

Effect of Changes in Index Re-composition on Stock Prices and Volume: Study of Pakistani Stock Markets

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Abstract

This study examines the effect of KSE-100 and LSE-25 index re-composition on addition and deletion of non-financial firms from the sample period 2004-2014. To study the price effect, event study methodology is used for calculating the average abnormal returns (AARs) and cumulative average abnormal returns (CAARs) for both stock indices. Trading volume effect is also analyzed in event window by using volume ratio. The findings of this study show that Positive and significant average abnormal return (AAR) of 0.52% for KSE-100 index and 1.176% for LSE-25 index are observed on announcement day of inclusion. These results support the information content hypothesis in both stock indices. In case of deletion of firms no negative average abnormal returns were found on announcement day, so it do not support the information content hypothesis as the prices of deletion of firms do not decrease on announcement day. Results for KSE-100 index and LSE-25 index show a temporary change in prices of added and deleted stocks of both stock indices, not a permanent and prices reverses after a few days of announcement. Hence it supports the price pressure hypothesis and rejects the downward sloping demand curve hypothesis. Finally this study can help in better resource allocation and investment decisions regarding index re-composition for investors and traders of Pakistani and other developing countries stock markets.

Keywords: Inclusion, exclusion, KSE-100, LSE-25, market model and event study

1. Introduction

The stock markets of the countries have been the major source for the direct foreign and local investments of the investors in the countries' economies. The stock exchanges show variations in the volumes and prices of the stocks listed at different times under different circumstances. Different investors, analysts and researchers apply their techniques for the prediction of the stock prices changes due to different news and events in the financial and non-financial sectors of countries. The researchers and the financial analysts apply different techniques on the data available for exploring and observing different prices and volumes trend for the sake of research and planning their investments and portfolios. As the stock exchanges have a lot of companies' data which demands more work for analysis so the analysis carried to study the stock markets, is generally based on the indexes of the stock exchanges, which is differently used for the different stock exchanges across the globe. It is now practice of describing the stock exchanges performance on the basis of the indexes all over the world. Countries' stock exchanges lay out their policies for the composition of the indexes of the stock markets for the inclusion and exclusion of the companies from the index.

Most of the researchers use the indexes as the basis for exploring the different phenomenon for the variation in the prices and the volume traded of the companies as being conclusive and easy reference. As far this index is considered as basis for the decision making by the investors but also when there is any change in the index composition of a stock exchange it may impact the prices and volume of the affected firms in the market when it is announced. This event provides opportunity to examine the price and volume behaviour of the particular firms in the stock markets. If the nature of the securities market is semi-strong efficiency then there exist the some benefits for the analysts and investors that they can benefit from the information for earning the abnormal returns. These changes in the market can be observed in the short span of time window in the markets.

The changes in the prices and the volumes traded of the affected firms included or excluded from the index of the stock exchanges have been studied by the different researchers at different times. These studies included the tests of the impact on the volume and prices of the firms before the announcement, on the announcement day and after the announcement date. As being the most developed economy the stock markets in the United States have been randomly tested for the impact of the news of the index composition revision in the past. This phenomenon has been established among the researchers and the investors that the stocks included (excluded) from the S&P 500 index of USA which mostly quoted for the reference by the researchers, impact the prices and the volume traded of the securities affected by the revision announcement.

The early studies on the index composition changes by (Shleifer, 1986) and (Harris & Gurel, 1986) identified the positive impacts on the prices and the volume traded by the news of the inclusion in the index and negative trend in the prices and the volume of the securities excluded from the index S&P 500 on the index composition revision announcement. The results of these studies showed the positive impact on the prices and volume of the included stocks in the S&P 500 and negative on the excluded securities from the index composition due to the changes in the demand of the affected securities by the investors. These findings are in-consistent with the Efficient Market Hypothesis in this regard that the inclusion or exclusion does not carry any significant

information about the profitability of the affected firms but also supports the hypothesis on the other hand as the inclusion and exclusion news a positive indication for the investors. The studies have been conducted and the results have been explained under different finance theories like Efficient Market Hypothesis, Signalling Theory, Mean Reversion Theory, Price Pressure Theory, Imperfect Substitute Theory and Liquidity Theory. But this study has focused on these three theories, price pressure hypothesis, Imperfect Substitute Hypothesis and Information signalling Hypothesis. This focused study has been carried by the researchers in developing and developed countries like the mostly in the developed economies and less in the developing stock exchanges. The findings in these studies has been explained in many ways to describe the reasons the changes in the prices and the volume traded of the included/ excluded firms from stock indexes. However the developing countries' stock exchanges need more to be explored for multiple phenomenon in this regard. Therefore, a little research has been carried in the stock exchanges of Pakistan and especially the comparative analysis is missing still for the testing of the effect of stock index revision announcements. As it is not necessary that the same effects of index re-composition would be on each stock market of Pakistan as the volatility level varies from market to market. Therefore, this study is expected to fill this gap. The main objectives of this research include:

- To examine the price affects of a security upon its inclusion in or exclusion from KSE-100 and LSE-25 index.
- To examine the trading volume effects of a security upon its inclusion in or exclusion from KSE-100 and LSE-25 index.

2. Literature Review

The most of the subject studies have been conducted in the mostly developed countries and the most of the literature is concerned in the developed economies and stock exchanges as well. The literature for observing the impact of stock inclusion/ exclusion in the indexes for which (Lynch, Anthony, R.Richard, & Mendenhall, 1997) tested the impact of S&P 500 for different companies from 1976-1995 which showed a permanent positive impact on price for the inclusion in S&P 500. This is not consistent with the efficient market theory which describe that no abnormal profits can be earned on the basis of the information available in the market. The researchers observed four competing hypothesizes for explanation of these abnormal price increases in the literature which named as DSDC, Information hypothesis, price pressure and liquidity hypotheses. (Diane, et al., 2003) tested the impact on the basis of information free event as the earlier studies were focused on demand curve of the securities. The results supported the hypothesis that the inclusion is not information free but carry the positive information for the public at large however they avoid rejecting the DSDC hypothesis at all. These findings are consistent with the findings of (Dhillon & Johnson, 1991) and (Jain, 1987).

The efficient market hypothesis was firstly introduced in finance by (Fama, 1970) for the analysis by economists and financial analysts, for research and decision making. He presented the hypothesis of efficient market where all the available assets in the market reflect all the information in their prices. The markets are further classified into weak EMH, semi-strong EMH and strong EMH (Fama, 1970) which describes that in weak EMH only past data of the company or the market is considered for analysis, semi-strong EMH compiles both historical and current information about the company and market for the investment decisions, and strong EMH includes all the data for historical, current and the inner information to make the decision of sale or purchase of the securities of companies.

The prices impacts on the securities on the inclusion or exclusion from indexes can be seen if any expectation of cash flows or profits is to be changed due to this announcement. The announcement of inclusion or exclusion from index acts like a signal for the investors by the management of the index about the belief and analysis of the organization being affected by the decisions and the investors decide to invest or sell the securities of the firms on the basis of these securities. These changes on the prices and the volume traded are to be permanent after the announcement of the event (Shleifer, 1986) and (Harris & Gurel, 1986).

The impact of the inclusion of the stocks in the indexes may play a signal to the investors which may impact the prices and the volume traded of the securities after the event. In this regard (Huang, Chakrabarti, Lee, & Jayaraman, 2002) studied the impacts on prices and volumes traded of the securities for the revision of the index composition on MSCI from 1998 to 2001 under information signaling theory and concluded positive impact. (Diane, et al., 2003) conducted research on the price impact for the revision of S&P 500 from 1987 to 1999 on the basis of information signaling hypothesis. The phenomenon of information signaling for the impact on the price and volume of the affected securities was considered by (Docking & Downen, 2006) on S&P 600 for the duration of 1999 to 2002.

A study on the supposition of liquidity in the price impact by the announcement of the changes in the index composition was carried by (Chordia, 2001) on the S&P 500 of USA and verified the supposition. (Schmitz & Esser, 2001) studied the CAC 40 index of France and DAX 100 of Germany comparatively on the theory of liquidity for the price and volume impacts on the revision of the index. Further (Chen, 2006) tested the Russell 1000 index and Russell 2000 index of USA on the supposition of liquidity theory and found positive impacts on

the volume and prices of the stocks included in the indexes after the revision announcement. Also (Docking & Drown 2003) by studying the S&P Small Cap 600 of USA on the basis of liquidity supposition and supported the early studies in this regard. The results of earlier studies further were supported by (Hegde & McDermott, 2003) on the S&P 500.

In comparison, they found that the liquidity associated with deleted stocks continue till three months after the deletion from the index. This finding is consistent with (Amihud & Mendelson, 1986) who concluded that the positive response of the investors is observed for the securities included in the index composition announcement and this reacts to opposite on exclusion from the index. He argued that this positive trend in price is due to decreased cost of trading of the included securities.

Further in this regard (Azevedo et al, 2014) analyzed the stock price and volume changes associated with revision of the composition of the FTSE Bursa Malaysia Kuala Lumpur Composite Index (KLCI), for the time span of 2005 to 2012. They added evidence for supporting the price pressure hypothesis for inclusion and exclusion from the KLCI. They described that the change in price and volume is temporary which is reversed soon after the event news. The further study on the prices and the volume traded was carried by (Ronald Q. and Doeswijk, 2005) on AEX Index in Netherlands. This study is important in this regard that the information about the revision of the index is being publicized well before the event and investors get the news ahead of announcement. Their finding revealed that the changes in the prices of the securities are due to temporary pressure on the trading of the securities of the particular company.

