

AN ASSESSMENT OF THE EFFECTS OF NAIROBI SECURITIES EXCHANGE (NSE) 20 SHARE INDEX

REVIEW ON MARKET SHARE PERFORMANCE OF DELETED STOCKS IN KENYA

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Abstract

The NSE 20 share index is reviewed periodically to ensure that it reflects an accurate picture of market performance. The aim of the study was to assess the effects of NSE 20 share index review on Market Share Performance of Deleted Stocks in Kenya. The specific objectives that guided the study were to: determine the effects Announcement Review on market share performance of deleted stocks in Kenya, establish the effects of Action Review on market share performance of deleted stocks in Kenya and evaluate the effects of review information contents on market share performance of deleted stocks in Kenya. The target population of was 18 stocks deleted from NSE20 share index from 1994 to 2014. The study used census sampling. Secondary data were obtained from NSE for the entire event analysis period and analyzed with the aid of SPSS. Study used Pearson correlation, Ordinary Least Square Regression (OLS) and market model to estimate the abnormal returns. Test for hypothesis was done using t-test statistic. The study found that, on average, within the review period, the mean market return performance was positive 0.20% compared to AAR for deleted stock of negative 0.58%, indicating that, in the short run, investors of deleted stock recorded a total reduction in return of 0.78%; during review action window, AAR were positive but declining before action but reverted

on third day ($t=3$) and turns positive on $t=5$ which continues to rise 1.10%. On average, the deleted stock performance within the review action period was negative 0.59% compared to market return of positive 0.13%; study further found that review announcement transmits new information into the market while review action has no information. Study concluded that in the short run, investors of deleted stock could lose a total of 0.78% of the returns, a significance effects on market stock performance, and index review announcement transmit new information to the market. The study recommends further research in the area using economic model and other market indices (All Share Index).

Keywords: NSE 20 Share Index, Market Share Performance, Deleted Stock, Index Review

INTRODUCTION

Stock indexes are designed not only to gauge market performance, but also to guide investors in making investment decisions especially stock portfolio mix. Several studies documents that changes in stock market composition or index reconstruction have impact on different stock characteristics such as price returns, trading volume, bid-ask spread or volatility (Duque & Madeira, 2010). As stated by He1 and Wang (2015) index review effect is an anomaly of stock market when the shares are added to or deleted from the index, stock prices and trading volume tend to rise or fall sharply in the short term, and this may form an arbitrage opportunity for investors. In addition, Duque and Madeira (2010) observed that effects of stock index review can be observed when they are announced or when they become effective.

Effects of index review or reconstruction on stock performance is an important category of behavioral finance research that is beneficial for learning the operation of the security market and the investors' behavior. As observed by scholars, addition of a stock to major stock indices leads to an increase return and trading, mainly witnessed in developed markets (Shleifer, 2005, Noronha and Singal, 2004), and local NSE market (Opiyo and Kubasu, 2014). On the other hand, stock deletions have exhibited mixed results based on time horizon and reasons for deletion. Therefore, it's not imperative to claim that stocks which exhibit declining return or projected poor performance are the one deleted from index or index deletion leads to decline in stock return. To clear this phenomenon, there is a need to analyse effect of stock deleted from index in emerging market. The following section reviewed index review from global, regional to local perspective.

The S&P 500 (Standard & Poor's 500) is the world renowned stock index which is an American stock market index based on the market capitalizations of 500 large companies

having common stock listed on the NASDAQ. S&P 500 index components and their weightings are determined by S&P Dow Jones Indices (S&P, 2014). It is different from other U.S. stock market indices, such as the Dow Jones Industrial Average or the NASDAQ Composite index, because of its diverse constituency and weighting methodology. S&P 500 is one of the majorly followed equity indices, and many consider it as one of the best representations of the U.S. stock market, and a leading indicator of business cycles (US National Bureau of Economic Research 2010).

The components of the S&P 500 are selected by committee. This is similar to the Dow Jones Industrial Average, but different from others such as the Russell 1000, which are strictly rule-based (S&P 500 Ground Rules, 2014). When considering the eligibility of a new addition, the committee assesses the company's merit using eight primary criteria: market capitalization, liquidity, domicile, public float, sector classification, financial viability, length of time publicly traded and listing exchange. In order to be added to the index, a company must satisfy these liquidity-based size requirements: market capitalization is greater than or equal to US\$5.3 billion, annual dollar value traded to float-adjusted market capitalization is greater than 1.0 and minimum monthly trading volume of 250,000 shares in each of the six months leading up to the evaluation date (Kaul, Mehrotra and Morck, 2000).

The constituent member securities must be publicly listed on either the New York Security Exchange (including NYSE Arca or NYSE MKT) or NASDAQ (NASDAQ Global Select Market, NASDAQ Select Market or the NASDAQ Capital Market). Securities that are ineligible for inclusion in the index are limited partnerships, master limited partnerships, OTC bulletin board issues, closed-end funds, ETFs, ETNs, royalty trusts, tracking stocks, preferred stock, unit trusts, equity warrants, convertible bonds, investment trusts units (Madhavan, 2002; Bankovica and Praņevics, 2007). The index is reviewed annually. According to Madhavan (2002), constituent stock that do not meet the addition criteria are dropped or deleted while the non-members who meet the criteria are added. The review effect have become a phenomena that have attracted many scholarly work with varied results regarding stock performance (Madhavan, 2002)

African capital market is characterised by emerging and frontiers stock exchanges which are less efficient as compared to the developed market exchanges. Some of the most vibrant bourse are Johannesburg Securities Exchange (JSE), Nigeria Securities Exchange (NSE), Ghana Securities Exchange (GSE), Malawi Security Exchange (MSE) and Nairobi Security Exchanges (NSE), among other exchanges. All these exchanges have varies stock indices which are used to assess market performance. For the purpose of regional views of index review, the study will review Johannesburg Securities Exchange.

The Johannesburg Stock Exchange offers secure, efficient secondary and primary capital markets across a diverse range of securities, supported by our post-trade and regulatory services. JSE is the preferred market for local and international investors looking to gain exposure to the leading capital markets in South Africa and the broader African continent. Currently the JSE is ranked the 19th largest stock exchange in the world by market capitalisation and in African continent as the largest exchange. The bourse has several indices which are used to measure performance of the market, market segment/sector or an economy industry (Exchange Journal 2013).

The major stock indices managed by JSE are FTSE/JSE All-Share Index which represent 99% of the full market capital value; FTSE/JSE Top 40 Index which consists of the largest 40 companies ranked by full market value; The FTSE/JSE Top 40 Index - USD which mirror the FTSE/JSE Top 40 Index but calculated in USD; The FTSE/JSE Mid-Capitalisation Index which consist of the next 60 companies ranked by full market value; The FTSE/JSE Small Capitalisation Index which consists of shares that are in the FTSE/JSE All-Share Index, but are not large enough to qualify for the FTSE/JSE Top 40 Index or the FTSE/JSE Mid-Capitalisation Index. Other indices are The FTSE/JSE Fledgling Index which consist of all ordinary securities listed on the JSE which qualify or are eligible for inclusion in an index, but are too small to be included in the FTSE/JSE All-Share Index; The FTSE/JSE Industrial 25 Index which track the 25 largest companies ranked by full market value (FTSE/JSE, 2015)

The most vibrant index which also doubles as the market performance gauge is the FTSE/JSE Top 40 Index which consists of the largest 40 companies ranked by full market value. All quarterly review of the JSE/ FTSE Africa Index Series constituents takes place in March, June, September and December. The review meeting of the constituents is held on the Wednesday before the first Friday of March, June, September and December using data to determine full market cap as at the close of business on the Monday 4 weeks prior to the review effective date. Any constituent changes will be implemented after the close of business on the third Friday of the month under review (FTSE/JSE, 2015).

Details of the outcome of the review and the dates, on which any changes are to be implemented, are published as soon as possible after the FTSE/JSE Advisory Committee meeting is concluded. Just like well-established exchange, the reviews of the constituents companies have attracted many scholars. The results of the deletion studies have remained a puzzle.

