of securities. Third, investors should be rational and pursuing profit maximization. Fourth, the number of buyers and sellers should be sufficiently large, and all participants small enough relative to the market, so that no individual market agent can influence the price of securities. Fifth, all buyers and sellers should be price takers, and finally, the market should be determined at the point of equality of demand and supply (Pike & Neale, 2012; Liaw, 2004; Jones 2009; Chandra, 2003). But these basic assumptions are not strictly true in the real world. In the real capital markets, there are a number of factors that hinder efficiency (Arnold, 2008). There is information asymmetry due to the fact that information is not free and is generally available to corporate insiders earlier than to others. Indeed, there are transaction costs and other trading barriers, and although most investors individually do not affect market prices, some do.

2.3 The efficient market hypothesis (EMH)

This study will mainly be guided by Fama's (1970) efficient market hypothesis (EMH). Fama organized growing empirical evidence of efficient capital markets and came up with the EMH as a formal statement of the market efficiency concept (Jones, 2009). Standard practice since then has been to discuss the efficient market concept in the form of the EMH. The EMH states that, an efficient market is one in which information is readily and widely available to investors, and all relevant and ascertainable information is

already reflected in security prices (Brealey, Myers & Allen, 2010). Therefore, sales in an efficient market cannot result in abnormal profits because the quick reaction of investors to new information ensures that the market is always close to its true value. This means that it is impossible for any investor or group of investors to consistently outperform the market, except by luck (Pike & Neale, 2012). How quickly new information is reflected in share prices is key to market efficiency (Emery, Finerty & Stowe, 1998).

Market efficiency evolved from the notion of perfect competition, but since conditions for a perfect market do not exist in a real capital market, security prices may not fully reflect all relevant information. Fama, therefore, pointed out the need to define 'fully reflect information' in the EMH in terms of the expected return from holding a security. He also pointed to the need to define 'relevant information' in the EMH, and in defining it, he divided the market into three levels: the weak form, the semi strong form and the strong form. Each deals with a different level of cumulative information. The weak-form EMH assumes that current stock prices fully reflect all security market information, which includes post price movements, trading volume data, rates of return and other market-generated information (Arnold, 2008; Reilly & Brown, 2011). When this level of efficiency holds, there is no value in predicting future price movements by analyzing trends in past price movements. Prices will fluctuate more or less randomly (Arnold, 2008).

The semistrong-form EMH asserts that security prices adjust rapidly to the release of all public information. This means that current share prices fully reflect all the past market information considered in the weak-form hypothesis, and all current non-market information such as earnings and dividend announcements, financial ratios, stock splits, economic news and political news (Reilly & Brown, 2011). There is, therefore, no benefit in analyzing existing information. Pike and Neale (2012) argue that only current and historical information is certain in its effect on price, making the semistrong-form tests the most ideal for capital market efficiency. In an efficient market, no impact should be observable prior to the announcement, nor during the days following the announcement (Vernimmen, 2007). The price of a stock should react immediately to relevant new information. Pandey (2009) notes that for the capital market to be efficient in the semistrong-form, the value of cumulative abnormal returns (CAR) should be equal to zero before the event, rise to a positive number just after the event and then stabilize. In an inefficient market, the value of CAR will continue rising for several weeks after the event.

The strong form sub-hypothesis contends that share prices reflect all publicly and privately held information. It encompasses the weak and the semistrong forms and represents the highest level of market efficiency. The market price fully reflects the 'true' or intrinsic value of the share based on the underlying future cash flows (Arnold, 2008; Reilly & Brown, 2011). The implication is that no investor, over a reasonable period of time, can earn abnormal rates of return by using publicly held information in a superior manner. This study will apply the semi-strong form EMH, which holds that security prices adjust rapidly to the release of all public information.

As the EMH strengthens from the weak to the strong form, opportunities for profitable speculation reduce. Jones (2009) explains that the EMH is concerned with the extent to which security prices quickly and fully reflect different types of available information, so that each of the three sub hypotheses involves a different level of cumulative information. Reilly & Brown (2011) believe that the EMH deals with informational efficiency.

