

Do Index Composition Changes Affect Valuation? A Study With Reference To Nifty Index Companies

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ABSTRACT

This study is aimed to study to effect of exclusion from and inclusion into the index on the companies' valuation. The study has the time period of 20 years spanning from 1996-97 to 2015-16. Being the diversified and benchmark index, Nifty 50 index was considered for the study. A total of 126 such events were selected, where a company has been excluded from or included into the index. Event Study Methodology was adopted to find the change in valuations based on return generation during the event period. The value implication of index exclusion and inclusion on stocks involved was on expected lines as the former resulted in downward valuation and the latter resulted in upward valuation. The study evidenced a negative effect on the valuation of the companies excluded from the index, but the effect was short lived and having the absence of excessive downward valuation to confirm the semi-strong form of market efficiency. After having a downward valuation, the excluded stocks recorded reversal as a result of purchase pressure by non index fund investors to purchase recently excluded stocks. In case of inclusion, after having upward valuations, reversal of returns was recorded, with increased selling pressure by the index fund investors. The study in both cases has confirmed the semi-strong form of efficiency.

Keywords: Inclusion, Exclusion, Nifty 50, Company Valuation, Market Efficiency

INTRODUCTION

The Efficient Market Hypothesis (EMH) assumes that the share prices provide all the publicly available information. Therefore the proposition of EMH is that stocks can be sold

or bought at the market price as long as the stock investors believe that there is no secret or private information.

Stock index is a portfolio of stocks that is representative of the entire market or a particular sector or segment of the market. It captures the overall behavior of the equity market and indicates the market trends by showing how a specified portfolio of share prices is moving. A good stock index is one that is well diversified, highly liquid and represents the market. Composition of a stock index is supposed to change. In order to ensure that stock indices reflect the true state of the market, they need to be regularly monitored and revised. Stocks may have to be included to and excluded from the index due to various reasons. Stock index revisions in recent times have become a common phenomenon in almost all the markets worldwide. Change in the Index Composition is vital information for investors as it effects change in portfolio of stocks.

Semi strong form of market efficiency holds that apart from share prices reflect all the historical information and all publicly available information, share prices also reacts quickly to adjust the new information, denoting that it is impossible to beat the market to make abnormal profits by any means, by trading on with new information.

An attempt has been made to analyse the valuation effect of the composition changes in the National Stock Exchange (NSE), by taking Nifty 50 as the proxy of the market as it is a well diversified index and contains the stocks from all the sectors to represent the overall market. Semi-strong form of the market efficiency has also been tested with respect to the index composition changes and the stock valuation.

REVIEW OF LITERATURE

The study reviewed the literature from some developed markets and the literature which was available in India. Duque and Madeira (2004) evidenced temporary positive effects for inclusion and negative temporary effects from exclusion of Stocks of Lisbon's PSI 20 index. Chen et.al (2004) concluded that there was permanent increase in the prices of added firms and no permanent decline for deleted firms in the S&P 500 index. Wurgler (2010) found that stock prices of the stocks that have been deleted from the S & P 500 index had suffered a decrease of more than nine percent in their share prices and which have been added has nearly nine percent increase in their share prices, between 1990 and 2005. Prem (1987) revealed that stock included has experienced an excess return of +3 percent and stock

excluded have experienced negative 1 percent excess returns in S&P 500 index. Parthasarthy (2010) evidenced positive permanent abnormal returns around the index announcements and inclusion in Nifty index. Selvam et.al (2012) found that the market reacted unfavorably to the stocks included and excluded from NSE S&P CNX Nifty Index. Aadil and Rajagopalan (2017) examined the value implication of Metal sector stocks as a result of exclusion and inclusion information and found that the exclusion causes a reduction while inclusion causes an increase in the stock valuation of companies and it was also found the semi strong form of market efficiency in both the cases.

Aatolaet *al.* in their study examined weak and semi strong forms of informational efficiency in EU ETS markets. The study concluded that EU ETS was semi strong informational efficient. Kutchu(2012), in his study tested semi strong form of market efficiency of Indian stock market, using event study methodology, concluded that there was a chance to make abnormal returns and the effect of was company specific. Dharmarathne (2013) undertook a study to examine the efficiency of Sri Lankan share market during the period 1999 to 2005 and concluded that the Sri Lankan share market was semi strong form efficient. Rajagopalan and Shankar (2013) analysed the buyback information impact on the stock returns during different market conditions, having differing implication and concluded that the market was semi strong form efficient.