Kenya is an emerging capital market with semi-strong market efficiency and one capital market, the Nairobi Securities Exchange (Opiyo, 2014). The NSE has five indexes with the most robust index being NSE 20 share index, which also acts as the market barometer. Index was

established in 1966 as Nairobi Securities Exchange Ltd (initially Nairobi Stock Exchange) which reflects daily prices of the 20 blue-chips companies (NSE, 2010). These companies are extracted from three sectors of market which includes the Main Investments Market Segment (MIMS), Alternative Investments Market Segment (AIMS) and Fixed Income Securities Market Segment (FISMS) and consist of 70% of the capitalization of the Nairobi Securities Exchange. The slot is allocated to markets/sectors as follows; Agricultural sector 1, Finance 6, Commerce 4, Industries 4 and AIMS 5 totalling to 20 companies (NSE, 2014).

Since the NSE 20 share index inception, the index have been reorganised severally with stock either being deleted or included. Within the study analysis period, 1994 – 2014, the index has been reviewed 13 times as follows: 1995, 1996, 2000, 2001, 2002, 2003, 2006, 2007, 2008, 2009, 2010, 2011 and 2014. This reviews, according to bourse authority, it is to enhance the efficiency of the stock and to reflect the true market position (NSE, 2014). Considering that the effect of the index reorganisation is a matter that influence firm management, investors and market operators at large, capital market should as efficient as possible to eliminate market abnormalities. However in most cases this has not been as observed that index reorganisation results into market in-equilibrium (Opiyo, 2014) and redistributed assets return allocation. Therefore, study will analyse the deletion effect of NSE 20 share index on stock market performance in Kenya. The study will focus on index deletion effect on variables such as price return, trading volume and volatility in order to determine the magnitude of the event and timing during which these effects seem noticed.

The Index Management Sub-Committee does a quarterly periodic review of constituents companies of the NSE 20 share index. These reviews are based on collection of data for a period of one year as at the end of each quarter, and details of the outcome of the review are published as soon as possible after the recommendations of the Index Management Sub-Committee have been endorsed by the Trading Committee and ratified by the Board. However, the change for the constituent companies are initiated and then adopted as soon there is any need (NSE, 2012). The publication of details of index review marks the announcement of index review. After announcement, review action or change of constituent company takes place shortly after i.e. mostly the week following announcement week or when need arise.

Statement of the Problem

Scholarly review from mainstream indices in well established markets both globally, regionally and locally have shown that stock addition to market index exhibit an abnormal return due to price increase and trade liquidity. This is because index review transmit new information in the market which may cause investors to rebalancing their portfolios leading market adjustment.

Although stock inclusion into index has shown positive effect, however with deletion has exhibited mixed results with scholars reporting 'no effect' to 'temporal price reduction effect' mainly from developed markets. For example, Shankar and Randhawa (2006) examined the effects of index changes in the Hong Kong and Singapore stock markets indicated that stocks deleted from the HSI experience the opposite effect, that is, a significant decline in prices on the announcement day (within ten days of the effective day) however the cumulative returns are not statistically significant. A study by Chakrabarti (2000) on price and volume effects of changes in MSCI Indices revealed that deleted stocks witness a steady and marked decline in their prices and volumes traded goes up significantly.

Kenya being an emerging market, stock reaction to arrival of information has little study. Though many proxies (earnings and dividends, IPOs and Right Issues) have been used to assess the reaction of stock market to the arrival of new information (Opiyo, 2014), index reconstruction as a proxy and especially the deletion effect has not been analysed. For instance, Opiyo (2014) studied the effects of NSE 20 share index inclusion and reported abnormal return following stock inclusion however the study did not analyse stock deletion. Given the possible implication that stock deletion from index would have on its market share performance, it's important that this deletion puzzle is resolved, and especially from emerging markets, like Kenya, which is characterized by information asymmetry. Therefore, the study bridged this vital academic gap by assessing the effects of NSE 20 share index review on market share performance of deleted stocks in Kenya.

Purpose of the Study

To assess the effects of NSE 20 share index review on market share performance of deleted stocks in Kenya.

Specific Objectives

- i. To determine the effects Announcement Review on Market Share Performance of deleted stocks in Kenya.
- ii. To establish the effects of Action Review on Market Share Performance of deleted stocks in Kenya.
- iii. To evaluate the effects of Information Contents Review on Market Share Performance of deleted stocks in Kenya.

THEORETICAL REVIEW

It commence with theoretical review which discusses various theories that explain stock market operation mechanism.

Theories of Stock Price and Volume Movement

Several hypotheses have been proposed to explain the securities exchange market operation. These theories in most cases concentrate on how arrival of corporate information or announcements (e.g. index reorganisation/review, dividend pay-out e.t.c.) affects stock price and volume. A greater percentage of these theories have been suggested in the context of changes to the indexes in the US market, and have almost exclusively examined changes in the S&P 500 index. Under this section, the study will review only three theories namely downward sloping curve or price pressure, certification or information theory and investor recognition theory.

Certification / Information Hypothesis

The most relevant theory that explains triggers of securities exchange market reaction is the certification theory advanced by Jain in 1987. Index review, as an event, has positive or negative information for stocks being added or deleted from index which leads to a revaluation of the stock price. According to this hypothesis, an index inclusion would convey positive information about the stocks while index deletion would convey negative information. This being private information not known in the market, it triggers investors to balance their portfolios according to the arrived information causing readjustment in stock equilibrium prices and trade volumes i.e. positive effect for added stock and negative effect for deleted stock. This theory also assumes reaction of prices to be symmetric for additions and deletions (Cai, J., 2007). The readjustment also results in increase in expected future cash flows, thus affecting stock pricing.

The hypothesis is supported by the standard valuation model (SVM) developed by Gordon in 1962. The new information content results to price change (increase for added stock, fall for deleted stock) within the standard valuation model shows that stock current average returns or present price is equivalent to the discounted future cash flows. The stock price revaluation then stems either on the change in expected cash flows or on a change in the required rate of return such as the discount rate (Kaul, Mehrotra and Morck, 2000). In support of this postulate, Chen, Norohna and Singal (2004) observed that increases in expected future cash flows can at least take place because of the following 3 reasons: certification, enhanced investor awareness resulting in higher expected future cash flows, and enhanced investor awareness resulting in better monitoring and more successful investment decisions. Also,

decrease in required return can accompany an index addition for several reasons: higher liquidity due to higher trading volume, greater interest in the added stocks as a result of reduced info asymmetry, and increased investors awareness due to decrease in shadow cost. This hypothesis argues that S&P 500 Index additions involve information on an added firm's future operating performance, potential longevity, or representativeness in that firm's industry (Denis, McConnell, Ovtchinnikov, and Yu, 2003).

Downward Sloping Demand Curve (DSDC) Hypothesis and Price Pressure Hypothesis (PPH)

The second hypothesis that explain the market reaction to corporate information is downward sloping demand curve or price pressure hypothesis developed by Shleifer in 1986. This theory based on investor's preference for local or rated stocks to foreign or unrated stocks. The theory holds that corporate announcement are information free events and stock market are efficient (Hegde and McDermott, 2003). In reference to index review, downward sloping demand curve and the price-pressure hypothesis assumes that any inclusion of a share into an index is an 'information free' situation since deletion (or addition) of stock into an index does not show any reflection on the firm's future earnings. Researchers have suggested several hypotheses from the first documentation of price effects of Standard and Poor's (S&P) index revision which was more than two decades ago. These hypotheses have tried to elaborate on the stock price changes with respect to deletion from (addition to) the S & P 500: the stock price effects to these announcements should be either information free, as a result of the downward-sloping curves for index stocks; or should consist of information relevant in pricing the newly included or deleted stocks carried in the revision decision by S&P (Lindsay Baran, Chang Liu, Zilong Liu and XiaolingPu, 2015).