2.4 New information and market response

Information in the EMH is defined as anything that may affect prices that is unknown in the present and thus appears randomly in the future (Dixon & Holmes, 1996). Jones (2009) views information as key in determining stock prices, and is therefore the central issue of the efficient market concept. Vernimmen (2007) points out that the financial market will not fairly price a company's securities unless that company provides all the relevant financial information. The market uses this information to assess the real capacity

of the firm to create value. Financial communication reduces the information asymmetries between market participants. Information can be classified as historical, current or forecast, but only current and historical information is certain in its effect on price (Pike and Neale, 2012). In the current study, earnings announcements constitute new information, while the NSE constitutes the market.

At any given time, it is investors' buy and sell decisions that will determine price. This is based on the assumption that in efficient capital markets, security prices are determined at the point where demand and supply meet (Liaw, 2004). One enters the market to buy or sell at a price justified by prevailing demand and supply (Reilly & Brown, 2011). The efficient market concept also assumes that investors will assimilate all relevant information into prices in making their buy and sell decisions (Jones, 2009). This, therefore, means that for a capital market to fairly price securities, information should be freely and widely available to all investors, who should also be able to interpret it correctly. Any event that will influence investors' buy and sell decisions will consequently have an effect on price. In an efficient market, today's price is a true measure of a security's worth because it values the firm's future growth and earnings. Reilly and Norton (2006) note that the speed of reaction depends on the rate at which data can be transmitted, received, analyzed, the analysis transmitted, received and acted upon by buying and selling. Arnold (2008) adds that how fast prices will adjust will also depend on the sophistication of market participants.

Reilly and Brown (2011) state that stock prices usually adjust to significant economic events. They react based on the underlying economic impact of the action or event. In other words, the market adjusts security prices according to the impact of the news on the firm's future earnings and dividends (Mayo, 2011). Security prices are rationally and efficiently determined by such fundamental considerations as earnings, interest rates, dividend policy and the economic environment. Changes in these variables are quickly reflected in a security's price. All known information is assumed to be embodied in the current price, so that only new information will alter that price.

Jones (2009) and Sharpe, Alexander and Bailey (2003) have grouped informational events into macro and micro-economic events. Macro-economic events are those that have an economic impact on the entire market environment. They cause a rise or fall in the stock market index, such as the NSE 20 Share index. They include changes in reported inflation, interest rates, tax rates, money supply, transaction costs, and legal restrictions (Jones, 2009; Sharpe *et al*, 2003). The movement of the market index is usually influenced by macro-economic events. This study will treat all macro-economic events into a single market factor, reflected in changes in the NSE 20 Share index.

Micro-economic events are company specific events that have an impact on investors' perception of the firm's future earning power (Jones, 2009; Sharpe *et al*, 2003). A public announcement of any such event will cause changes in the price of the firm's stock. Examples of micro-economic events include discovery of ore reserves, a strike by employees, changes in management, a stock split, accounting changes, dividend and earnings announcements, and other unexpected news (Chandra, 2003; Reilly & Brown, 2011; Jones, 2009). This study uses one of these micro events – earnings announcements – in testing efficiency of the NSE.

The question of whether capital markets are efficient is the most controversial area in investment research. While some studies have supported the view that security prices adjust rationally and speedily to new information, others refute such claims hence the continuing debate on the validity of the EMH. The technique that has been widely used to test the weak form of efficiency is to examine correlation of daily returns. The existence of a serial correlation in some of the findings contradicts the weak form of efficiency. However, majority of the studies have found evidence that daily prices follow a random path, which is consistent with the EMH.

The semi-strong efficient market hypothesis can be empirically tested by studying the reaction of market prices to company events (event studies). The tests center on questions of whether new information which is

reasonably expected to affect a security's price, actually does so in the expected direction, by the expected amount, and with the expected strength. Many of the early studies investigated whether trading in shares immediately following significant announcements produced unexpectedly high returns. Many found that excess returns were nil, therefore overwhelmingly supporting the EMH (Arnold, 2008).