According to Sanger and Peterson (1990) there is negative impact on the value of firm of delisted stock when index re-composition takes place. They observe that the loss of firm value was because of drop off liquidity that causes delisting. These two authors study don't support downward sloping demand curve.

Further the study was on the Pakistani stock exchanges was limited only to the 14 firms and another study by (Sohail, Raheman, Noreen, Fida, & Zulfiqar, 2012) observe the index re-composition effects for the period 2001-10 in which they have compared different models but have studied one market KSE. This study would be more comprehensive that is to be conducted as it covers the Pakistani market that is not only KSE but also LSE to observe the changes and comparison of these markets behaviour in index composition effects by taking the sample of all firms included in or excluded from the index for the period 2004-14. Pakistani stock markets are volatile as has been established from record and the different studies the targeted study would be an important addition to the existing literature for observing the changes in the prices and the volume of the affected firms in the index composition revision announcements. This would further help the analysis of the all three stock exchanges of Pakistan into one stock exchange by the amalgamation plan in the future studies.

And one of the stocks for the inclusion in the index showed a 7% increase 01 week before the inclusion announcement while the prices of the excluded stocks remained unaffected. But the pressure of the selling and purchasing was observed for the both winners and losers at the day of announcement. The ISE index composition where the derivatives are not traded was investigated by (Bildik & Gülay 2008) for change in price of the securities with the index composition revision. The findings were consistent with the past studies in other stock exchanges where the prices increase with the inclusion and decrease with exclusion in an abnormal way. The same goes with the impact on volume traded of the companies for the inclusion and exclusion from index composition. These findings support the theory of imperfect substitute availability, price pressure of trading volumes, signaling theory.

In the Central and Eastern Europe region Zladokas (2007) studied the effect of index re-composition with the help of standard event study methodology. Information content hypothesis was supported by their results as their results shows that both the announcement and actual index re-composition send information to the market. Significant abnormal return on announcement day was reported by them but could not find any support on the subject of abnormal return on inclusion day.

Still the research on the stock exchanges of Pakistan is not so much extensive and a comprehensive analysis of two three stock exchanges i.e. KSE and LSE is still missing which if conducted would depict an overall behaviour of the investors in stock markets of Pakistan. It would be important to test the overall impact on the abnormal returns and volume traded of the affected firms in the Pakistani stock market.

3. Data Description and Methodology

3.1. Data Description

This study population includes all companies that are listed at Karachi Stock Exchange and Lahore Stock Exchange. The Sample is taken from all the non financial companies of KSE and LSE that are added or deleted from index since 2004 till 2014. Those stocks would be eliminated from the sample at the time of analysis due to reasons such as merger or acquisitions, rights issues or stock splits, bankruptcy and trading halts after inclusion or exclusion and non sufficiency and non availability of data within our observation period.

90 inclusions and 90 exclusions of KSE and 67 inclusions and 67 exclusions of LSE include both financial and non financial companies of KSE and LSE. After applying selection criteria the clean sample of this study involves 59 included stocks and 72 excluded stocks of Karachi Stock exchange furthermore 29 inclusions and 37

deletions of Lahore stock exchange, which consists of non-financial stocks for both stock indices.

3.2. Methodology

The topic of this research study is re-composition effect on stock price and volume which shows that an event of re-composition is involved. To study this event an event study methodology has been used that was first suggested by Fama et al (1969). Event study methodology is the most commonly used analytical tool that aims to find an abnormal movement in a company's stock price caused by a particular event or announcement.

In this study market model is used because it gives most consistent and precise results in most of the situation. Market Model is basically a regression of the stock returns and the return of the market index.

3.3. Model Specification

3.3.1. Expected Return

The market model in an equation form can be expressed as

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} \dots \dots \dots (3.1)$$

where

$E(R_{it})$ = expected return of the stock i at time period t

R_{mt} = market return at time t

Ordinary least square regression is used over the estimation window to estimate the coefficients of α and β .

3.3.2. Abnormal Return (AR)

The difference between the actual return and the expected return is the abnormal return. It is calculated by using the following formula.

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \dots \dots \dots (3.2)$$

where

AR_{it} = Abnormal Return of stock i on day t

R_{it} = Daily actual return of event window on day t where t changes from -15 to +15

3.3.3. Cumulative Abnormal Return (CAR)

To calculate the total abnormal return in the event window CAR is used. It is the adding up of all the abnormal returns from the start of the event window T_1 until a particular day t in the window.

$$CAR_t = \sum AR_{T+1 \rightarrow T_2} \dots \dots \dots (3.3)$$

Where

CAR_t = Cumulative Abnormal Return of the entire event

$AR_{T+1 \rightarrow T_2}$ = Sum of Abnormal Returns in the event window

3.3.4. Average Abnormal Return (AAR) & Cumulative Average Abnormal Return (CAAR)

The formula used to calculate AAR is as follows

$$AAR = \frac{\sum AR}{N} \dots \dots \dots (3.4a)$$

where

$\sum AR$ = Sum of all Abnormal Returns

N = Number of added or deleted stocks

Similarly to check the cumulative impact of events on stock returns over the event window Cumulative Average Abnormal Return is calculated as:

$$CAAR = \frac{\sum CAR}{N} \dots \dots \dots (3.4b)$$

3.3.5. Significance test of AAR (t-AAR) & CAAR (t-CAAR)

To find out the significance of Average Abnormal Return T-statistic is used and it will help us to interpretate the results and to conclude this study. T- statistic shows AAR is significant or insignificant. If the value of t-statistics is equal to or greater than 1.96 then the abnormal returns are significant during the event or particular day. Following formula is used to calculate the significance of AAR

$$T = \frac{AAR}{\sigma / \sqrt{n}} \dots \dots \dots (3.5a)$$

where

σ = Standard deviation

Similarly to calculate the significance of CAAR

$$T = \frac{CAAR}{\sigma / \sqrt{n}} \dots \dots \dots (3.5b)$$

3.3.6. Abnormal Volume

To compute the abnormal volume caused by index re-composition the methodology used by Harris and Gurel (1986) is applied.

$$AV = (V_{i,t} / V_i) / (V_{m,t} / V_m) \dots \dots \dots (3.6)$$

where,

$V_{i,t}$ = Volume of stock i on day t

V_i = Average volume turnover for stock i

$V_{m,t}$ = Market volume on day t

V_m = Average market volume

To verify that abnormal volume equals to unit statistically or not t-test is used. If Abnormal Volume is larger than unit significantly, it shows that trading volume during that event date is higher than normal level.

4. Results and Discussion

4.1 Average Abnormal Return (AAR) and Cumulative Average Abnormal Return (CAAR)

4.1.1 Stocks Included in and Excluded from KSE-100 Index

In table 1 shows positive and significant average abnormal return (AAR) has seen on announcement day of included stocks in KSE-100 index by using market model. Results on announcement day are consistent with the Sohail et al. (2012), (Bildik & Gülay 2008). This means that return on event day is different from all other days. The result of average abnormal return reveals that Pakistani firms also reward positive and significant abnormal return with AAR value of 0.52% and t-statistic value is 2.02008. These results show the 95% level of significance on announcement day. In pre-event window, two abnormal returns were found to be significant but have negative values on 5th and 9th day of prior event window with AAR values of -0.524% and -0.885% respectively and have significant but negative t-values of -2.00310 and -3.09716.

In post-event window, all the average abnormal returns were found to be statistically insignificant. It means that returns after the announcement day follow a similar pattern as like other days. There were not found any leakage of event after the announcement day in inclusion of KSE-100 index. Positive returns were found on 2nd, 4th, 6th, 9th, 10th and 13th days of after the announcement day and all other remaining days in post-event window, abnormal returns were found to be negative.

Figure 1 reveals that at event day 0, highly significant return were observed with positive AAR value of 0.00521 which shows an upward trend on the day of announcement. The results of added stocks in KSE-100 index were consistent with earlier studies (Lynch, Anthony, R.Richard, & Mendenhall, 1997 and Azevedo et. Al, 2013). On the first day of after the announcement day negative trend was to be found and decrease to negative level of -0.45%. But after that day return reverses back to its positive level on day 2nd. Highly negative return was observed on day 12th with AAR value of -0.633% but this trend was temporary and suddenly increases to its positive level on day 13th. The findings of inclusion in KSE-100 index illustrate that their stocks do not follow any pattern; they show a random behaviour in upward and downward trend in terms of prices. These results show that there have seen a temporary change in prices of added stocks in KSE-100 index, not a permanent and prices reverses after a few days of announcement. Hence the results of inclusion in KSE-100 index support the price pressure hypothesis and reject the downward sloping demand curve hypothesis as according to downward sloping demand curve hypothesis, when indexers purchases stocks due to announcement of added stock; the number of trading shares have a tendency to reduce, thus prices of stocks increase permanently. The results also support the information content hypothesis as there was positive and significant change in prices of added stocks on event day.

In table 1, negative cumulative effect of average abnormal return was found on event day with CAAR value of -1.537% and value of t-statistic is -0.76841. Before announcement day few positive cumulative average abnormal returns were found on 7th, 10th, 11th, 12th, 13th, 14th and on 15th day, but all the returns were found to be statistically insignificant. No positive cumulative average abnormal return was found in 15 days after the announcement.