Investor Recognition Hypothesis (IRH)

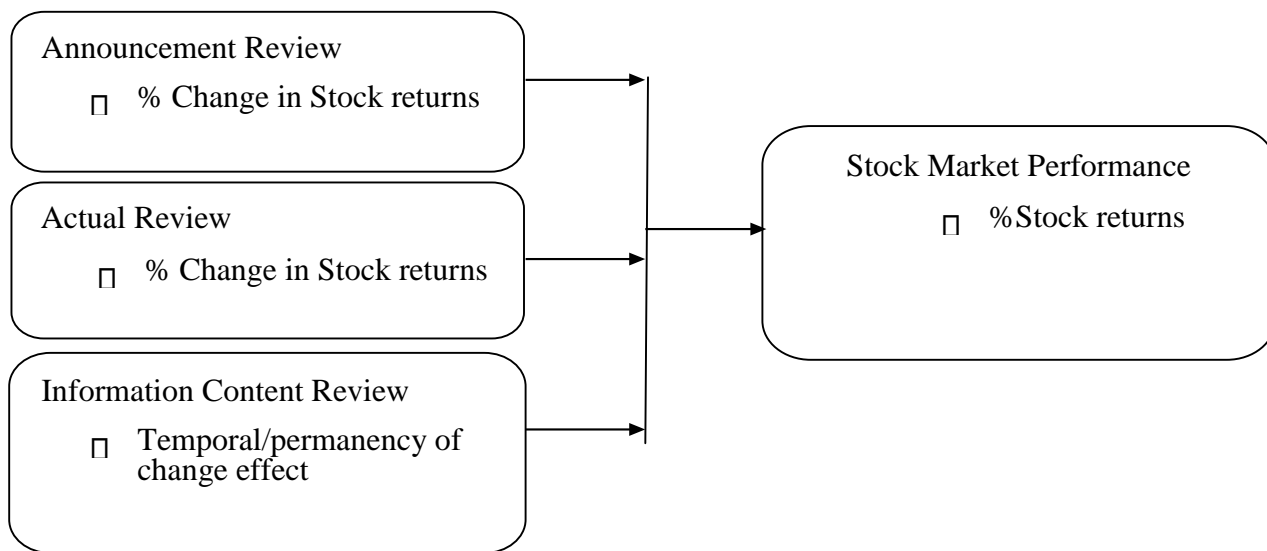
This hypothesis was suggested 1987 by Merton. The theory holds that positive corporate announcement increases awareness of investor's and hence decreasing show cost for corporate activities monitoring. Investor recognition (IR) is a key determinant of expected returns. It is also an important determinant of corporate financial policy and changes in investor recognition are strongly related to contemporaneous and future corporate financing and investing activities. IRH can be interpreted as following; when a stock is included to the index, more investors become aware and hold it for its diversification benefits. As a result, the shadow cost reduces and there is a permanent reduction in the stock price. This theory does not require the price effects to be symmetric, since the deletion of an index would not necessarily mean

investors becoming unaware of the stock (Reuven L, and Richard G, 2008). The investor recognition hypothesis also explains that expected return news is relatively more important in small firms. The variance of cash flow news is greater in small firms, causing them to have increased idiosyncratic risk (Vuolteenaho's 2002).

Conceptual Framework

According to Kothari (2004), conceptual framework provides clear concepts of the areas in which meaningful relationships are of variables are likely to exist. This study developed a conceptual framework (figure 1) where independent variable was the arrival of stock deletion announcement in the market. This, according to the study, is information with a potential to evoke price and liquidity changes. Change, that is, stock performance is the dependent variable and was assessed on market price and trade volume adjustment.

Figure 1. Conceptual Framework



RESEARCH METHODOLOGY

The study adopted an event study research design. This design provides a better way of evaluating the magnitude of a movement over time (Fama, 1991) and measure the impact of a specific event, for instance index review, on the value of a firm with the use of financial market data. Event study design method also give a clear picture of the speed of adjustments of prices to information in the context of the stock exchange (MacKinlay, 1997; Kothari and Warner, 1997; Terry, 2009). Thus, the design was suitable for the study.

The target population of the study comprise all companies that were deleted from the NSE 20 share index from 1994 to 2014. According to NSE 20 share index review press release information, the index has been reviewed nine times, with a total of 18 stocks being deleted from the index within the analysis period. Therefore, the study targeted a population of 18 stocks as shown in Table 1.

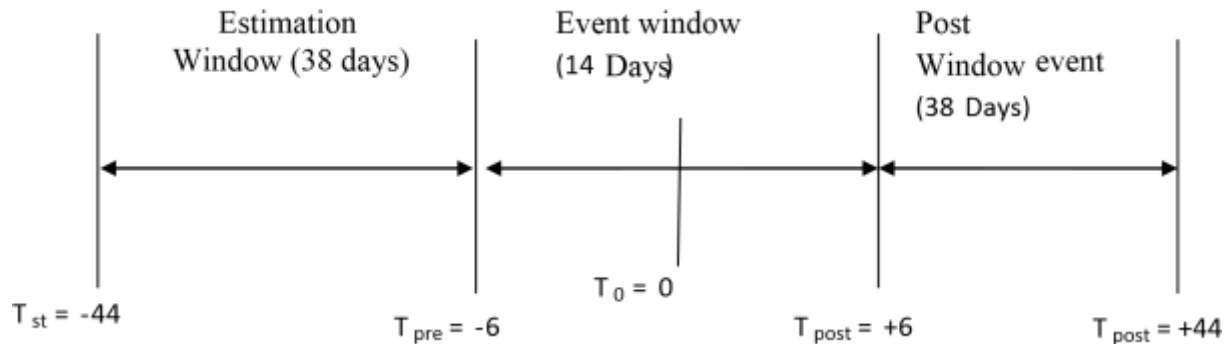
Table 1: Target population

S/no	Review Year	Deleted stocks	Totals
1.	1995	CMC Holdings	1
2.	1996	Lonrho Motors	1
3.	2000	African Lakers Corp K. National Mills	2
4.	2002	E A Packaging	1
5.	2006	Uniliver Tea Williamson Tea Kakuzi Uchumi NIC Bank BOC Gases	6
6.	2007	TPS Eastern Diamond Trust Sammer Africa Total Kenya	4
7.	2008	Centum Investment	1
8.	2010	East Africa Cables Ltd	1
9.	2014	Mumias sugar co. ltd	1
Grand Totals			18

Source: Nairobi Securities Exchange (2016)

The study gathered only secondary data from NSE daily trading results for the entire study period. These data included; NSE 20 share index reviews announcement and inclusion dates, daily closing prices and trade volumes for deleted stocks, NSE 20 share index daily closing basis points. All these data covered the event window (14 days) and market return analysis window (90 days). Where necessary, closing prices were adjusted for dividend and changes in capital structure (i.e. stock splits or stock consolidation).

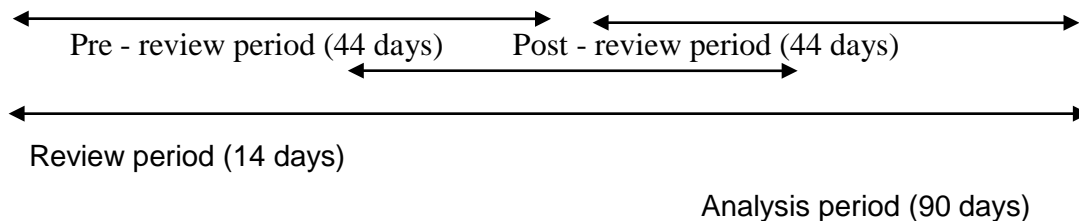
The study employed Ordinary Least Square (OLS) Regression method to estimate the market model parameters (to be used in determining residual effect). Pearson correlation analysis was done to establish the relationship between pre and post inclusion stock movement. Significance effects were tested using parametric test statistics t-test statistics. Study findings are presented in the form of frequency tables, percentages, pie charts and graphs, followed with detailed discussion of the finding, summary of findings, conclusions and recommendations.



Model Specification

The chronological order of the time variable in the study event for the purposes of analysis was computed as shown in Figure 2.

Figure 2: Chronology of Event Analysis



Source: Adopted and modified from MacKinlay (2007)

According to figure 2, T_0 will represent the stock deletion day. T_{-6} and T_{+6} show the review/event period (announcement and action dates), and T_{-44} and T_{+44} marks the study analysis period. The study chose analysis period of 90 days with an event window of 14 days, pre and post event windows of 44 days. The researcher chose 14days event/review window as, in most cases, NSE 20 share index review announcement and action normally occurred within two successive weeks. In addition, NSE market was less efficient and thus would respond to index changes

more slowly. In support of this, Kiete and Uloza (2005) used 14 days event window and showed that it was ideal for an emerging market. However, Peterson (1989) argued that 21 day event period is more ideal, whereas Dhillon and Johnson (1991) extended their event window period to 61 days.

The estimation period of 90 days was chosen based on a research done by Kothari and Warner (2004), who found this the most widely used length of estimation period in event studies. In addition, 90 days period is sufficient to capture and iron out any possible seasonality effects on stock prices thus could give more accurate estimation of model parameters.

ANALYSIS AND DISCUSSION OF FINDING

Estimated Parameters of OLS Regression Model

The study used the weighted price method to compute NSE 20 share index return for the estimation of market model parameter. According to MacKinlay (1997), under general conditions Ordinary Least Squares (OLS) is a consistent estimation procedure for the Market model parameters.