A majority of work on this area has been done in the developed countries or matured markets like US, Canada, France, and Germany. In India relatively very less research has been done in this subject and only a few studies are available on index composition changes. Moreover the studies in India during the past have taken only a select period. Hence, it is intended to conduct a comprehensive one for the whole period from the inception of the Nifty 50 index to assess the value implication of exclusion from and inclusion of companies.

STATEMENT OF PROBLEM

Stock Markets are playing a vital role in price discovery process of company shares and making the transferability of shares easier. Worldwide, constituting stock indices and updating the price movement of constituent stocks in respective Index has been an accepted practice of following the overall movement of market. Stock indices, otherwise famously called as market portfolio represent the whole market by having considered sufficient number

of stocks fulfilling certain market requirements. Investors are normally interested in following the indices carefully to make their investment portfolio. The concept of efficient markets also plays a vital role in the investment process as it contented that, past, publicly available as well as insider or privately held information do not help much in earning returns in stock markets, in excess of a return generated by market portfolio (index). Index fund managers are interested in taking the risk as of a market to generate a return that is commensurate with market. As a result, Fund managers normally used to follow the index very watchfully to observe any change in composition of market portfolio represented by an index to revise their investment portfolio also.

Indices are subjected to have changes in their composition in terms of companies, which may result in exclusion from (or) inclusion to indices. Exclusion from and inclusion to index normally affect the market dynamics of demand for and supply of such shares excluded or included if the investors are more in the nature of Index Funds investing. The change in the dynamics as a result of exclusion or inclusion would have its own implications on market valuation of such stocks involved in composition changes. An attempt is made in the present research to answer some empirical and vital questions as to whether exclusion of stocks from index resulted in decreased or downward valuations and whether inclusion of stocks to index resulted in increased or upward valuations. Moreover it is also intended to test the price adjustment process of upward or downward valuations in excess of normal returns generated by stocks as a result of exclusion from and inclusion to index to decide about the market efficiency in semi-strong form as exclusions from and inclusion to index are vital information, to lower or upgrade valuations of respective companies involved.

In order to know the valuation impact of exclusion from and inclusion to index, the National Stock Exchange developed, Nifty 50 has been taken as it has wide coverage of industries and acting as a barometer of Indian economy in recent times.

OBJECTIVES OF THE STUDY

1. To enquire into the valuation implication in stocks based on returns around exclusion of companies from the Nifty 50.
2. To study the valuation implication in stocks based on returns around inclusion of companies to Nifty 50.
3. To test whether the stock market is semi-strong form efficient during events of exclusion from and inclusion to Nifty 50.

SCOPE OF THE STUDY

The study is concerned with testing the effect on valuation and the quickness with which the new information gets adjusted in the prices and tests the impact of inclusion to and exclusion of shares from the index. In spite of the fact there are several situations which provide new information having different sort of effect on the stock prices, only the situation of the index composition changes (where the shares are included or excluded) have been taken up for the study. The study has taken the Nifty 50 as the core index and the change in the index is taken in the present study. The study also examined the effect of the index composition changes on the stock valuation of the companies in Nifty 50 for excessive downward or upward valuation to test the semi-strong form of the market efficiency was also tested.

STUDY PERIOD

The study on index composition changes aimed at taking the changes from the inception of Nifty 50 from 1994-95. But data related to the changes in the composition were available from 18th September 1996 only. Therefore the study period is based on twenty years having full data, spanning from 1996-97 to 2015-16.

METHODOLOGY**Exclusion from and Inclusion into the Index**

The study has been taken to examine the effect of Index composition on the companies' stock valuation. Change in the composition of Nifty 50 Index means the exclusion from and inclusion in the index. A stock is being included in the index after being scrutinized for the eligibility criteria and excluded after failing to perform under the required standards. Hence the exclusion and inclusion were taken up as "Events."

Being the Benchmark Index, Nifty 50 was taken up for the study. All the events from the foundation of the index have been considered for the study. The dates of events and the share prices of the concerned companies have been collected from Prowess, Capital Line and NSE official website and verified for similarity. The data sets for analyzing the returns around the exclusion and inclusion dates were formed by applying the following criteria:

- a) The companies excluded and included should belong to the Nifty 50 index.

- b) Daily closing stock price data over a period of 261 days before the event date and 10 days after the announcement date should be available from the data bases.
- c) The companies selected based on the above criteria did not have event clustering during the event window. In other words, no other event except the exclusion/inclusion related has been made during the event window of the selected companies.

Event Study Methodology as suggested by Craig A. Mackinlay has been used to analyze the returns around the select event and the following procedure has been followed.

Step 1: The exclusion or inclusion dates of the companies were kept as “event day”. 20 days surrounding the event day [10 days before (-10) and 10 days after the event day (+10)] have been taken as “event window.” 250 days prior to the first day of the event window i.e. -261 day to -11 days before the event day has been taken as the estimation window.