Figure 2, shows the cumulative behaviour of added stock return. On announcement day, negative cumulative average abnormal return was observed with CAAR value of -1.537%, on next day after the announcement CAAR was decreased on 1st day and after that CAAR again increased from -1.987% to -1.704%. This upward and downward trend of cumulative stocks of inclusion in KSE-100 index shows that there exist uncertainty in the market regarding the news and even after the announcement day this uncertainty remains consistent. It means that behaviour of the market was unpredictable and market does not follow any trend.

All the average abnormal returns were found to be insignificant on announcement day, pre-event window and in post-event window in exclusion of KSE-100 index. Positive average abnormal returns of 0.546% with insignificant t-statistic value of 1.89537 are observed on the announcement day of exclusion of stocks from KSE-100 index by use of market model. These results are contrary to most of the studies. But, nonetheless, these results are found to be insignificant, unexpectedly. On event day, insignificant AAR shows that there is no any impact of exclusion on deleted stocks of non-financial sector from KSE-100 index. The behaviour of average abnormal return of deleted stocks of non-financial sector from KSE-100 index can be observed through figure 3. This figure shows that on event day, AAR value is positive but not significant which shows an upward trend on that event day of exclusion from KSE-100 index. Hence the positive result for AAR on event day of exclusion does not support the information content hypothesis. After the event day of exclusion from index, there showed a random behaviour

in stock prices, as this behaviour was showing a mix trend of increase and decrease. The findings show that there is no significant decrease in prices of excluded stock of non-financial companies after the event day. The results support the price pressure hypothesis and are consistent with the Ronald Q. and Doeswijk, 2005, because there have shown a temporary decrease in prices but when prices reverse, it then moves to its positive level. Findings do not support the downward sloping demand curve (DSDC) hypothesis, because there is no any permanent change in prices of deleted stock.

The results for CAAR of deleted stocks of non-financial companies from KSE-100 index are reported in table 2. Negative cumulative abnormal returns were observed only 14th and 15th day in pre-announcement window. All the other returns were observed positive but insignificant. On event day, positive cumulative effect of average abnormal return was found with CAAR value of 1.981% and value of t-statistic is 1.44950. In post-event window, positive cumulative average abnormal returns are observed in exclusion from KSE-100 index.

4.1.2 Stocks Included in and Excluded from LSE-25 Index

Table 3, reports the results for price effects of stocks inclusion in LSE-25 index. AAR results are explained in pre-event window, on event day and for post-event window in LSE-25 index. In pre-event window, significant but negative abnormal returns of -1.412% and -0.724% with t-statistic of -2.15574 and -2.02686 are observed on 1st and 2nd days. But only one positive average abnormal returns of 1.597% with significant t-statistic of 2.09128 are observed on day 13th. All these average abnormal returns are significant at 95% level. If t-statistic value is greater than 1.96, then that return will be considered as significant. On event day, average abnormal return has a positive and significant impact on stocks inclusion in LSE-25 index with AAR value of 1.176% and t-statistic value is 2.08105. These results show the consistent performance with Sohail et al (2012). According to them, returns of added stocks in KSE-100 index have a positive and significant impact on day of announcement by all three models (market adjusted model, market model and CAPM). After the first day of announcement, negative average abnormal return of -2.157% with significant t-statistic -2.23230 was observed. The significant value of return reveals that there is a leakage of information in the market on that day after the first day of announcement and market has reacted accordingly.

According to figure 5, highly positive trend was observed on day 4th and 13th but after these days decreasing trend have seen. Positive average abnormal returns (AAR) of 1.176% were to be found with an increasing trend on announcement day and are consistent with the Bildik & Gülay (2008). Increasing trend of AARs of added stocks in LSE-25 index shows the significant and positive impact of these stocks on announcement day and these results are consistent with the Sohail et al (2012). After the event day, high negative and significant average abnormal return -2.157% shows the decreasing trend on first day. But after that day prices reverse to its positive level on day 2nd but again prices suddenly decreases to its negative level. This change in stock prices is temporary, not permanent in addition of LSE-25 index. It is concluded that addition in LSE-25 index illustrate prices of added stock shows random behaviour in the market in increasing and decreasing trend. This temporary change in prices of added stocks in LSE-25 index prove the price pressure hypothesis and is consistent with the study of Harris and Gurrel (1986) and reject the downward sloping demand curve hypothesis as according to downward sloping demand curve hypothesis, prices of added stocks should follow the permanent change. The results also support the information content hypothesis as there was positive and significant change in prices of added stocks on event day.

In pre-event window, table 3 shows negative but significant cumulative average abnormal return (CAAR) -3.172% with t-statistic -2.09871 was found only on 5th day. This level of significance shows that market reacts instantaneously on that day and this return is different from other days. Positive cumulative average abnormal returns 0.016%, 1.239% and 0.371% were found on 11th, 12th and 13th day, but all the returns were found to be insignificant. Negative cumulative average abnormal return -0.369% with insignificant t-statistic value was observed on event day 0. No positive and significant cumulative average abnormal return was found in 15 days after the announcement.

Cumulative behaviour of added stock return is showed in figure 6. This shows that positive behaviour of cumulative average abnormal return of added non-financial stock was found on 12th and 13th day in pre-event event window. On event day, negative but insignificant cumulative average abnormal return -0.369% was observed, on next day after the announcement CAAR was showing decreasing trend on 1st day -2.526% and after that CAAR again increased to -1.560%. This increasing and decreasing trend of cumulative stocks of inclusion in LSE-25 index shows that there exist uncertainty in the market regarding the news and even after the announcement day this uncertainty remains constant. It means that behaviour of the market was unpredictable and market does not follow any trend.

Table 4 explains the results and discussion of index exclusion of non-financial companies from LSE-25 index. According to this table, only one significant and negative average abnormal return (AAR) -0.634% with t-statistic of -1.97528 was observed on 4th day before the announcement. Other negative average abnormal returns -0.295%, -0.160%, -0.045%, -0.411%, -0.193%, -0.110% and -0.00371 were observed on day 1st, 6th, 8th, 9th, 11th, 14th and 15th, but all these AARs have insignificant t-statistic value which is less than 1.96. Positive 0.576% but

insignificant average abnormal return with t-statistic 1.46172 is observed on announcement day of exclusion from LSE-25 index. Insignificant value of AAR illustrate that there is no any impact deleted stocks on event day of exclusion from LSE-25 index. But these results are contrary to most of the previous studies such as Harris and Gurrel (1986), Shleifer (1986) because of positive impact on price of a security upon its exclusion from LSE-25 index on day of announcement. Due to this positive trend on event day, rejects the information content hypothesis. There was showed a random behaviour in stock prices, as this behaviour was showing a mix trend of increase and decrease of average abnormal returns in post event window. Results show that all the average abnormal returns were found to be insignificant after the announcement day. The results support the price pressure hypothesis and give a supporting argument in favour of Zladokas (2007), because there have shown a temporary change in prices in terms of price reversal phenomena. Findings rejects the downward sloping demand curve (DSDC) hypothesis, because there is no any permanent change in prices of deleted stock.

Table 4 describes the results for CAAR of deleted stocks of non-financial companies from LSE-25 index. Negative cumulative average abnormal returns -0.523%, -0.228%, -0.254%, -0.567%, -0.234%, -0.074%, -0.174%, -0.129%, -0.010%, -0.482% and -0.371% were observed on 1st, 2nd, 3rd, 4th, 6th, 7th, 8th, 9th, 13th, 14th and 15th day of before announcement. Positive cumulative effect of average abnormal return of 0.053% with insignificant t-statistic of 0.04264 was observed on event day. All the cumulative average abnormal returns were found to be negative after the announcement day except one CAAR of 0.020% with t-statistic of 0.00988 of day 13th. All the returns are insignificant in post-event period.

4.2. Abnormal Volume (Trading Volume Effects)

In chapter 3, methodology described that volume ratio will show the different level of trading volume in following way:

VR = 1 shows that trading volume is not different from expected

VR < 1 shows that in the event window trading volume is lower than expected

VR > 1 shows that trading volume in the event window is higher than expected

As both effects of stock prices and trading volume was closely observed using similar event windows.

4.2.1 Stocks Included in and Excluded from KSE-100 Index

The effects of index re-composition of KSE-100 index on the trading volume of the added firms are also observed. The results of volume ratio of added firms to the index that are calculated according to methodology implemented Harris and Gurel (1986), represented in Table 5. According to table 5, abnormal volume is significantly different from 1 on event day, with volume ratio of 1.57224 and t-statistic is 2.21829, which shows the 5% level of significance on announcement day. It means that abnormal trading volume is higher than expected on event day. Significant volume ratio results are observed on 10th prior to the announcement with t-statistic of 1.98947. VR (1.7467) > 1 indicate that abnormal trading volume is higher than expected on 10th day before announcement. In post-event window, all the volume ratios are found to be insignificant and greater than 1 (VR > 1) which shows that abnormal trading volume is higher than expected.

Figure 9 shows the trading volume behaviour of addition of firms to KSE-100 index around the event window. On announcement day, positive and significant increasing trend was to be found for included stocks to KSE-100 index. These results are consistent with Sohail et al (2012) and Zladokas (2007) and show the similar performance of stock returns. These results support the information content hypothesis, as according to this hypothesis, positive increasing trend should be found on event day. Mean of abnormal volume significantly decreases before one day announcement which is lower than normal level, but it significantly increases on announcement day but after the first day of announcement it decreases to 1.572241 to 1.126733, it shows the temporary decrease in average abnormal volume of added stocks to KSE-100 index in post-announcement period. But this temporary change remains consistent in post-announcement period which clearly supports the price pressure hypothesis and these results are consistent with the previous study. But this study is against the downward sloping demand curve hypothesis (DSDC).