For the i^{th} firm in event time, the OLS estimators of the market model parameters for an estimation window of observations are;

$$\beta_i = \frac{\sum_{t=T+1}^T (R_{it} - \hat{\mu}_i)(R_{mt} - \hat{\mu}_m)}{\sum_{t=T+1}^T (R_{mt} - \hat{\mu}_m)^2} \quad (\text{i})$$

$$\hat{\alpha}_i = \hat{\mu}_i - \hat{\beta}_i \hat{\mu}_m \quad (\text{ii})$$

$$\hat{\sigma}_{\epsilon_i}^2 = \frac{1}{L_1 - 2} \sum_{t=T+1}^T (R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt})^2 \quad (\text{iii})$$

Where μ_i and μ_m are the mean return for both security i and market return during period T .

The results of estimated Ordinary Least Square (OLS) regression parameters yielded a beta (β) of 0.516034729 and alpha (α) of -0.001306774. The computed individual stock AR_{*i*}, Market Returns (R_m), Average Abnormal Returns (AAR_{*i*}) and Cumulative Return (CAR_{*i*}) are attached as appendixes.

Announcement review effects

The specific objective one sought to establish the effects of index review announcement on deleted stock performance. The study used the Market model (Brown and Warner, 1985) to estimate normal return around the event window. The Market model assumed that asset returns are normally distributed. According to MacKinlay (1997) for any stock i the normal returns can be expressed as:

$$R_{it} = \hat{\alpha} + \beta R_{mt} + \varepsilon_{it} \quad \sim \quad E_{\varepsilon_{it}} = 0, \text{var}(\varepsilon_{it}) = \sigma_{\varepsilon_{it}}^2 \quad (\text{iv})$$

Where R_{it} and R_{mt} are period t returns of stock i and market portfolio respectively. ε_{it} is the zero mean residual. $\hat{\alpha}, \hat{\beta}$ and ε_{it} are parameters of the model that have to be estimated.

Using the computed standard OLS regressions results, the abnormal returns of a stock and the cumulative abnormal returns were computed as follows;

$$\widehat{AR}_{it} = (R_{it} - \hat{\alpha} - \hat{\beta}_i R_{mt}) \quad \sim \quad N(0, \sigma^2) \quad (\text{v})$$

$$\sigma^2(\widehat{AR}_{it}) = \sigma_{\varepsilon_i}^2 + \frac{1}{Li} \left[1 + \frac{R_{mt} - \bar{\mu}_m}{\hat{\sigma}_m^2} \right] \quad (\text{vi})$$

Analysis finding within the event window was presented in table 2 and figure 3. Findings indicated that M_R , AAR and CAR were all positive before the review announcement however the AAR and CAR curves turned negative a day ($T=-1$) before the announcement day ($T=0$). The AAR was relatively stable up to time $T=-3$ from where it recorded a consecutive decline from 0.18% ($t=-3$) to -0.56% ($t=0$) and with the lowest pre announcement return being on the announcement day ($T=0$). After the review announcement, deleted stocks AAR continued to record a relatively declining returns up to time $t=6$. The similar trend was also confirmed by the CAR. This finding implied that prior to review announcement, the to be deleted stock performance were average however, three days to deletion announcement, already a decline in return was exhibited. This could be attributed to market active participants or analysis who could have predicted with some degree of accuracy stocks to be deleted.

These findings were supported by Sandra and Janis (2007) who showed that significant abnormal returns were present on the announcement day, and investments in these stocks would earn on average 5.1% over the subsequent month. However the study did not make any clear conclusions regarding existence of abnormal returns on the inclusion day. In addition, the

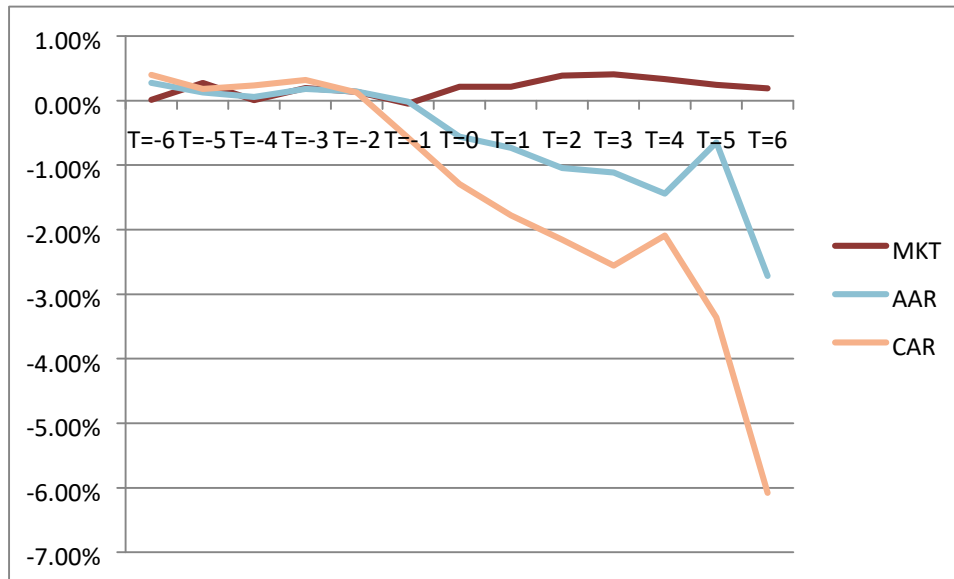
findings also showed that both events (the announcement of inclusion and the actual inclusion itself) contained new information, which was observable through significant increase in volatilities of the stocks.

In addition, it could also be due to possibility of trading on inside information. The further sharp drop in abnormal return after review announcement could be attributed to fund manager's activities in replacing deleted stock from their portfolios. On average, within the review period, the mean market return performance was positive 0.20% compared to AAR for deleted stock of negative 0.58%. This further indicated that, in the short run, investors of deleted stock recorded a total reduction in return of 0.78%. This finding corroborated with Bankovica and Praņevics (2007) findings which showed that significant abnormal returns were present on the announcement day and investments in these stocks would earn on average 5.1% over the subsequent month. In addition, both events (the announcement of inclusion and the actual inclusion itself) contained new information, which was observable through significant increase in volatilities of the stocks. This effect was stronger for the announcements than for the actual inclusions as volatility started to increase a few days before the respective event. The findings showed that it is possible to earn abnormal returns in the CEE markets when a stock is included in a blue chip index. Similarly, this findings were also supported by Sadeghi (2011) who investigated the impacts of index additions on the return and liquidity of Shariah-compliant shares in Egypt and Jordan and found out that stock prices respond positively to index additions and negatively to index deletion, an evidence in support of short and long-term increases in the returns and liquidity of added shares.

Table 2: Market Return, AARs and CARs within review announcement period

Time (T=i)	Rm	AAR	CAR
T=-6	0.01%	0.27%	0.40%
T=-5	0.28%	0.13%	0.18%
T=-4	0.01%	0.06%	0.23%
T=-3	0.20%	0.18%	0.32%
T=-2	0.13%	0.14%	0.12%
T=-1	-0.05%	-0.02%	-0.58%
T=0	0.21%	-0.56%	-1.29%
T=1	0.21%	-0.73%	-1.78%
T=2	0.39%	-1.04%	-2.16%
T=3	0.41%	-1.11%	-2.56%
T=4	0.33%	-1.44%	-2.09%
T=5	0.24%	-0.65%	-3.36%
T=6	0.19%	-2.71%	-6.08%

Figure 3: Market Return, AARs and CARs within review announcement period



Action review effects

Findings for study objective two, which was crafted to assess the effect of index review action on share price performance is illustrated in Table 3 and Figure 4. The finding revealed that AAR and CAR were relatively negative and below the M_R however at $t=-6$ and $t=-5$ AAR were positive but declining. Compared to post review announcement findings (sharp decline in AAR), the reported positive AAR could have resulted from decline in activities of speculators and fund managers who were cautious of return and would prefer future capital gain instead. As a result, the market reacted to the anomaly and tried to correct itself. Another reason for the reported decline in AAR after review announcement and before review action would be due to change of investor's mind, especially, institutional fund managers who faults the NSE decision after their own investigation and could see future growth prospects in deleted stock. These investors created demand for deleted stock stabilizing stock prices and returns. These finding corroborated finding by Madhavan (2002) who suggested that a significant portion of excess returns due to price pressure were realised during index announcement period. In addition, reported permanent changes in liquidity also corroborates with the study finding implying to investors would experience lower net returns where implicit transaction costs associated with demanding liquidity at specific points in time are captured.