The technique that has most widely been used to measure semi-strong efficiency is event study analysis. This analysis is based on the estimate of excess returns, which is obtained by subtracting the daily return on the market from the daily return on the company's stock. Arnold (2008), however, notes an anomaly with the EMH. He argues that most of the information in earnings announcements is reflected in share prices before the announcement is made. Most of this information is anticipated because investors receive information through press reports, statements and briefings by directors, and interim reports throughout the year. Ball and Brown (1968), found that share prices start to drift upwards or downwards 12 months before the annual report is published. In the month the final report is produced, less than 15 per cent of the change is unanticipated and the share price tends to move by 10-15 per cent.

When much of the information is unanticipated by investors, their response is different. Bernard and Thomas (1989) studied the post-earnings announcement drift and found out that there is a sluggish response to the announcement of unexpectedly good or unexpectedly bad profit figures. Cumulative abnormal returns continued to drift up or down for up to 60 days after announcement.

A study of Wall Street takeover news found the US stock market efficient in responding to published takeover rumors. Rendleman, Jones, and Latane (1982) analyzed returns associated with earnings reports at the New York Stock Exchange using a large sample and daily data from 20 days before to 90 days after announcement. They found that 31 per cent of the total response came before the earnings announcement, 18 per cent on the day of announcement, and 51 per cent afterward. These results are evidence against the EMH because they indicate that the market has not adjusted stock prices to reflect earnings reports as fast as expected by the semi-strong form EMH. This implies that earnings surprises can be used to predict returns for individual stocks. A similar study by Defeo (1986) investigated the dynamics in the speed of price adjustments to earnings announcements using data from 400 firms traded at the New York stock Exchange and the American Stock Exchange. Results from the study revealed that there were cross sectional differences which were linked to the type of report (whether interim or annual) and firm size (whether large or small).

Another study by Mallikarjunappa & Dsouza (2013) at the Indian Stock Market concluded that it was not semi-strong form efficient. Price adjustment continued until 30 days after earnings announcements, because both average abnormal return and cumulative average abnormal return do not tend to zero. A test of semi-strong form efficiency in the same market by Raja, Sudhar & Selvam (2009) using stock splits made the same conclusion. Hussin, Ahmed & Ying (2010) carried out a similar study on the Malaysian Stock Exchange using the event study methodology. The study found that increases in dividends and decreases in dividends led to positive and negative excess returns respectively. They concluded that the market was not semi-strong form efficient.

Mobarek (2006) assessed if the Dhaka Stock Exchange deviated from the idealized efficiency. The results from both parametric and non-parametric tests provided evidence that security returns do not follow the random path. He attributed the anomaly to a delay in dissemination of new price sensitive information or biases in the response of market participants to such information. Similarly, Rahman and Hossain (2006) found the Dhaka Stock Exchange not efficient in the weak form.

At the Nigerian Stock Exchange market, excess returns were significant for up to 30 days before and up to 25 days after the announcement, indicating that the market was not semi-strong form efficient (Adelagan, 2003). Dickson and Kinandu (1994) tested for weak-form efficiency at the Nairobi Stock Exchange. They investigated whether successive share price returns were independent of random variables, so that price

returns cannot be predicted from historical price returns. They found that the behavior of the price series took a random walk, and concluded that the Nairobi Stock exchange was weak form efficient.