In table 6 trading activity of deleted stocks from KSE-100 index are studied which results are quite similar to stock returns of deletion. Results for deleted stocks represent that average abnormal volume is higher than normal level (VR 2.78896 >1) which shows that volume ratio is different from 1 on event day. No significant average volume ratio was to be found on the day of announcement; it means that there is no any impact of index re-constitution of KSE-100 index on the trading volume for deleted stocks. This study results are agreed to the findings of Sohail et al (2012) in which no significant abnormal (AV) was reported for deleted stocks from the KSE-100 index. Only one significant average abnormal return was to be found on 2nd day of pre-announcement window, which shows that these results of volume ratios are different from normal level that is greater than one (VR 2.1703 > 1). All the volume ratios are found to be insignificant and their abnormal trading volume is different from one on all days of pre-announcement window except one which has volume ratio nearly equal to one (0.9641) on day 13th. While in post-announcement window, significant average abnormal volume was observed on day 12th which has volume ratio (0.57789) < 1, which shows that abnormal volume is lower than expected. All the other

trading activity in post-announcement period was found to be insignificant and mostly abnormal volumes are higher than normal level.

Trading volume behaviour is to be observed in pre-event window, on event day and in post-event window for the stocks subject to exclusion from the KSE-100 index. On announcement day, slightly downward trend was to be found as compared to one day before the announcement. On the next day after the event day, increasing trend was to be observed and after that mostly decreasing trend is observed for volume ratios in post-announcement period. This temporary behaviour of abnormal volume after the announcement period supports the price pressure hypothesis, but contrary to information content hypothesis and rejects the downward sloping demand curve hypothesis (DSDC).

4.2.2 Stocks Included in and Excluded from LSE-25 Index

The effects of index re-constitution of LSE-25 index on the trading volume of the added firms are also observed by market model. The results of volume ratio by using market model are interpreted under table 7. LSE-25 index follow the similar pattern on abnormal volume of addition of firms as it is detected in KSE-100 index. According to this pattern, significant mean of abnormal volume are observed on announcement day with high volume ratio of 4.42400 which is greater than one and shows the higher value of trading volume than expected level and its t-statistic is 2.00844. Positive effect of volume ratio for added stocks to LSE-25 index re-constitution indicate the consistent results with Sohail et al (2012) who were also observed the same positive effect VR of index inclusion to KSE-100 index. Significant abnormal trading activity was observed from day 5th to 12th day and on 15th day of prior-event window which shows the high abnormal trading volume different from unit. $VR > 1$ indicate that average abnormal trading volume is greater than expected on these days of pre-announcement window. After the announcement day, average abnormal volumes are found to be significant on day 7th, 8th and 12th and 13th with volume ratios of (VRs) of 2.4786, 2.5138, 3.16247 and 3.2182 respectively with t-statistics of 2.43995, 2.41116, 2.18156 and 2.45779. All these volume ratios are found to be greater than one; it means that all these VRs are greater than expected level. All the remaining is found to be insignificant, but higher than normal level.

Behaviour of abnormal trading activity of inclusion of firms to LSE-25 index for pre-announcement window, event window and for post-announcement window is to be observed in figure 11. Hence, between the announcement day and the effective change day volume ratio (VR) increases, which are an indication of the fact that investors start to adjust their portfolios in accordance with the inclusion of index. Before first day of the announcement, downward trend was to be found with VR of 3.2189, but after that on announcement day VR significantly increase to 4.42400 and then it decrease to 1.9820 after the announcement day which is the clearly indication of temporary change of volume ratios (VRs) around the event window. Hence it seems too consistent with the theories of price pressure hypothesis and information content hypothesis as accordance with previous studies. However, it rejects the downward sloping demand curve hypothesis (DSDC) because no any permanent change was observed in abnormal trading behavior in post-announcement period.

Trading activity of exclusion of non-financial firms from LSE-25 index represented in table 8. Findings for deleted stocks represent that average volume ratio of 1.61404 is greater than normal level but it shows an insignificant effect of exclusion on announcement day which confirms the findings of previous study which also indicate the insignificant effect of deleted stocks on event day. In pre-announcement window, significant mean of abnormal volumes are observed on 4th and 8th day with volume ratio of 0.4002 and 0.5671 ($VR < 1$) which is lower than normal level and their t-statistic is -6.25486 and -2.39535 respectively. Other shows the insignificant abnormality of trading volume in pre-event period. Few of the mean of abnormal volumes are found to be near to one which is 0.92416 and 0.91394 on day 6th and 15th. While few of the volume ratios do not reaches its normal level ($VR < 1$) with abnormality of 0.5671, 0.68715, and 0.7496 on day 8th, 9th and 13th. Significant volume ratios of 2.34993 and 1.9932 are to be observed on 9th and 11th day respectively in post-announcement period. Their $VR > 1$ indicate that abnormal volumes are higher than expected level. But all the remaining abnormal trading volumes found to be insignificant and few of them show the lower than normal trading activity after the announcement day. The random behaviour of volume ratios support the price pressure hypothesis, but contrary to information content hypothesis because according to information content hypothesis abnormal volume should have insignificant and downward trend on announcement day of exclusion. It rejects the downward sloping demand curve hypothesis (DSDC) which assumes that there should be a permanent change in trading volume behaviour after the event day. Interestingly, volume ratios (VRs) of deleted stocks are almost always greater than one and those of added stocks even up to 100%, which demonstrates that investors are more sensitive to stocks subject to excluding from the index relative to included stocks.

5. Conclusion

This study investigate the price effect with the help of market model and trading volume effect with the help of volume ratio proposed by the Harris and Gurrel (1986) as a result of re-composition of KSE-100 index and LSE-25 index due to addition and deletion of non-financial firms into the index. This study covers the period of daily stock prices and trading volume data of non-financial companies including index re-composition from 2004 to

2014 for KSE-100 index and LSE-25 index. Event study methodology has been used in this study by using the market model.

Price pressure hypothesis, information signalling hypothesis and downward sloping demand curve hypothesis (DSDC) are also examined in this study regarding the price and trading volume effect of added and deleted stocks to KSE-100 index and LSE-25 index. Price pressure theory suggest that the inclusion and exclusion of the securities in the index composition affect the demand and the volume traded of the securities of the particular companies so the price may increase at temporary basis which return to its mean value after some times (Harris & Gurel, 1986). The change in the prices of the stocks is contributed towards the informational and the price pressure phenomenon which is based on the short term impact as contrary to informational which is permanent in nature (T. Hendershot, A. J. Menkveld, 2014). The short term changes in the prices and the volume of the stocks being affected due to the price pressure.

According to Information signalling hypothesis, information which is carried out by announcement of index re-constitution is not an information free event. For added stocks, this information act as a good news and for deleted stocks, act as a bad news. As a result of added stocks, this information shows the positive impact and for deleted stocks shows a negative impact around and after the announcement of index re-constitution and this change in price can be a permanent. However, downward sloping demand curve hypothesis follow that demands of stock in long run makes a downward slopes as there are permanent prices changes. Similarly, increased demand of stock from index results in enhanced effects of stock prices whereas sale of large part of data have a decreasing affect on stock prices. Therefore, the demands curves for this hypothesis have a downward slope and hence it might not have a horizontal slope (Haris and Gruel, 1986). Other researcher like Shleifer, (1986) stated permanent increment in stock prices added in S&P 500; hence it supports downward slope demand curve hypothesis.

Earlier studies explain that stocks inclusion in or exclusion from the index show significant positive (negative) abnormal returns on the announcement day and trading volume is effected by the event. Within this structure, this study also examines the price and volume effects on stocks related with the changes in index composition of two separate indices, KSE-100 and LSE-25. Positive and significant average abnormal return (AAR) of 0.52% for KSE-100 index and 1.176% for LSE-25 index are observed on announcement day of inclusion to the index. Results of average abnormal returns for both stock indices indicate that LSE-25 index earn more mean of abnormal returns as compared to KSE-100 index. Negative but insignificant cumulative effect of average abnormal return (CAAR) was found on announcement of inclusion in case of KSE-100 index and LSE-25 index.

Positive average abnormal returns (AAR) of 0.546% for KSE-100 index and 0.576% for LSE-25 index are observed on the announcement day of exclusion of stocks from KSE-100 index and LSE-25 index. These results are contrary to most of the studies. But, nonetheless, these results are found to be insignificant, unexpectedly. But in case of cumulative average abnormal return (CAAR) positive but insignificant returns were found with 1.981% and 0.053% for KSE-100 index and LSE-25 index.

All the effect of stock prices associated with addition and deletion of firms to KSE-100 index and LSE-25 index are confirmed by the behaviour of abnormal trading volume which demonstrates significant results in case of inclusion of firms and insignificant results in case of exclusion of firms on announcement day and in post-announcement period, mostly mean of abnormal volumes remains higher than its normal level after reconstitution of index.

Finally it is concluded that given results support the information content hypothesis in case of addition of firms in KSE-100 index and LSE-25, as there was observed positive and significant change in prices of added stocks on event day for both stock indices. But information content hypothesis rejects in case of deletion from both stock indexes, because there are observed positive average abnormal returns on day of announcement. Results for KSE-100 index and LSE-25 index show that there have seen a temporary change in prices of added and deleted stocks of both stock indices, not a permanent and prices reverses after a few days of announcement. Hence it supports the price pressure hypothesis and rejects the downward sloping demand curve hypothesis.

This would further help the analysis of all stock exchanges of Pakistan into one stock exchange by the amalgamation plan in the future studies. It is recommended that effects of index re-composition can be studied by using Fama and French three factor model for future research.