On the review action date ($t=0$), AAR reported negative returns which continued to time $t=2$ and the highest negative return of -3.08% on time $t=3$. This reversed AAR following review action could be attributed to activities of fund managers whose investment policies do not allow them to keep non index stocks in their portfolio. Therefore they only act after deletion action and

not on announcement. Furthermore, the reported three consecutive declines in AAR could also be due to prudent investor (non-speculative) who made decision on actions and not announcement or follows what the majority does. After the third day ($t=3$) of review action, a decline in AAR was witnessed which turned to positive on $t=5$ and continued to rise the following day ($t=6$) to 1.10%. On average, the deleted stock performance within the review action period was negative 0.59% compared to market return of positive 0.13%. This implied that during index review action, deleted stock recorded a total decline in return of 0.72% (a reduction in negative AAR compared to review announcement window [0.78%]). In addition, market return also declined from 0.20% (review announcement window) to 0.13% (review action window), implying that deleted stock were among the major determinants of market performance or index deletion has negative effects on the overall market performance. The study finding of reversal of significance return after review action was supported by Shankar and Randhawa (2006) study which reported that stocks deleted from HSI show significantly negative returns at announcement but these returns were subsequently reversed within 10 days after the effective day. In addition, these findings was also confirmed by the trends in the abnormal trading volume which showed a spike around the announcement and effective days, but reverted to normal in the post-effective day period.

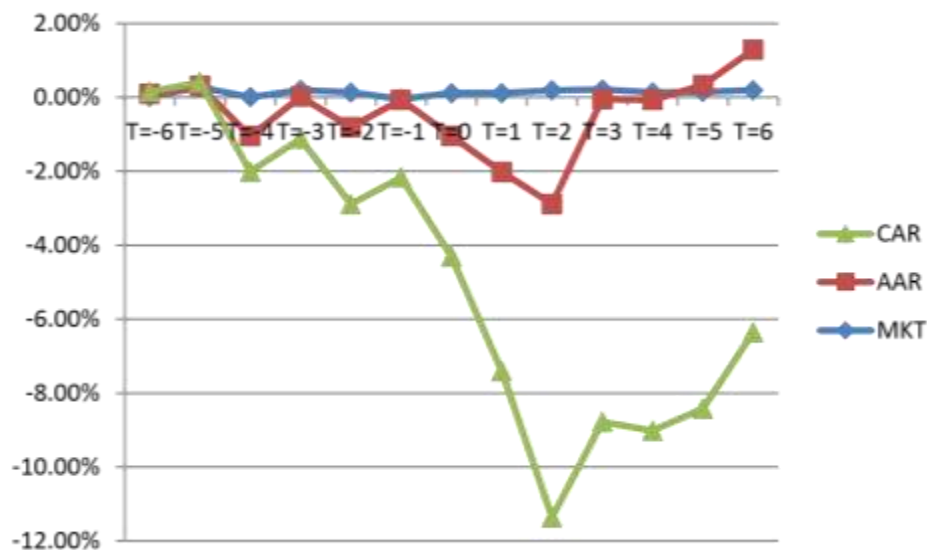
The study further collaborated with Hacibedel and Bommel (2006) who found convincing evidence of positive (negative) permanent price impacted upon index inclusion (exclusion). Furthermore, the analyzed returns over an event window from before announcement to after inclusion, the study found evidence of a pronounced short term drift which is partially reversed at the inclusion date. The study concluded that in the short term phenomenon there was limited arbitrage on the predictable portfolio rebalancing behavior of tracker funds and index changes were not information free events.

Table 3: Market Return, AARs and CARs within review action period

T_i	R_m	AAR	CAR
T=-6	0.01%	0.07%	0.07%
T=-5	0.28%	0.03%	0.10%
T=-4	0.01%	-1.06%	-0.96%
T=-3	0.20%	-0.18%	-1.14%
T=-2	0.13%	-0.94%	-2.08%
T=-1	-0.05%	-0.02%	-2.10%
T=0	0.11%	-1.16%	-3.26%

T=1	0.11%	-2.13%	-5.39%
T=2	0.19%	-3.08%	-8.47%
T=3	0.21%	-0.26%	-8.73%
T=4	0.13%	-0.21%	-8.94%
T=5	0.14%	0.19%	-8.75%
T=6	0.19%	1.10%	-7.65%

Figure 4: Market Return, AARs and CARs within review action period

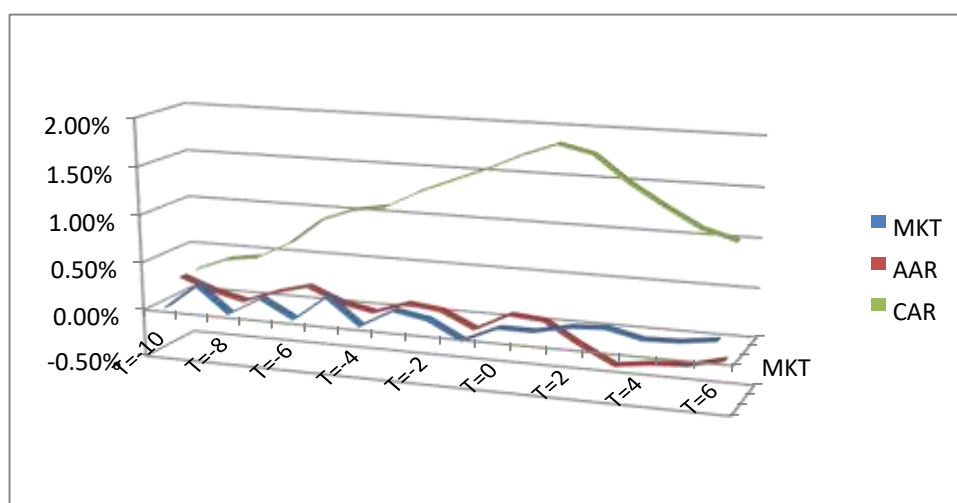


Review information content

Specific objective three aimed to assess the information content of index review. This was important to determine whether index review transmitted new information that would influence pricing of securities. The study analysed the average return performance for deleted stocks within 16 days window divided into 10 days pre announcement period and six days post announcement period. Study findings was shown in figure 5, and illustrates that the AARs for deleted stocks were relatively higher than the R_m . After the review announcement, a change in performance was exhibited as deleted stock AARs declines and below the R_m . This finding on changes and positions of R_m and AARs before and after review announcement implied that indeed, index review transmitted information into the market. Study of the CARs curve also pointed to the same as it showed a rise, reached maximum at announcement and turned to decline cumulative returns after announcement. This finding collaborated with Shankar and

Randhawa (2006) finding that showed index review announcement signified a new information in the market, which was observable through significant increase in volatilities of the stocks. The study finding on information content also agreed with Howard and Chan (2002) finding which reported that deleted stocks realized a decline in return of up to 3% on the first trading day after the change denoting present of new information in the market. Furthermore, the finding were also supported by Brealey and Richard (2000) study titled 'Stock prices, stock indexes and index funds' whose findings showed that present significant abnormal returns at the announcement day compared to action date indicated present of information content.

Figure 5: Market Return, AARs and CARs movement within review announcement period to test for information content



Market Share Performance

Market return declined from 0.20% (review announcement window) to 0.13% (review action window), implying that deleted stock were among the major determinants of market performance or index deletion has negative effects on the overall market performance. These were clearly illustrated in both Figure 4 and 5. This was a clear indication that deleted stock were among the major determinants of market performance or index deletion has negative effects on the overall market performance

Inferential statistics – Test of hypothesis

The study employed parametric tests, which assumed that individual firm's abnormal returns were normally distributed (Pattel, 1978). Using the AR, the study computed the Average Abnormal Return (AAR) for stock i for days T (event day being $t = 0$) as well as variance of

abnormal returns ($\text{var}(\text{AR}_i)$) to test for the significance of ARs in the sub-event windows (i.e. estimation period and event period).

$$\text{AAR}_i = \frac{1}{N} \sum_{t=1}^N (\text{AR}_{it}) \sim N(0, \text{var}(\text{AR}_i)) \quad (\text{vii})$$

$$\text{var}(\text{AR}_i) = \sigma_i^2 \quad (\text{viii})$$

The AR were then standardized to ensure that each have the same variance by dividing each residual by the standard deviation (obtained over the estimation period) as follows;

$$\theta_i = \frac{\text{AAR}_i}{\sqrt{\text{var}(\text{AAR})}} \sim N(0,1) \quad (\text{ix})$$

Therefore, in a particular event window, the test statistics of the hypothesis that the average standardized residual across firm was equal to zero, it was computed and tested with t-test statistics, which assumed that average standardized residual (AARs) across firm was equal to zero, that is, individual firm's abnormal returns were normally distributed within the event window as shown.