2.5 Conceptual framework

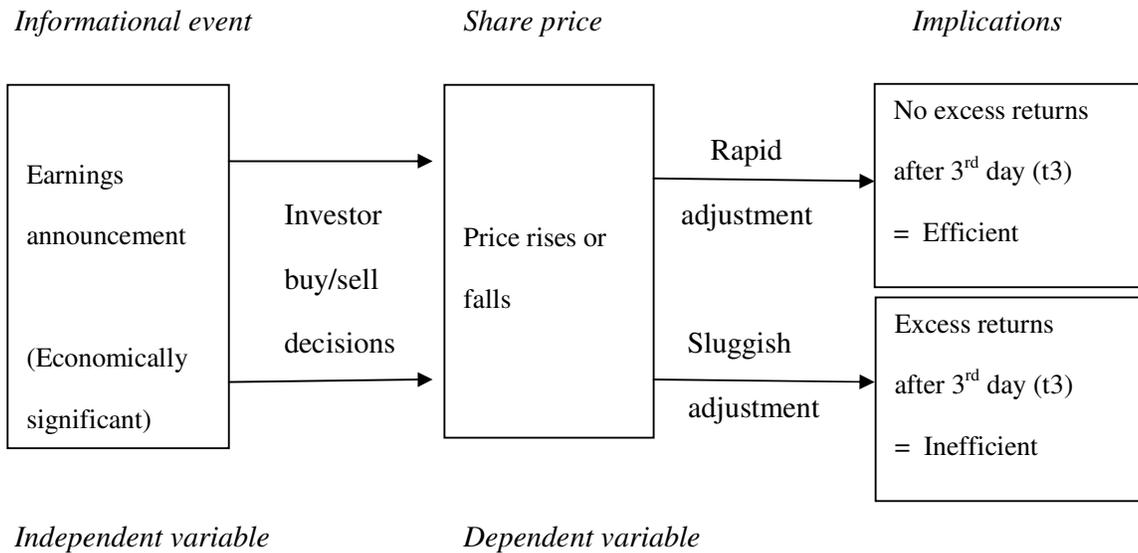


Figure 1: Conceptual framework

Figure 1 shows that earnings announcements constitute an informational event. When a listed company announces its earnings, investors use this information to make their buy and sell decisions. According to the semistrong-form EMH, security prices adjust rapidly to the release of all public information. Therefore depending on the economic significance of that information, price will rise or fall to a new level. If the market is semistrong-form efficient, price adjustment will be rapid and no excess returns will be possible after three days. But if the market is not efficient, adjustment will be sluggish and excess returns will be significant beyond three days after announcement.

3. Methodology

3.1. Research design

This research was designed as an event study. The efficient market hypothesis was tested at the NSE using the event study methodology. An event study examines how a stock responds to a change in a variable, such as unexpected increase in earnings or dividends (Mayo, 2011). This means that a company’s stock returns are examined to determine the impact of a particular event on the stock’s price (Jones, 2009). This methodology uses an index model of stock returns, which states that security returns are determined by a market factor and a unique company factor. The company excess returns(ER) are the residual error terms representing the difference between the security’s actual rate of return and the expected rate of return (market return).

$$ER_{it} = AR_{jt} - MR_{jt} \tag{Equation 1}$$

Where:

- ER_{jt} = excess rate of return of security j in period t,
- AR_{jt} = actual rate of return on security j in period t, and

MR_{jt} = market rate of return on security j in period t .

The Cumulative Abnormal Return (CAR) is the sum of the individual abnormal returns over the period of time under examination.

This study was carried out at the NSE and at the CMA library in Nairobi. The researchers used historical daily trading data from the NSE. The initial price was taken as the closing price on the day before each earnings announcement. Abnormal returns were calculated for the 1st, 3rd, 7th, 14th, 21st, and 28th day event windows in both the pre- and post-announcement periods.

3.2 Population and sample

The study targeted all 56 public listed companies whose stocks are traded at the NSE. A sample of 20 listed companies was selected from the population. The NSE has categorized listed companies into five sectors: the agricultural, commercial and services, finance and investment, industrial and allied, and the alternative investment sectors. The NSE 20-Share Index companies represent the five categories of listed firms. Only actively traded stocks are usually selected into the index.

3.3 Data collection procedure

For each firm in the sample, the researchers identified and recorded as t_0 the day on which the earnings report was approved by the board of directors. We also recorded the percentage change in after-tax profit. This was easily obtained from annual financial reports available at the CMA library. The stocks' closing prices on the day of announcement and on the 1st, 3rd, 7th, 14th, 21st, and 28th day before and after announcement were recorded. The corresponding NSE 20-Share share index was also recorded. The percentage change in earnings from the previous year was also recorded.