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Appendix

Table 1: AAR and CAAR for addition of firms to KSE-100 Index

Event Days	AAR	T-STATISTIC	SIG/INSIG	CAAR	T-STATISTIC	SIG/INSIG
-15	0.00065	0.21729	INSIG	0.00065	0.21729	INSIG
-14	0.00093	0.23125	INSIG	0.00157	0.26502	INSIG
-13	0.00345	1.11321	INSIG	0.00503	0.64793	INSIG
-12	0.00062	0.14593	INSIG	0.00565	0.64827	INSIG
-11	-0.00053	-0.18994	INSIG	0.00512	0.52961	INSIG
-10	0.00041	0.11757	INSIG	0.00553	0.50796	INSIG
-9	-0.00885	-3.09716	SIG	-0.00332	-0.28438	INSIG
-8	-0.00091	-0.31200	INSIG	-0.00424	-0.33192	INSIG
-7	0.00449	1.35923	INSIG	0.00025	0.01817	INSIG
-6	-0.00504	-1.66864	INSIG	-0.00479	-0.32692	INSIG
-5	-0.00524	-2.00310	SIG	-0.01002	-0.63122	INSIG
-4	-0.00413	-1.49773	INSIG	-0.01415	-0.86501	INSIG
-3	-0.00035	-0.11534	INSIG	-0.01450	-0.82078	INSIG
-2	-0.00030	-0.08261	INSIG	-0.01481	-0.77647	INSIG
-1	-0.00577	-1.86769	INSIG	-0.02058	-1.02300	INSIG
0	0.00521	2.02008	SIG	-0.01537	-0.76841	INSIG
1	-0.00450	-0.93184	INSIG	-0.01987	-0.96255	INSIG
2	0.00282	0.93721	INSIG	-0.01704	-0.78245	INSIG
3	-0.00269	-0.90342	INSIG	-0.01973	-0.84775	INSIG
4	0.00317	0.88111	INSIG	-0.01657	-0.67988	INSIG
5	-0.00100	-0.27680	INSIG	-0.01757	-0.68962	INSIG
6	0.00157	0.41330	INSIG	-0.01599	-0.60304	INSIG
7	-0.00321	-0.56525	INSIG	-0.01920	-0.68036	INSIG
8	-0.00103	-0.29311	INSIG	-0.02024	-0.67933	INSIG
9	0.00370	1.21856	INSIG	-0.01654	-0.54484	INSIG
10	0.00200	0.40261	INSIG	-0.01454	-0.44908	INSIG
11	-0.00306	-0.93357	INSIG	-0.01759	-0.55325	INSIG
12	-0.00633	-1.11151	INSIG	-0.02392	-0.75826	INSIG
13	0.00034	0.08262	INSIG	-0.02358	-0.70474	INSIG
14	-0.00558	-0.97290	INSIG	-0.02917	-0.85102	INSIG
15	-0.00558	-1.55931	INSIG	-0.03475	-0.98792	INSIG

Table 2: AAR and CAAR for deletion of firms from KSE-100 Index

Event Days	AAR	T-STATISTIC	SIG/INSIG	CAAR	T-STATISTIC	SIG/INSIG
-15	-0.00048	-0.16912	INSIG	-0.00048	-0.16912	INSIG
-14	-0.00322	-1.19832	INSIG	-0.00370	-0.95894	INSIG
-13	0.00508	1.90250	INSIG	0.00138	0.28162	INSIG
-12	0.00217	0.53844	INSIG	0.00354	0.51177	INSIG
-11	0.00162	0.59860	INSIG	0.00516	0.71100	INSIG
-10	0.00083	0.30096	INSIG	0.00599	0.70507	INSIG
-9	0.00108	0.18987	INSIG	0.00707	0.61521	INSIG
-8	-0.00573	-1.32504	INSIG	0.00133	0.10074	INSIG
-7	0.00634	1.93512	INSIG	0.00767	0.61916	INSIG
-6	0.00127	0.47676	INSIG	0.00894	0.72336	INSIG
-5	-0.00201	-0.66130	INSIG	0.00694	0.55190	INSIG
-4	-0.00232	-0.79883	INSIG	0.00462	0.33076	INSIG
-3	0.00014	0.04737	INSIG	0.00476	0.34577	INSIG
-2	0.00489	1.29244	INSIG	0.00965	0.75826	INSIG
-1	0.00471	1.31920	INSIG	0.01435	1.17654	INSIG
0	0.00546	1.89537	INSIG	0.01981	1.44950	INSIG
1	0.00465	1.32293	INSIG	0.02446	1.72582	INSIG
2	0.00166	0.47884	INSIG	0.02612	1.73081	INSIG
3	0.00319	1.03330	INSIG	0.02932	1.82012	INSIG
4	0.00395	1.39356	INSIG	0.03327	1.93675	INSIG
5	-0.00269	-0.89536	INSIG	0.03058	1.64474	INSIG
6	0.00451	1.13131	INSIG	0.03509	1.75763	INSIG
7	-0.00215	-0.65261	INSIG	0.03294	1.65650	INSIG
8	0.00174	0.58977	INSIG	0.03468	1.77349	INSIG
9	0.00142	0.41771	INSIG	0.03610	1.86534	INSIG
10	0.00032	0.10305	INSIG	0.03642	1.82400	INSIG
11	0.00192	0.67394	INSIG	0.03834	1.89312	INSIG
12	-0.00185	-0.71976	INSIG	0.03649	1.73892	INSIG
13	-0.00349	-1.31816	INSIG	0.03300	1.56126	INSIG
14	0.00187	0.60188	INSIG	0.03487	1.63795	INSIG
15	0.00270	0.80035	INSIG	0.03757	1.82516	INSIG

Table 3: AAR and CAAR for addition of firms to LSE-25 Index

Event Days	AAR	T-STATISTIC	SIG/INSIG	CAAR	T-STATISTIC	SIG/INSIG
-15	-0.00957	-0.87857	INSIG	-0.00957	-0.87857	INSIG
-14	-0.00269	-0.61263	INSIG	-0.01226	-0.96263	INSIG
-13	0.01597	2.09128	SIG	0.00371	0.25477	INSIG
-12	0.00868	0.65013	INSIG	0.01239	0.70267	INSIG
-11	-0.01223	-1.24974	INSIG	0.00016	0.01249	INSIG
-10	-0.00209	-0.43810	INSIG	-0.00193	-0.15384	INSIG
-9	-0.00769	-1.33107	INSIG	-0.00962	-0.83825	INSIG
-8	-0.00299	-0.72731	INSIG	-0.01261	-0.94568	INSIG
-7	0.00472	0.35319	INSIG	-0.00789	-0.36924	INSIG
-6	-0.01659	-1.15599	INSIG	-0.02448	-1.66228	INSIG
-5	-0.00724	-2.02686	SIG	-0.03172	-2.09871	SIG
-4	0.01674	1.14871	INSIG	-0.01498	-0.82015	INSIG
-3	0.00598	0.82259	INSIG	-0.00900	-0.49443	INSIG
-2	0.00767	0.85975	INSIG	-0.00133	-0.08181	INSIG
-1	-0.01412	-2.15574	SIG	-0.01545	-1.04994	INSIG
0	0.01176	2.08105	SIG	-0.00369	-0.22477	INSIG
1	-0.02157	-2.23230	SIG	-0.02526	-1.59065	INSIG
2	0.00966	1.48539	INSIG	-0.01560	-0.83342	INSIG
3	-0.00787	-1.67634	INSIG	-0.02347	-1.22057	INSIG
4	-0.00012	-0.02178	INSIG	-0.02359	-1.09836	INSIG
5	0.00163	0.23505	INSIG	-0.02196	-0.93972	INSIG
6	-0.01372	-1.57886	INSIG	-0.03568	-1.49173	INSIG
7	-0.00386	-0.52409	INSIG	-0.03954	-1.62360	INSIG
8	-0.00570	-1.42066	INSIG	-0.04524	-1.86735	INSIG
9	0.00245	0.37322	INSIG	-0.04278	-1.90926	INSIG
10	0.00445	0.40675	INSIG	-0.03833	-1.35203	INSIG
11	-0.00527	-1.31570	INSIG	-0.04360	-1.49696	INSIG
12	0.00022	0.05842	INSIG	-0.04339	-1.52749	INSIG
13	-0.00317	-0.38326	INSIG	-0.04655	-1.80954	INSIG
14	0.00088	0.17425	INSIG	-0.04567	-1.77287	INSIG
15	0.00743	0.83284	INSIG	-0.03824	-1.22980	INSIG