Significance of review announcement effect

The first study hypothesis stated that 'announcement review had no significant effects on market share performance of deleted stocks' was analysed by comparing mean differential between pre and post announcement means. The results were illustrated in table 4. From the results of these findings, there was a decrease in AARs means from positive 0.001263 to negative 0.01283 (for pre and post review announcement respectively) and increase in stock variances from 9.90981E-07 to 5.72643E-05 (for pre and post review announcement respectively). There was strong positive Pearson correlation of 0.724 denoting that both pre and post review announcement returns were moving in the expected direction. The test for the significance of mean differential, at 95% level of confidence, gives t-stat of 5.01638 against t critical one-tail 2.015 ($p=0.002$) and t critical two tail ± 2.5706 ($p=0.004$). Both t critical values (t one-tail and t two-tail) failed to accept the null hypothesis as there was significance differences between pre and post deletion review announcement AARs in the short run following index reviews. These findings were confirmed by Bildik and Gulay (2001), Chen et al (2004), Denis et al (2003) and Howard and Chan (2002), all who reported significance effects on index review announcement.

Table 4: t-Test: Paired Two Sample for Means during review announcement period

	<i>Pre-announcement</i>	<i>Post-announcement</i>
Mean	0.001263009	-0.012829072
Variance	9.90981E-07	5.72643E-05
Observations	6	6
Pearson Correlation	0.723827383	
Hypothesized Mean		
Difference	0	
Df	5	
t Stat	5.016388963	
P(T<=t) one-tail	0.00202379	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.00404758	
t Critical two-tail	2.570581836	

Significance of review action effect

The second study hypothesis - 'action review had no significant effects on market share performance of deleted stocks' - was also analysed by comparing mean differential. The result were shown in table 5 and illustrates that there was an increase in negative AARs means from negative 0.0035 to negative 0.00732 (for pre and post review action respectively) and decrease in stock variances from 2.6216E-05 to 2.43382E-04 (for pre and post review action respectively). In addition, there was a weak negative Pearson correlation of -0.4169 denoting that as pre review action returns were falling, post action results were rising. The test for the significance of mean differential, at 95% level of confidence, gives t-stat of 0.50987 against t critical one-tail 2.015 ($p=0.316$) and t critical two-tail ± 2.5706 ($p=0.6314$). Both t critical values (t one-tail and t two-tail are greater than t stat, $p>0.05$) failed to reject the null hypothesis as there was no significance differences between pre and post deletion review action AARs in the short run following index reviews. This finding was corroborated by Chen et al (2004) and Denis et al (2003) who reported that review action experienced insignificance effects on deleted stock performance.

Table 5: t-Test: Paired Two Sample for Means during review action period

	Pre-action	Post-action
Mean	-0.0035	-0.007316667
Variance	0.000026216	0.000243382
Observations	6	6
Pearson Correlation	-0.416935863	
Hypothesized Mean		
Difference	0	
Df	5	
t Stat	0.509867515	
P(T<=t) one-tail	0.315922854	
t Critical one-tail	2.015048373	
P(T<=t) two-tail	0.631845708	
t Critical two-tail	2.570581836	

Significance of review information effect

The third and last hypothesis - 'review information contents had insignificant effects on market share performance of deleted stocks' - was also assessed by further analysis of results obtained from hypothesis one and two. For objective one, results for test for the significance of mean differential, at 95% level of confidence yielded t-stat of 5.01638 against t critical one-tail 2.015 ($p=0.002$) and t critical two-tail ± 2.5706 ($p=0.004$), of which both t critical values failed to accept the null hypothesis as there was significance differences between pre and post deletion review announcement AARs in the short run following index reviews. This affirms that index review announcement had significance information that affects market share performance. This finding corroborates with Howard and Chan (2002) all who reported that review announcement has significance effects denoting new information.

Furthermore for hypothesis two, the test for the significance of mean differential, at 95% level of confidence gave t-stat of 0.50987 against t critical one-tail 2.015 ($p=0.316$) and t critical two-tail ± 2.5706 ($p=0.6314$), both failed to reject the null hypothesis as there was no significance differences between pre and post deletion review action AARs in the short run following index reviews. Thus this finding also affirmed that index review action had no significance information that affected market share performance. These findings were supported by Bildik and Gulay (2001) and Howard and Chan (2002), who reported insignificance effect on review action denoting no new information for security pricing. Furthermore, the finding were

also supported by Brealey and Richard (2000) study titled 'Stock prices, stock indexes and index funds' whose findings showed that present significant abnormal returns at the announcement day compared to action date indicated present of information content.

SUMMARY OF FINDINGS

Announcement review effects

During announcement review period, R_m , AAR and CAR were all positive before the review announcement however the AAR and CAR curves turned negative a day to announcement day ($T=0$). The AAR was relatively stable up to time $T=-3$ from where it recorded a consecutive decline from 0.18% ($t=-3$) to -0.56% ($t=0$) and with the lowest pre announcement return being on the announcement day ($T=0$). After the review announcement, deleted stocks AAR continue to record a relatively declining returns up to time $t=6$. On average, within the review period, the mean market return performance was positive 0.20% compared to AAR for deleted stock of negative 0.58%, indicating that, in the short run, investors of deleted stock recorded a total reduction in return of 0.78%.

Action review effects

Summary of index review action effects revealed that AAR and CAR were relatively negative and below the R_M during action window, however at $t=-6$ and $t=-5$ AAR were positive but declining. On the review action date ($t=0$), AAR reported negative returns which continues to time $t=2$ and the highest negative return of -3.08% on time $t=3$. After the third day ($t=3$) of review action, a decline in AAR is witnessed which turns to positive on $t=5$ and continue to rise the following day ($t=6$) to 1.10%. On average, the deleted stock performance within the review action period was negative 0.59% compared to market return of positive 0.13%.

Review information content

Summary for review of information content illustrated that the AARs for deleted stocks were relatively higher than the R_M . After the review announcement. A change in performance was exhibited as deleted stock AARs declines and below the level of R_m after index review announcement implying that index review transmitted information into the market.

CONCLUSIONS

The study concluded that there exists a strong positive relationship between pre and post review announcement returns as both moved in the expected direction. In the short run, investors of deleted stock could lose a total of 0.78% of the returns. Furthermore, study

concluded that there was a significance differences between pre and post deletion review announcement AARs in the short run following index reviews. Thus, index review announcement had negative significance effects on deleted stocks.

The study also concluded there was is a weak negative Pearson correlation between pre and post review action returns (as pre review returns falls, post action results were rise). The study further concluded that within the review action period investors could record a reduction of 0.72% return on stock following index review action. Finally, study concluded that there was no significance effect of index review action on performance of deleted stock.

The study concluded that index review announcement had significance information that affected market share performance, while index review action had no significance information that affected market share performance.

RECOMMENDATIONS

Review announcement

The study recommended that, for fund managers or investors with ability to analyse stock returns, the predicted stocks to be deleted should be replaced before the review announcement date to avoid loss of value. The study also recommended that following the significance of review announcement effects, investors should dispose deleted stock a day after announcement otherwise after the third day, massive reduction in return would results to great loss.

Review action

The study recommended that deleted stock should not be disposed-off after review action as in most cases, the market tend to revert the NSE decision. If done, then this could results into massive return loss following the continued decline in return from announcement to action time. Indeed, study recommended that for investors who were interested in long-term return should purchase deleted stocks, as exhibited by rise in AAR after deletion action. Last but not least, the study recommended that index review action should not be used as information to guide in stock portfolio readjustment.

Review information effect

The study recommended that index review announcement could be used as new information to be incorporated in making stock investment decision or stock portfolio rebalance

SUGGESTION FOR FURTHER STUDIES

The study suggested the following further studies: The effects of firm's market share performance on both inclusion and deletion from other market indices apart from blue chip index. Additionally, estimations of normal returns could be recalculated using economic models instead of statistical model used by the study, for example, using the model by Fama and French (1993).