3.4 Data analysis and interpretation

The data collected was analyzed using a single factor market model that is based on the Asset Pricing Model (APT) (Chandra, 2003).

$$ER_{jt} = AR_{jt} - MR_{jt} \quad \text{Equation 1}$$

For each firm in the sample, percentage, actual, market and excess returns around the announcement date were calculated, using Equation 3.

The firms in the sample were then grouped into two: those whose earnings increased and those whose earnings decreased, as in Chandra (2003). Under each category, average excess returns across the firms on each day t were calculated.

$$\overline{AR}_t = \sum_{j=1}^{j=m} \frac{AR_{jt}}{m} \quad \text{Equation 2}$$

Where:

\overline{AR} = Average excess return

m = number of firms in that category

Cumulative excess returns (CER) were also calculated for each category, from t_{-28} to t_{28} .

The data were then interpreted for evidence of market efficiency at the NSE.

4. Findings and Discussion

4.1 Price reaction to earnings announcements

Of the 20 firms that were sampled, 11 reported increased earnings while nine reported decreased earnings, relative to previous earnings. While an increase is expected to lead to positive excess returns, a decrease is

likely to result in negative excess returns. For each set of firms, the average excess returns for the periods before and after announcements were calculated.

The study found that excess returns were realized whenever the firms announced their earnings. Excess returns were realized for each return window from t_{-28} to t_{28} . The excess returns were analyzed during the pre-announcement and the post-announcement period.

The pre-announcement period covered the period from t_{-28} to t_{-1} . There were excess returns realized in the pre-announcement period. Of the 11 firms with increased earnings, six had negative mean excess returns in the pre-announcement period, ranging from -0.7% to -7.9%. The remaining five had positive mean excess returns in the range of 1.32% to 16.2%. The average pre-announcement excess return is positive at 0.35%, but the average is negative after announcement, that is -0.58%.

For firms which had reported a decline in returns, five had positive pre-announcement returns, ranging from 0.2% to 8.2%. The other four had negative pre-announcement returns ranging between -1.1% and -6.4%. The average return for all firms in this category was 0.08% and -4.33% before and after announcement respectively. In both cases, the number of firms with positive and negative excess returns is almost equal. This implies that in the pre-announcement period, price can follow any direction, with an equal chance for both positive and negative returns.

The post-announcement period covers the period from t_0 to t_{28} . For firms with increased earnings, positive excess returns were expected, but only three out of 11 had positive excess returns in the pre-announcement period. Eight had negative excess returns ranging from -0.5% to -6.9%. This implies that there may have been an earlier overreaction that was being corrected by a price fall. Under decreased earnings, post-announcement excess returns were negative in eight out of the nine firms. This was consistent with what is expected when news of reduced earnings reach the market.

4.2. Pre- and post-announcement excess returns

Under increased earnings, average excess returns did not vary much between the pre- and post-announcement periods. The averages for the periods were -0.55% and -0.14% respectfully. Under decreased returns however, there was a significant difference between pre-announcement (0.08%) and post-announcement returns (-4.33%). Generally, post-announcement excess returns were found to be higher than pre-announcement returns, whether positive or negative.

4.3. Excess returns under increased and decreased earnings

The pattern of excess returns differs under increased and decreased earnings. Under increased returns, average excess returns remained close to zero from t_{-28} to t_{21} , only to rise to -3.23% at t_{28} , in the negative direction. The implication is that there may have been an early reaction in most firms, driven by quarterly or semi-annual financial reports and reports from analysts.

Under decreased returns, excess returns were found to be close to zero from t_{28} to t_0 , but they start rising in the negative direction from t_1 . They consistently rise up to -7.66% by t_{28} . This reaction is greater than under increased returns. The implication here is that price reacts more to negative news than to positive news.

4.4. Cross-sector comparison of average excess returns

The results were also compared across different sectors. The firms listed at the NSE have been grouped into five sectors: agricultural, commercial and services, finance and investment, industrial and allied, and the alternative investment segment. But only four sectors were compared. The alternative investment segment was excluded from the comparison because only one from the sector was used in the study.