Step 2: Nifty 50 returns were taken as the proxy of the market, representing a widely diversified portfolio.

Step 3: Returns of 250 days during the ‘estimation window’ of the respective shares’ returns (R_j) were regressed against the Nifty 50 returns (R_M) to determine the constant and the regression coefficient in order calculate the expected returns during the event window (Market Model).

Step 4: The Difference between the actual returns and the expected returns (as computed in step 3) during the event window is considered as ‘abnormal returns’ (ARs).

Step 5: Average Abnormal Returns (AARs) were calculated across stocks by taking simple average of the companies considered throughout the event window, on a day basis.

Step 6: Cumulative Average Abnormal Returns (CAARs) were also calculated. The Average Abnormal Returns in all the trading days in the event window and Cumulative Average Abnormal Returns during the event window were analyzed by using ‘t’ test to identify whether they are statistically different from zero to identify the statistically significant abnormal returns, representing excessive downward or upward valuation in the context of value implication.

CALCULATIONS

The Return of individual securities are calculated as

$$R_{jt} = (P_{jt} - P_{jt-1}) / P_{jt-1}$$

Where, R_{jt} is the returns of security ‘j’ at time ‘t’

P_{jt} is the price of security 'j' at time 't'

$P_{j,t-1}$ is the price of security 'j' at previous time observed

In order to calculate the expected return during the event window, based on the constant and regression coefficient during the estimation window (250) days, the following regression is used.

$$R_{jt} = \alpha_j + \beta_j R_{mt} + \varepsilon_{jt}$$

Where, R_{jt} is expected return of security j on day 't'

α_j is intercept term for security 'j'

β_j is systematic risk component of security 'j'

R_{mt} is return on the market portfolio of the Nifty 50 on day 't'

ε_{jt} is white noise error term of security 'j' on day 't' having zero mean and constant variance

The Abnormal Returns are calculated as,

$$AR_j = R_{jt} - R_{mtj}$$

Where, AR_j is Abnormal Return of the security 'j'

R_{mtj} is the Return of the security 'j' at time 't' arrived at after regressing security return with market returns R_{mt} and

$$R_{mt} = (I_{mt} - I_{mt-1}) / I_{mt-1}$$

Where, I_{mt} is Closing Market Index at time 't'

I_{mt-1} is Closing Market Index at previous time observed

The Average Abnormal Returns (AARs) in step 5 for event days observed in the event window across stocks are calculated as,

$$AAR_t = \left(\frac{1}{n}\right) \sum_{j=1}^n AR_{jt} = (AR_{j1} + AR_{j2} + \dots + AR_{jn}) / n$$

Where, AAR_t is Average Abnormal Returns at time 't' for the sample stocks

AR_{j1} is Abnormal Returns observed in security 1 at 't'

AR_{j2} is Abnormal Returns observed in security 2 at 't'

AR_{jn} is Abnormal Returns observed in security n at 't'

Cumulative Average Abnormal Returns (CAARs) are the sums of daily Average Abnormal Returns (AARs) during the event window

$$CAAR_t = \sum_{t=-k}^{+k} (AAR_t)$$

Where, -k to +k denotes -10 to +10 during the event window

While the Average Abnormal Returns (AARs) are used to analyse the information content of changes in composition of index and Cumulative Average Abnormal Returns (CAARs) are used to analyse the adjustments of prices to new information. In order to check the efficiency of market student 't test' has been applied to know whether the Average Abnormal Returns and the Cumulative Average Abnormal Returns did not differ significantly from zero by framing the following null hypotheses.

$$H_{01}: AAR_t = 0$$

The test statistics is

$$t = \sqrt{N} \frac{AAR_t}{S_t} \sim t_{N-1}$$

$$H_{02}: CAAR_t = 0$$

The test statistics is

$$t = \sqrt{N} \frac{CAAR_t}{S_t} \approx N(0,1)$$

SAMPLE METHOD AND SIZE

Purposive sampling method was adopted by identifying companies excluded from and included to Nifty 50. The total of 167 events (83 Exclusion and 84 Inclusion) had occurred during the study period from 1996-97 to 2015-16. The number of companies which have not been included for the study due to non availability of price data was 32 (16 Exclusion and 16 Inclusion). The events eliminated from the study, due to Event-Clustering, were 9, 4 of them were exclusion events and 5 were inclusion events. So, the total number of events left out from the study, due to the unavoidable reasons was 41, out of which 20 were exclusion events and 21 were inclusion events. Finally, the study selected a total of 126 events, 63 each of exclusion events and inclusion events, and is presented below in Table 1.