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APPENDICES

Appendix I: RM, AARs and CARs for deleted stocks within announcement window

Ti	MKT	CMC	LM	ALC	KNM	EAP	UT	WT	KL	UL	NIC	BOC	TPS	DT	SA	TK	CI	
T=-6	0.01%	0.02%	0.02%	0.25%	0.30%	0.18%	0.20%	0.02%	0.02%	3.49%	-	-	0.18%	0.25%	0.02%	0.25%		
T=-5	0.28%	-	-	1.42%	0.10%	0.01%	-	-	-	-	-	-	0.10%	0.01%	1.42%	-	1.42%	1.7
		0.06%	0.01%				1.19%	0.06%	0.01%	1.52%	0.49%				0.06%			
T=-4	0.01%	0.18%	0.18%	0.28%	0.02%	-	-	0.18%	0.18%	-	0.25%	0.02%	-	0.28%	0.18%	0.28%		
						0.20%	0.23%			1.18%			0.20%					
T=-3	0.20%	-	0.01%	0.23%	0.25%	-	-	-	0.01%	-	1.42%	-	-	0.23%	-	0.23%		
		0.08%				0.13%	0.19%	0.08%	0.06%	0.06%	0.10%	0.13%		0.08%				
T=-2	0.13%	-	-	0.36%	1.42%	-	-	-	-	0.02%	0.28%	-	-	0.36%	-	0.36%		
		0.20%	0.20%			0.05%	0.40%	0.20%	0.20%			0.10%	0.05%		0.20%			
T=-1	-	0.10%	-	-	0.28%	-	-	0.10%	-	-	0.23%	-	-	-	0.10%	-		
	0.05%		0.13%	0.19%		0.11%	0.05%		0.13%	0.06%		0.20%	0.11%	0.06%		0.06%		
T=0	0.21%	0.02%	-	-	0.23%	-	-	-	-	-	0.36%	-	-	-	-	-		
			0.05%	1.91%		0.21%	0.21%	1.73%	0.05%	1.73%		1.19%	0.21%	1.73%	1.73%	0.05%		
T=1	0.21%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		0.10%	0.11%	1.73%	0.23%	0.49%	0.49%	1.68%	0.11%	1.68%	0.06%	0.23%	0.49%	1.68%	1.68%	0.11%		
T=2	0.39%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		0.10%	0.21%	1.68%	0.19%	1.61%	1.61%	1.49%	0.21%	1.49%	1.68%	0.19%	1.61%	1.49%	1.49%	0.21%		
T=3	0.41%	-	-	-	0.40%	-	-	-	-	-	-	0.40%	-	-	-	-		
		0.20%	0.49%	1.49%		2.03%	2.03%	1.52%	0.49%	1.52%	1.49%		2.03%	1.52%	1.52%	0.49%		
T=4	0.33%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		1.19%	1.61%	1.52%	0.05%	2.24%	2.24%	1.18%	1.61%	1.18%	1.52%	0.05%	2.24%	1.18%	1.18%	1.61%		
T=5	0.24%	-	-	-	0.10%	-	-	-	-	-	-	0.10%	-	-	-	-		
		0.23%	2.03%	1.18%		0.19%	0.19%	0.06%	2.03%	0.06%	1.18%		0.19%	0.06%	0.06%	1.03%		
T=6	0.19%	-	-	-	0.10%	-	-	-	-	-	-	0.10%	-	0.14%	-	-		
		0.19%	2.24%	0.06%		2.91%	1.91%	4.06%	2.24%	0.10%	5.06%		1.91%		7.06%	2.24%		
AAR	0.20%	0.16%	0.53%	0.56%	0.21%	0.77%	0.75%	0.90%	0.53%	0.54%	0.70%	0.12%	0.69%	0.39%	1.13%	0.25%	0.98	

KEY: MKT – Market (NSE 20 Share Index), CMC - CMC Holdings, LM - Lonrho Motors, ALC - African Lakers Corp, KNM - K. National Mills, EAP - E A Packaging, UT - Uniliver Tea, WT - Williamson Tea, KL – Kakuzi, UL – Uchumi, NIC - NIC Bank, BOC - BOC Gases, PTS - TPS Eastern, DT - Diamond Trust, SA - Sammer Africa, TK - Total Kenya, CI - Centum Investment, EAC - East Africa Cables Ltd, MS - Mumias sugar co. ltd.

Appendix II: RM, AARs and CARs for deleted stocks within action window

Ti	MKT	CMC	LM	ALC	KNM	EAP	UT	WT	KL	UL	NIC	BOC	TPS	DT	SA	TK	CI	EAC
T=-6	0.01%	0.02%	0.02%	0.25%	0.30%	0.18%	0.20%	0.02%	0.02%	3.49%	0.21%	0.20%	0.18%	0.25%	0.02%	0.25%	0.30%	0.21
T=-5	0.28%	0.06%	0.01%	1.42%	0.10%	0.01%	1.19%	0.06%	0.01%	1.52%	0.49%	0.10%	0.01%	1.42%	0.06%	1.42%	1.70%	0.49
T=-4	0.01%	0.18%	0.18%	0.28%	0.02%	0.20%	0.23%	0.18%	0.18%	1.18%	0.25%	0.02%	0.20%	0.28%	0.18%	0.28%	0.34%	0.25
T=-3	0.20%	0.08%	0.01%	0.23%	0.25%	0.13%	0.19%	0.08%	0.01%	0.06%	1.42%	0.10%	0.13%	0.23%	0.08%	0.23%	0.28%	1.42
T=-2	0.13%	0.20%	0.20%	0.36%	1.42%	0.05%	0.40%	0.20%	0.20%	0.02%	0.28%	0.10%	0.05%	0.36%	0.20%	0.36%	0.43%	0.28
T=-1	0.05%	0.10%	0.13%	0.19%	0.28%	0.11%	0.05%	0.10%	0.13%	0.06%	0.23%	0.20%	0.11%	0.06%	0.10%	0.06%	0.07%	0.23
T=0	0.11%	0.02%	0.05%	1.91%	0.23%	0.21%	0.21%	1.73%	0.05%	1.73%	0.36%	1.19%	0.21%	1.73%	1.73%	0.05%	0.21%	0.36
T=1	0.11%	0.10%	0.11%	1.73%	0.23%	0.49%	0.49%	1.68%	0.11%	1.68%	0.06%	0.23%	0.49%	1.68%	1.68%	0.11%	0.49%	1.73

T=2	0.19%	0.10%	0.21%	1.68%	0.19%	1.61%	1.61%	1.49%	0.21%	1.49%	1.68%	0.19%	1.61%	1.49%	1.49%	0.21%	1.61%	-
T=3	0.21%	0.20%	0.49%	1.49%	0.40%	2.03%	2.03%	1.52%	0.49%	1.52%	1.49%	0.40%	2.03%	1.52%	1.52%	0.49%	2.03%	-
T=4	0.13%	1.19%	1.61%	1.52%	0.05%	2.24%	2.24%	1.18%	1.61%	1.18%	1.52%	0.05%	2.24%	1.18%	1.18%	1.61%	2.24%	-
T=5	0.14%	0.23%	2.03%	1.18%	0.10%	0.19%	0.19%	0.06%	2.03%	0.06%	1.18%	0.10%	0.19%	0.06%	0.06%	2.03%	0.19%	-
T=6	0.19%	0.19%	1.24%	0.06%	0.10%	1.91%	1.91%	0.06%	1.24%	0.10%	0.06%	0.10%	1.91%	0.14%	0.06%	2.24%	1.91%	-

KEY: MKT – Market (NSE 20 Share Index), CMC - CMC Holdings, LM - Lonrho Motors, ALC - African Lakers Corp, KNM - K. National Mills, EAP - E A Packaging, UT - Uniliver Tea, WT - Williamson Tea, KL – Kakuzi, UL – Uchumi, NIC - NIC Bank, BOC - BOC Gases, PTS - TPS Eastern, DT - Diamond Trust, SA - Sammer Africa, TK - Total Kenya, CI - Centum Investment, EAC - East Africa Cables Ltd, MS - Mumias sugar co. ltd.