The commercial and services sector had the highest average excess returns in both the pre- and post-announcement periods, and also the highest over-all average excess returns. The finance and investment sector had the lowest average excess returns in both periods. This implies that the stocks in the commercial and services sector are the most volatile and responsive to earnings reports, while those in the finance and investment are the least volatile. Liaw (2004) observes that volatility in emerging markets creates opportunities for high excess returns to speculators.

4.5. Cumulative excess returns

Cumulative abnormal returns were calculated both for firms with increased and decreased earnings. For firms with increased returns, cumulative excess returns were positive. They increased gradually from 0.01% at t_{28} to 4.49% at t_{14} , but started dropping after that to end at 0.39% by t_{28} . This implies that the investor consistently outperforms the market using the information contained in earnings announcements.

Cumulative excess returns for firms with decreased returns are positive and increasing from t_{28} to t_1 , but they turn negative from t_3 and continue rising negatively up to t_{28} . This implies that investor returns are superior to the market in the pre-announcement period, but are generally inferior in the post-announcement period.

According to Mayo (2011), the pattern of excess returns in an efficient market should be such that they fluctuate around zero. However the pattern of excess returns as obtained in this study is not consistent with the efficient market. Excess returns for both firms with increased and decreased returns tended to drift away from zero. Cumulative excess returns are generally higher for firms with decreased returns.

4.6. Speed of reaction to earnings announcements

The data was also analyzed to determine the speed of reaction to earnings news. The speed of reaction is the number of days it takes before excess returns cease. Under increased returns, average excess returns are evident up to the 28th day. Excess returns therefore cease in a period beyond 28 days. The returns are however very low up to t_{21} . Under decreased returns, average excess returns are low in the pre-announcement period but grow in the post-announcement period to peak at -7.66% by t_{28} . Excess returns are therefore likely to continue beyond the 28th day. For both categories of firms, the speed of reaction is therefore more than 28 days.

4.7 Pricing efficiency

Data was analyzed for evidence of pricing efficiency at the NSE after earnings announcements. The researchers examined the pattern of post-announcement excess returns, average excess returns across each set of firms in each day, and also the speed at which the stocks get clear of excess returns. Two anomalies to the efficient market hypothesis were evident – underreaction and overreaction. Underreaction means a slow incorporation of news into prices. This is realized when the initial quick reaction is too small, so that the subsequent completion of the reaction takes place over a period of time after the announcement. Ou & Penman (1989) argue that the market sometimes underutilizes financial statement information. The initial reaction therefore may be too small and be completed over a period of up to six months.

Each of the firms used in the study had excess returns in the post-announcement period. But some had excess returns in the expected direction, while some had them in the opposite direction. A majority of the firms which had excess returns in the expected direction, there is evidence of underreaction. Excess post-announcement returns increased gradually from t_1 , to t_{28} and will, therefore, continue for many days. The study found evidence that excess returns will approach zero in a period that is far beyond the 28th day. This is evidence of underreaction, and therefore of inefficiency. It is important to note that delayed reaction was more evident under decreased earnings than under increased earnings. Eight out of nine firms in this

category had negative post-announcement average excess returns as expected. This implies that there was a correct and immediate price response to negative earnings. However, it was sluggish, as it took more than 28 days for the price to settle to a new level. Arnold (2008) argues that the speed of price adjustments depends on the sophistication of market participants. Reilly & Norton (2006) add that it also depends on the speed of news transmission, analysis and dissemination of that analysis.

Underreaction is also evident in the pattern of average excess returns at time t (AER_t) for firms with decreased earnings. The returns move in a predictable direction, but gradually increase from t_1 , with the highest negative returns at t_{28} . The reaction will therefore be completed beyond the 28th day. Loh (2010) argues that investor inattention is a major cause of underreaction. He points to the presence of investor attention constraints which lead to category learning, so that investors focus on marketwide information rather than firm-specific information. Loh had investigated investor attention as a plausible explanation to incomplete investor reaction. He found out that investor attention varies across firms, and that low attention stocks react less to stock recommendations than high attention stocks in the three day window. Underreaction can also be caused by investor uncertainty over some important factors affecting the economy (Black, 1976). These factors include political uncertainty, interest rates and inflation, among others which can affect the level of future output.