Table 4: AAR and CAAR for deletion of firms from LSE-25 Index

Event Days	AAR	T-STATISTIC	SIG/INSIG	CAAR	T-STATISTIC	SIG/INSIG
-15	-0.00371	-0.92182	INSIG	-0.00371	-0.92182	INSIG
-14	-0.00110	-0.34921	INSIG	-0.00482	-1.13869	INSIG
-13	0.00471	1.30367	INSIG	-0.00010	-0.02034	INSIG
-12	0.00413	1.20450	INSIG	0.00403	0.70959	INSIG
-11	-0.00193	-0.61469	INSIG	0.00210	0.31692	INSIG
-10	0.00072	0.21942	INSIG	0.00282	0.42202	INSIG
-9	-0.00411	-1.66405	INSIG	-0.00129	-0.17439	INSIG
-8	-0.00045	-0.19995	INSIG	-0.00174	-0.23285	INSIG
-7	0.00100	0.26759	INSIG	-0.00074	-0.13224	INSIG
-6	-0.00160	-0.33952	INSIG	-0.00234	-0.41303	INSIG
-5	0.00301	0.72045	INSIG	0.00067	0.09898	INSIG
-4	-0.00634	-1.97528	SIG	-0.00567	-0.75940	INSIG
-3	0.00313	0.94936	INSIG	-0.00254	-0.28672	INSIG
-2	0.00025	0.08013	INSIG	-0.00228	-0.22826	INSIG
-1	-0.00295	-0.56395	INSIG	-0.00523	-0.49949	INSIG
0	0.00576	1.46172	INSIG	0.00053	0.04264	INSIG
1	-0.00593	-1.29373	INSIG	-0.00540	-0.42166	INSIG
2	-0.00346	-0.66675	INSIG	-0.00885	-0.64281	INSIG
3	0.00094	0.40782	INSIG	-0.00792	-0.55236	INSIG
4	-0.00350	-1.03398	INSIG	-0.01142	-0.80793	INSIG
5	0.00157	0.60532	INSIG	-0.00985	-0.70874	INSIG
6	0.00623	1.30746	INSIG	-0.00362	-0.25522	INSIG
7	-0.00288	-0.87737	INSIG	-0.00650	-0.45233	INSIG
8	0.00042	0.08876	INSIG	-0.00608	-0.35552	INSIG
9	-0.00010	-0.02307	INSIG	-0.00617	-0.32546	INSIG
10	-0.00038	-0.10398	INSIG	-0.00655	-0.32862	INSIG
11	0.00161	0.45791	INSIG	-0.00494	-0.23413	INSIG
12	0.00024	0.05646	INSIG	-0.00470	-0.21545	INSIG
13	0.00490	1.10508	INSIG	0.00020	0.00988	INSIG
14	-0.00547	-1.77107	INSIG	-0.00527	-0.25814	INSIG
15	-0.00086	-0.24364	INSIG	-0.00613	-0.27233	INSIG

Table 5: Addition of firms to KSE-100 index (Volume Ratio)

Event Days	Variable Name	Mean AVs	T-STATISTIC	SIG/INSIG
Test Value 1				
-15	VR _t -15	0.83563	-1.01439	INSIG
-14	VR _t -14	1.2511	0.52888	INSIG
-13	VR _t -13	1.7950	1.03656	INSIG
-12	VR _t -12	1.2778	0.57298	INSIG
-11	VR _t -11	1.3692	1.35827	INSIG
-10	VR _t -10	1.7467	1.98947	SIG
-9	VR _t -9	1.3304	0.76176	INSIG
-8	VR _t -8	1.8935	1.30012	INSIG
-7	VR _t -7	2.1504	1.33958	INSIG
-6	VR _t -6	3.4777	1.07889	INSIG
-5	VR _t -5	1.1060	0.24134	INSIG
-4	VR _t -4	1.0218	0.08610	INSIG
-3	VR _t -3	1.8341	1.14984	INSIG
-2	VR _t -2	1.4747	1.15232	INSIG
-1	VR _t -1	0.75957	-1.98847	SIG
0	VR _t 0	1.57224	2.21829	SIG
1	VR _t +1	1.12673	0.40520	INSIG
2	VR _t +2	1.13317	0.56231	INSIG
3	VR _t +3	1.15974	0.57233	INSIG
4	VR _t +4	1.33702	1.28070	INSIG
5	VR _t +5	1.48525	1.04691	INSIG
6	VR _t +6	1.45325	1.10176	INSIG
7	VR _t +7	1.61633	1.81129	INSIG
8	VR _t +8	1.45073	1.46110	INSIG
9	VR _t +9	1.30290	1.24614	INSIG
10	VR _t +10	2.30811	1.36450	INSIG
11	VR _t +11	1.61560	1.83803	INSIG
12	VR _t +12	1.20362	0.75337	INSIG
13	VR _t +13	1.38506	1.19237	INSIG
14	VR _t +14	1.05277	0.21407	INSIG
15	VR _t +15	1.08836	0.42454	INSIG

Table 6: Deletion of firms From KSE-100 index (Volume Ratio)

Event Days	Variable Name	Mean AVs	T-STATISTIC	SIG/INSIG
Test Value 1				
-15	VR _t -15	1.19337	0.65167	INSIG
-14	VR _t -14	1.2868	0.68755	INSIG
-13	VR _t -13	0.9641	-0.19440	INSIG
-12	VR _t -12	1.27696	0.84133	INSIG
-11	VR _t -11	1.1627	0.44774	INSIG
-10	VR _t -10	1.1867	0.67695	INSIG
-9	VR _t -9	4.12321	1.14012	INSIG
-8	VR _t -8	4.4774	1.26176	INSIG
-7	VR _t -7	1.8235	1.31812	INSIG
-6	VR _t -6	2.84723	1.30682	INSIG
-5	VR _t -5	2.7741	1.24738	INSIG
-4	VR _t -4	4.6693	1.27317	INSIG
-3	VR _t -3	1.26885	1.12389	INSIG
-2	VR _t -2	2.1703	2.44020	SIG
-1	VR _t -1	2.8943	1.87012	INSIG
0	VR _t 0	2.78896	1.02882	INSIG
1	VR _t +1	3.7529	1.84282	INSIG
2	VR _t +2	3.6464	1.35592	INSIG
3	VR _t +3	1.88981	1.41540	INSIG
4	VR _t +4	1.4881	1.12125	INSIG
5	VR _t +5	1.7365	1.09430	INSIG
6	VR _t +6	1.78517	1.42053	INSIG
7	VR _t +7	1.5527	1.07017	INSIG
8	VR _t +8	1.2719	0.84108	INSIG
9	VR _t +9	1.24354	0.64045	INSIG
10	VR _t +10	1.1700	0.41321	INSIG
11	VR _t +11	0.9743	-0.06913	INSIG
12	VR _t +12	0.57789	-2.64970	SIG
13	VR _t +13	0.8352	-0.94458	INSIG
14	VR _t +14	1.0589	0.24561	INSIG
15	VR _t +15	1.00951	0.01987	INSIG

Table 7: Addition of firms to LSE-25 index (Volume Ratio)

Event Days	Variable Name	Mean AVs	T-STATISTIC	SIG/INSIG
Test Value 1				
-15	VR_t -15	4.93106	2.71347	SIG
-14	VR_t -14	6.1920	1.73989	INSIG
-13	VR_t -13	5.4256	1.54306	INSIG
-12	VR_t -12	4.16120	2.52868	SIG
-11	VR_t -11	3.5148	2.95001	SIG
-10	VR_t -10	2.3708	2.01562	SIG
-9	VR_t -9	1.86232	2.30562	SIG
-8	VR_t -8	2.4994	2.47109	SIG
-7	VR_t -7	2.5730	2.00892	SIG
-6	VR_t -6	2.17771	2.14243	SIG
-5	VR_t -5	1.8801	2.10376	SIG
-4	VR_t -4	3.3836	1.37641	INSIG
-3	VR_t -3	3.87899	1.83432	INSIG
-2	VR_t -2	5.2892	1.64263	INSIG
-1	VR_t -1	3.2189	1.83818	INSIG
0	VR_t 0	4.42400	2.00844	SIG
1	VR_t +1	1.9820	1.61923	INSIG
2	VR_t +2	2.1237	1.97123	INSIG
3	VR_t +3	2.76612	1.49753	INSIG
4	VR_t +4	4.2051	1.25340	INSIG
5	VR_t +5	3.7993	1.47699	INSIG
6	VR_t +6	2.16550	1.83479	INSIG
7	VR_t +7	2.4786	2.43995	SIG
8	VR_t +8	2.5138	2.41116	SIG
9	VR_t +9	2.64780	1.67945	INSIG
10	VR_t +10	3.0401	1.91880	INSIG
11	VR_t +11	3.5382	1.70593	INSIG
12	VR_t +12	3.16247	2.18156	SIG
13	VR_t +13	3.2182	2.45779	SIG
14	VR_t +14	1.6473	1.49982	INSIG
15	VR_t +15	1.77516	1.53002	INSIG

Table 8: Deletion of firms From LSE-25 index (Volume Ratio)

Event Days	Variable Name	Mean AVs	T-STATISTIC	SIG/INSIG
Test Value 1				
-15	VR_t -15	0.91394	-0.28469	INSIG
-14	VR_t -14	1.0242	0.05795	INSIG
-13	VR_t -13	0.7496	-1.22084	INSIG
-12	VR_t -12	1.25235	0.71921	INSIG
-11	VR_t -11	1.6892	0.93232	INSIG
-10	VR_t -10	1.0188	0.04853	INSIG
-9	VR_t -9	0.68715	-1.41322	INSIG
-8	VR_t -8	0.5671	-2.39535	SIG
-7	VR_t -7	1.0343	0.05849	INSIG
-6	VR_t -6	0.92416	-0.23144	INSIG
-5	VR_t -5	1.0152	0.03619	INSIG
-4	VR_t -4	0.4002	-6.25486	SIG
-3	VR_t -3	1.50616	0.89196	INSIG
-2	VR_t -2	1.6213	1.05641	INSIG
-1	VR_t -1	1.3901	0.53629	INSIG
0	VR_t 0	1.61404	0.84165	INSIG
1	VR_t +1	1.3351	0.49846	INSIG
2	VR_t +2	1.2013	0.38268	INSIG
3	VR_t +3	0.91260	-0.17360	INSIG
4	VR_t +4	0.9063	-0.20102	INSIG
5	VR_t +5	0.7483	-1.20631	INSIG
6	VR_t +6	1.68533	0.90460	INSIG
7	VR_t +7	2.3463	0.78670	INSIG
8	VR_t +8	2.9226	0.92459	INSIG
9	VR_t +9	2.34993	1.99254	SIG
10	VR_t +10	1.8084	0.90693	INSIG
11	VR_t +11	1.9932	1.99913	SIG
12	VR_t +12	1.27545	0.66343	INSIG
13	VR_t +13	0.7772	-0.91615	INSIG
14	VR_t +14	0.7992	-0.49157	INSIG
15	VR_t +15	1.39327	0.57487	INSIG