Appendix III: RM, AARs and CARs for deleted stocks to signify information content

	MKT	CMC	LM	ALC	KNM	EAP	UT	WT	KL	UL	NIC	BOC	TPS	DT	SA	TK	CI	EAC
T=-10	0.01%	0.02%	0.02%	0.25%	0.30%	0.18%	0.20%	0.02%	0.02%	3.49%	0.21%	0.20%	0.18%	0.25%	0.02%	0.25%	0.30%	0.21
T=-9	0.28%	0.06%	0.01%	1.42%	0.10%	0.01%	1.19%	0.06%	0.01%	1.52%	0.49%	0.10%	0.01%	1.42%	0.06%	1.42%	1.70%	0.49
T=-8	0.01%	0.18%	0.18%	0.28%	0.02%	0.20%	0.23%	0.18%	0.18%	1.18%	0.25%	0.02%	0.20%	0.28%	0.18%	0.28%	0.34%	0.25
T=-7	0.20%	0.08%	0.01%	0.23%	0.25%	0.13%	0.19%	0.08%	0.01%	0.06%	1.42%	0.10%	0.13%	0.23%	0.08%	0.23%	0.28%	1.42
T=-6	0.01%	0.02%	0.02%	0.25%	0.30%	0.18%	0.20%	0.02%	0.02%	3.49%	0.21%	0.20%	0.18%	0.25%	0.02%	0.25%	0.30%	0.21
T=-5	0.28%	0.06%	0.01%	1.42%	0.10%	0.01%	1.19%	0.06%	0.01%	1.52%	0.49%	0.10%	0.01%	1.42%	0.06%	1.42%	1.70%	0.49
T=-4	0.01%	0.18%	0.18%	0.28%	0.02%	0.20%	0.23%	0.18%	0.18%	1.18%	0.25%	0.02%	0.20%	0.28%	0.18%	0.28%	0.34%	0.25
T=-3	0.20%	0.08%	0.01%	0.23%	0.25%	0.13%	0.19%	0.08%	0.01%	0.06%	1.42%	0.10%	0.13%	0.23%	0.08%	0.23%	0.28%	1.42%
T=-2	0.13%	0.20%	0.20%	0.36%	1.42%	0.05%	0.40%	0.20%	0.20%	0.02%	0.28%	0.10%	0.05%	0.36%	0.20%	0.36%	0.43%	0.28%
T=-1	0.05%	0.10%	0.13%	0.19%	0.28%	0.11%	0.05%	0.10%	0.13%	0.06%	0.23%	0.20%	0.11%	0.06%	0.10%	0.06%	0.07%	0.23%
T=0	0.11%	0.02%	0.05%	1.91%	0.23%	0.21%	0.21%	1.73%	0.05%	1.73%	0.36%	1.19%	0.21%	1.73%	1.73%	0.05%	0.21%	0.36%
T=1	0.11%	0.10%	0.11%	1.73%	0.23%	0.49%	0.49%	1.68%	0.11%	1.68%	0.06%	0.23%	0.49%	1.68%	1.68%	0.11%	0.49%	1.73%
T=2	0.19%	0.10%	0.21%	1.68%	0.19%	1.61%	1.61%	1.49%	0.21%	1.49%	1.68%	0.19%	1.61%	1.49%	1.49%	0.21%	1.61%	1.68%
T=3	0.21%	0.20%	0.49%	1.49%	0.40%	2.03%	2.03%	1.52%	0.49%	1.52%	1.49%	0.40%	2.03%	1.52%	1.52%	0.49%	2.03%	1.49%
T=4	0.13%	1.19%	1.61%	1.52%	0.05%	2.24%	2.24%	1.18%	1.61%	1.18%	1.52%	0.05%	2.24%	1.18%	1.18%	1.61%	2.24%	1.52%
T=5	0.14%	0.23%	2.03%	1.18%	0.10%	0.19%	0.19%	0.06%	2.03%	0.06%	1.18%	0.10%	0.19%	0.06%	0.06%	2.03%	0.19%	1.18%
T=6	0.19%	0.19%	1.24%	0.06%	0.10%	1.91%	1.91%	0.06%	1.24%	0.10%	0.06%	0.10%	1.91%	0.14%	0.06%	2.24%	1.91%	0.06%
T=-10	0.07%	0.24%	0.20%	0.20%	0.21%	0.13%	0.45%	0.24%	0.12%	0.31%	0.10%	0.54%	0.02%	0.27%	0.33%	0.31%	0.03%	0.13%

KEY: MKT – Market (NSE 20 Share Index), CMC - CMC Holdings, LM - Lonrho Motors, ALC - African Lakers Corp, KNM - K. National

Mills, EAP - E A Packaging, UT - Uniliver Tea, WT - Williamson Tea, KL – Kakuzi, UL – Uchumi, NIC - NIC Bank, BOC - BOC Gases, PTS - TPS Eastern, DT - Diamond Trust, SA - Sammer Africa, TK - Total Kenya, CI - Centum Investment, EAC - East Africa Cables Ltd, MS - Mumias sugar co. ltd.

Appendix IV: Composition Changes in NSE 20 Share Index from 2000 to 2010

S/N.	2000		2001		2002		Mar-03	
1	Unilever Tea		Unilever Tea		Unilever Tea		Unilever Tea	
2	Williamson Tea		Williamson Tea		Williamson Tea		Williamson Tea	
3	Kakuzi		Kakuzi		Kakuzi		Kakuzi	
4	Sasini		Sasini		Sasini		Sasini	
5	African Lakes	IN	African Lakes	OUT	TPS Ltd	IN	TPS Ltd	
6	Kenya Airways		Kenya Airways		Kenya Airways		Kenya Airways	
7	Nation Media		Nation Media		Nation Media		Nation Media	
8	Uchumi		Uchumi		Uchumi		Uchumi	
9	Barclays Kenya		Barclays Kenya		Barclays Kenya		Barclays Kenya	
10	Diamond Trust		Diamond Trust		Diamond Trust		Diamond Trust	
11	NIC Bank		EA Packaging		EA Packaging	OUT	NIC Bank	IN
12	KCB		KCB		KCB		KCB	
13	Standard Chart		Standard Chart		Standard Chart		Standard Chart	
14	Bamburi Cement		Bamburi Cement		Bamburi Cement		Bamburi Cement	
15	BOC Gases		BOC Gases		BOC Gases		BOC Gases	
16	BAT (K) Ltd		BAT (K) Ltd		BAT (K) Ltd		BAT (K) Ltd	
17	EABL		EABL		EABL		EABL	

18	KPLC		KPLC		KPLC		KPLC	
19	K. National Mills		K. National Mills	OUT	Firestone EA	IN	Firestone EA	
20	Total Kenya		Total Kenya		Total Kenya		Total Kenya	

S/N.	2006		Jul-07		Jul-08		Dec-09	
1	Unilever Tea	OUT	Rea Vipingo	IN	Rea Vipingo		Rea Vipingo	
2	Williamson Tea	OUT	CMC Holdings	IN	CMC Holdings		CMC Holdings	
3	Kakuzi	OUT	Express Kenya	IN	Express Kenya		Express Kenya	
4	Sasini		Sasini		Sasini		Sasini	
5	TPS Ltd		TPS Ltd	OUT	Safaricom	IN	Safaricom	
6	Kenya Airways		Kenya Airways		Kenya Airways		Kenya Airways	
7	Nation Media		Nation Media		Nation Media		Nation Media	
8	Uchumi	OUT	I.C.D.C.I	IN	Centum Invest.	OUT	Co-operative Bank	IN
9	Barclays Kenya		Barclays Kenya		Barclays Kenya		Barclays Kenya	
10	Diamond Trust		Diamond Trust	OUT	Equity Bank	IN	Equity Bank	
11	NIC Bank	OUT	Mumias Sugar	IN	Mumias Sugar		Mumias Sugar	
12	KCB		KCB		KCB		KCB	

13	Standard Chart		Standard Chart		Standard Chart		Standard Chart	
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14	Bamburi Cement		Bamburi Cement		Bamburi Cement		Bamburi Cement	
15	BOC Gases	OUT	Kengen	IN	Kengen		Kengen	
16	BAT (K) Ltd		BAT (K) Ltd		BAT (K) Ltd		BAT (K) Ltd	
17	EABL		EABL		EABL		EABL	
18	KPLC		KPLC		KPLC		KPLC	
19	Firestone EA		Sameer Africa	OUT	East African Cables	IN	East African Cables	
20	Total Kenya		Total Kenya	OUT	Athi River Mining	IN	Athi River Mining	

Source: Nairobi Security Exchange