An overreaction takes place when the initial reaction is too high, followed by a downward trend in prices. Evidence of overreaction was found in the pattern of post-announcement excess returns for individual firms with increased returns. But this overreaction evidently took place early - before the release of earnings news - but was corrected in the post-announcement period. Six out of eleven of firms in this category generally had negative rather than the expected positive post-announcement excess returns up to the 28th day. This is evidence that there were possibly earlier overreactions which were being corrected by a negative price movement in the post-announcement period. The pattern of average excess returns under increased earnings provided further evidence of early reaction and overreaction. Average excess returns were much of the time positive, but very close to zero. They however turned negative at t_{21} and rise to -3.23% at t_{28} . The fact that the returns later turned negative implies that there was an earlier positive overreaction which was now being corrected.

Ball & Brown (1968) state that share prices start to drift upwards or downwards even twelve months before the annual report is published. This view supports the possibility of early reactions to earnings announcements. By the time the annual report is published, only about 10 – 15% price movement is expected. Benard (1992) states that when there is an initial overreaction, subsequent corrections can go in a direction opposite to the initial response. He further says that an initial over- or underreaction is likely to be corrected over a long period of time. The pattern of excess returns under increased returns is consistent with Benard's view.

Daniel, Hirshleifer & Subrahmanyam (1997) argue that overreaction can be caused by investor overconfidence about the information they collect on their own. They as a result overreact to this information, but underreact to information provided by managers in financial reports. Jagadeesh and Titman (2012) argues that overreaction can also be caused by speculative trading activities. But when the report is finally out, the overreaction is corrected. He also states that the participation of a large number of retail investors favors herding behavior, so that the whole market tends to move in the same direction, causing over- or underreaction.

5. Summary, Conclusion, and Recommendations

5.1 Summary

The main purpose of the study was determine the speed at which the NSE reacts to earnings announcements, and if it is efficient in pricing stocks after such announcements. Excess returns were calculated, and then compared between the pre- and post-announcement periods under increased and decreased returns and across sectors.

The findings of the study were that the NSE Market reacted to earnings announcements through a rise or fall in price. However, the reaction began before the announcement is made, sometimes more than twenty eight days earlier. The reaction continued after the announcement, often going beyond the twenty eighth day. Excess returns were realized both before and after the announcement. Cumulative excess returns did not approach zero by the 28th day. The study also found evidence of the market anomalies of underreaction and overreaction.

5.2 Conclusion

It takes more than 28 days at the NSE before stock price fully adjusts to the information contained in earnings announcements. For all the firms used in the study, excess returns continued beyond the 28th day after announcement. This is not consistent with the semistrong-form sub-hypothesis of the efficient market hypothesis in which security prices adjust rapidly to the release of all public information. The NSE market is not efficient in pricing stocks after earnings announcements. Its efficiency was undermined by the anomalies of underreaction and overreaction. Sometimes the market underreacts to the information contained in earnings announcements, while at other times it overreacts. Any underreaction or overreaction will later be corrected, leading to a post-announcement drift in prices.

5.3. Recommendations

The study recommends that there should be policy initiatives from the Capital Market Authority to discourage short term speculation. The Capital Markets Authority as a regulator should ensure timely release of important micro-economic information such as earnings and dividends. The public should be educated on the functioning and benefits of investing in the stock market, with a view to attracting more long-term rather than for short-term investors. This will reduce the overreaction caused by speculative trading of retail investors. NSE trading rules should be amended so that a certain minimum volume of share trade is reached before price can move. This will prevent overreaction that is driven by a few players who want to manipulate the market.

The study further makes the following suggestions for further research. A comparative study should be undertaken on price reactions to earnings announcements using cross-listed stocks. It is further suggested that a similar study be carried out to find out the efficiency of the NSE. This study assessed the efficiency of the NSE by using earnings announcements. Further research should be carried out using other events such as stock splits and intended mergers. Since the study covered only a twenty-eight day window within which excess returns did not cease, further research should be conducted to cover a longer period of time.

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