Figure 1: Values of AAR for added stocks in KSE-100 Index

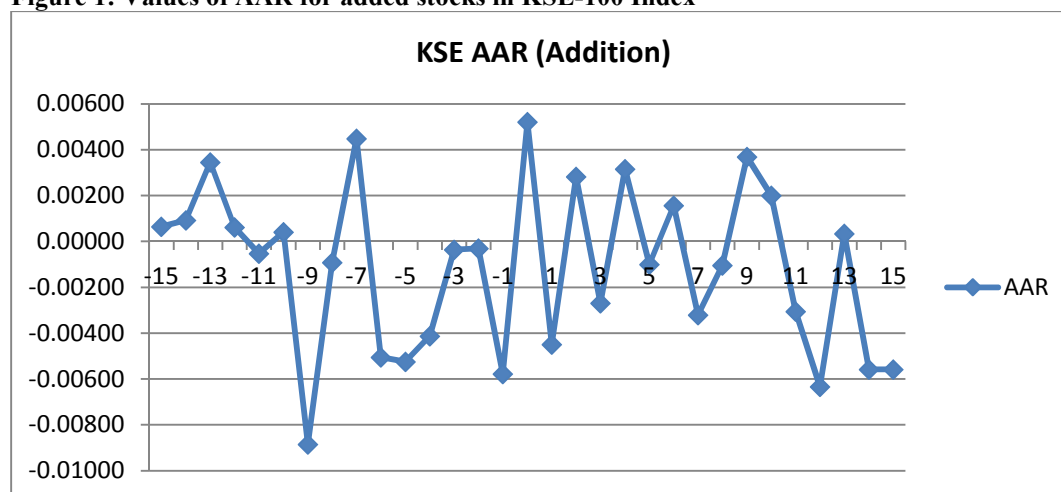


Figure 2: Values of CAAR for added stocks in KSE-100 Index

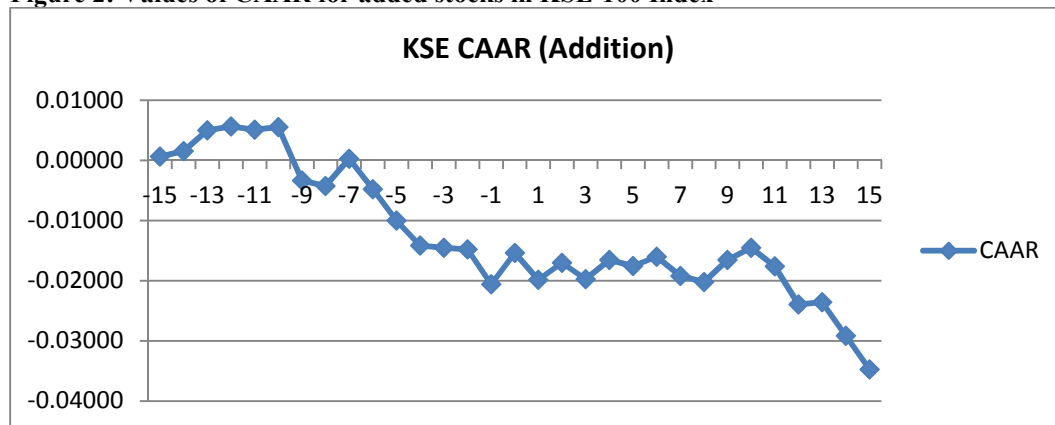


Figure 3: Values of AAR for deleted stocks in KSE-100 Index

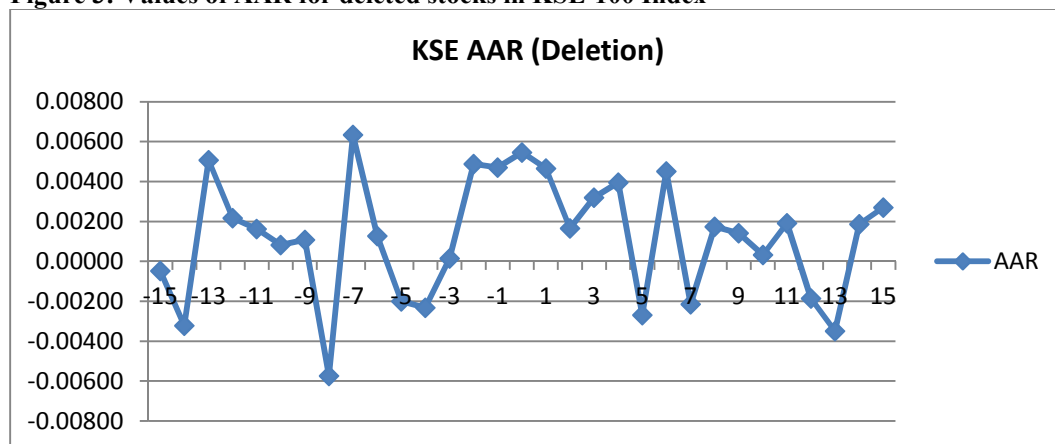


Figure 4: Values of CAAR for deleted stocks in KSE-100 Index

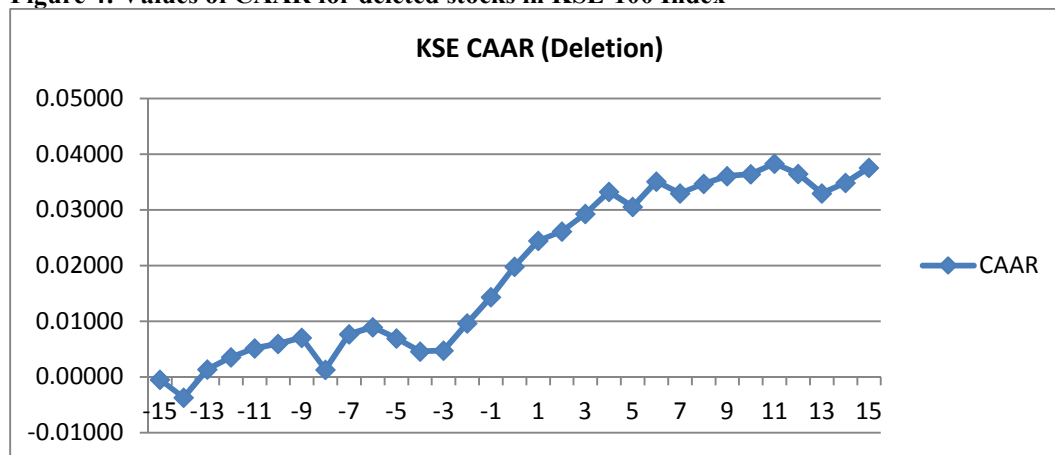


Figure 5: Values of AAR for added stocks in LSE-25 Index

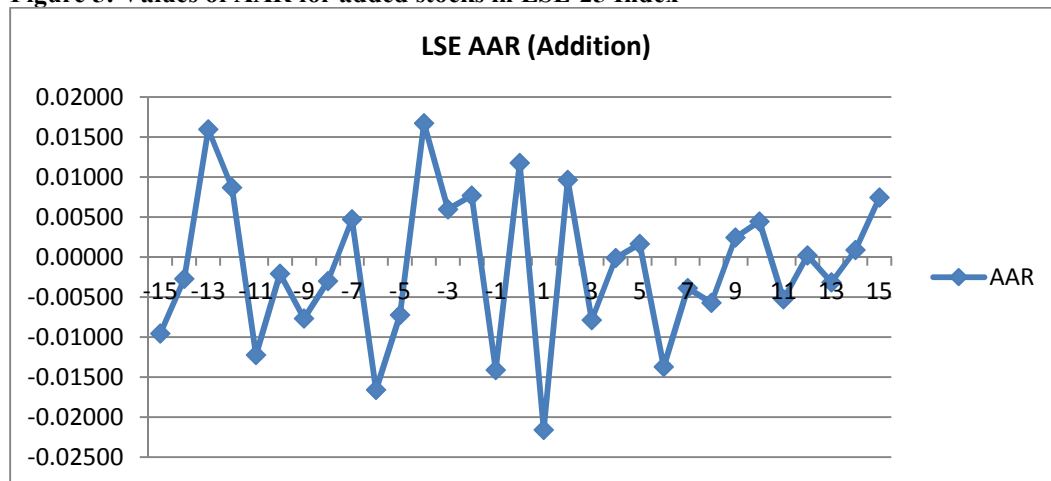


Figure 6: Values of CAAR for added stocks in LSE-25 Index

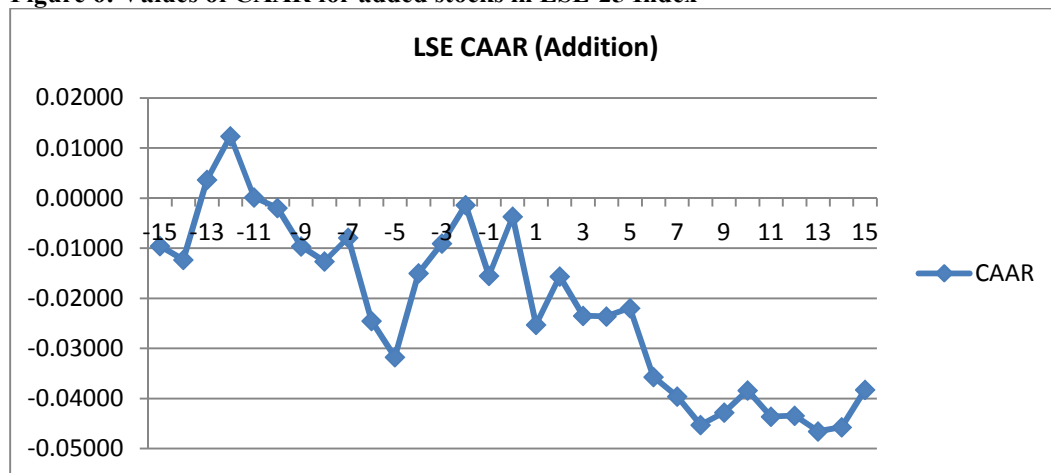


Figure 7: Values of AAR for deleted stocks in LSE-25 Index

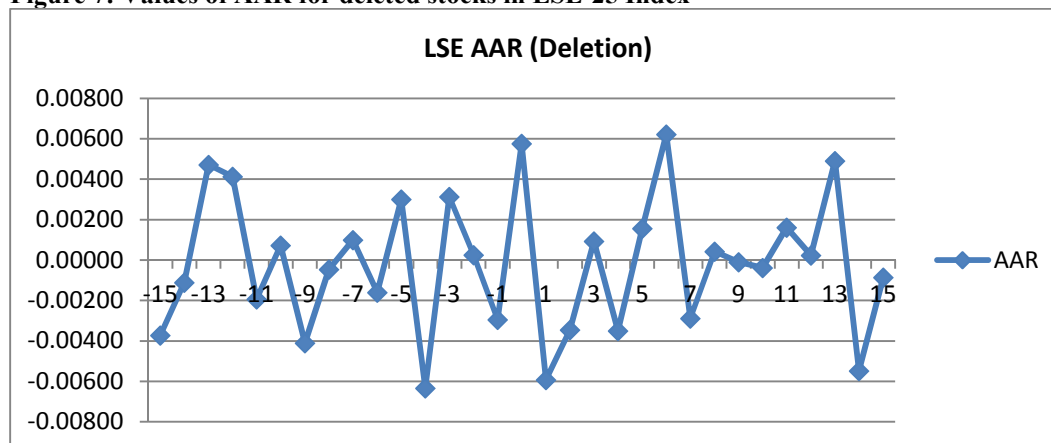


Figure 8: Values of CAAR for deleted stocks in LSE-25 Index

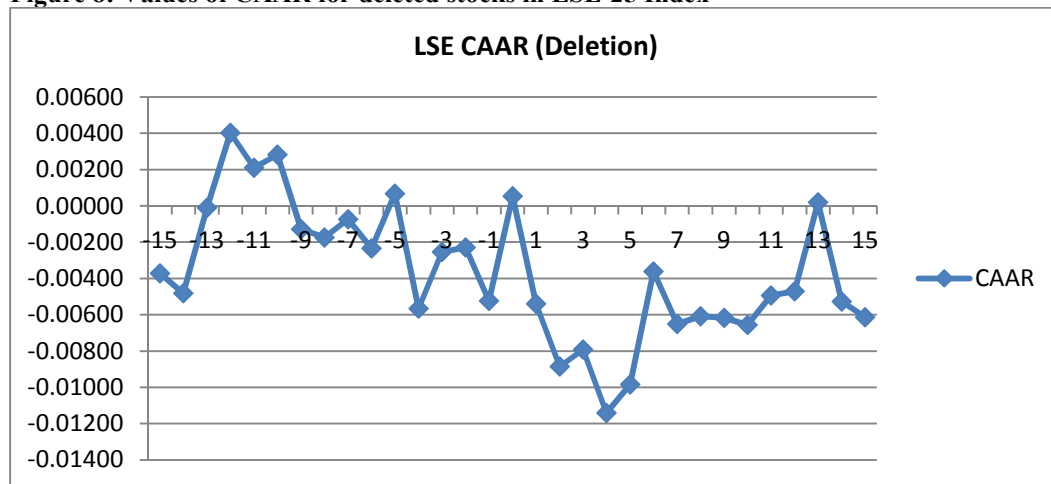


Figure 9: Volume Ratio Results for addition of firms to KSE-100 Index

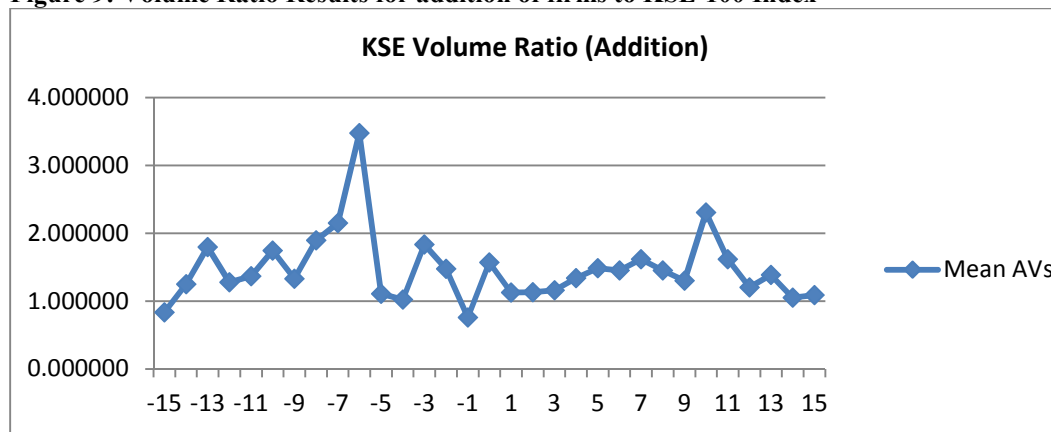


Figure 10: Volume Ratio Results for deletion of firms from KSE-100 Index

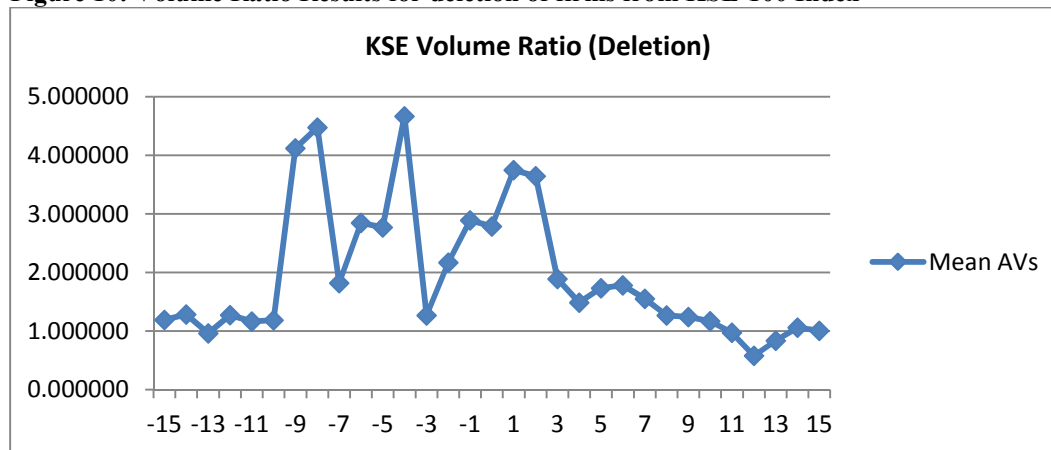


Figure 11: Volume Ratio Results for addition of firms to LSE-25 Index

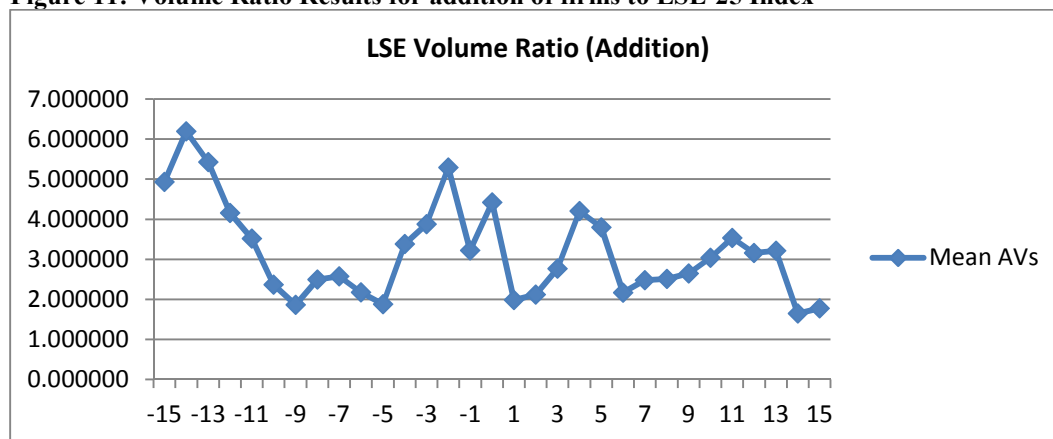


Figure 12: Volume Ratio Results for deletion of firms from LSE-25 Index