Table 1
Sample Size

Total Events:	167	
	Exclusion	Inclusion
Total Events from 1996-97 to 2015-16	83	84
Events left out due to Non availability of Data	16	16
Events eliminated due to Event-Clustering**	04	05
So the Total Number of Events Selected	63	63

*Tata Motor Ltd DVR is being included on 4th January 2016 only, making it an index of 51 Stocks, hence not been considered for the study.

** Event Clustering means the stocks have more events other than exclusion or inclusion in the event window, e.g. Merger and Acquisitions, Dividend Announcements, Demergers, Quarterly Earnings Announcements, Stock Split.

Source: Compiled by the Researcher from the data Collected from NSE Website

So the total number of event selected (both Exclusion & Inclusion): **126**

RESULTS AND DISCUSSION

Stock Valuation around Exclusion Day

Exclusion of a company from an index is an event which is believed to have the enough information content to affect the prices of shares. An attempt has been made by the researcher to examine the valuation effect of exclusion of the stocks from the nifty 50 index in the national stock exchange, and has been spotlighted in the proceeding paragraphs.

The AAR and CAAR with the respective values along with statistical significance, at 1 per cent, 5 per cent and 10 per cent levels are analysed for exclusion for the data set of sixty three (63) companies considered for the study during the event window and are presented in Table 2.

It is observed that the event day generated negative AAR of 0.122 per cent which was not significant showing that the exclusion from the index had adversely affected the companies' valuation during the pre-event period. On the -4th day AAR of 0.850 per cent was observed, which was significant at 5 per cent level, showing that there was a reduction in the valuation. Except for this day (-4th), mixed reaction of exclusion on the market valuation was found during the pre-event window. During the post-event period no significant AAR was found supporting the semi-strong form of market efficiency. The effect of exclusion was observed from - 4th to the + 3rd day of the event window.

Table 2
AARs and CAARs of the Excluded Companies

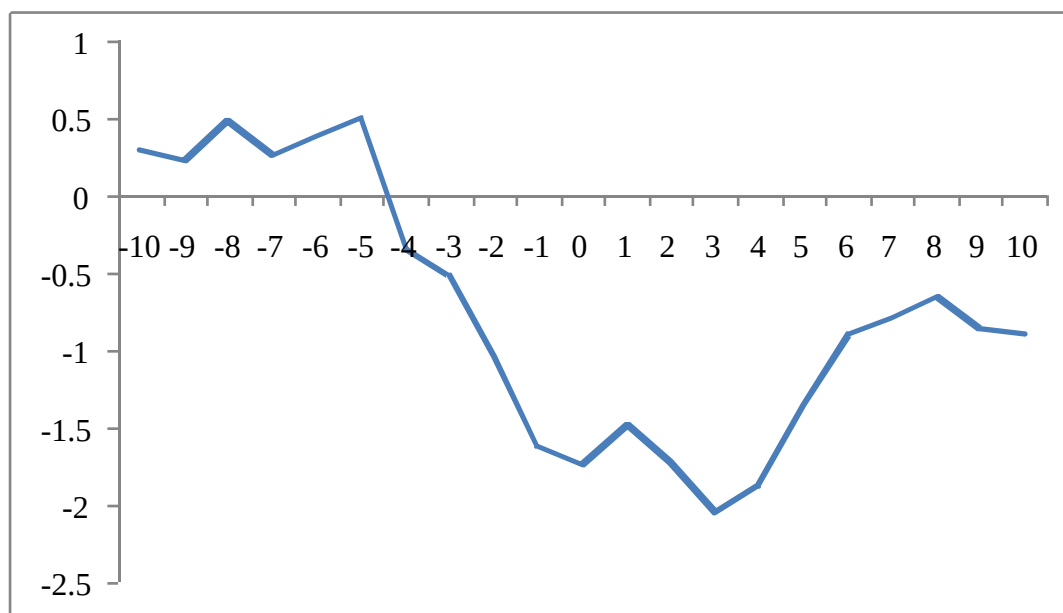
DAYS	AAR	t-statistics	p-value	CAAR	t-statistics	p-value
-10	0.309	0.836	0.406	0.309	0.836	0.406
-9	-0.070	-0.219	0.827	0.240	0.448	0.656
-8	0.259	0.799	0.427	0.498	0.753	0.454
-7	-0.235	-0.85	0.399	0.263	0.413	0.681
-6	0.133	0.377	0.708	0.396	0.573	0.568
-5	0.114	0.312	0.756	0.510	0.605	0.547
-4	-0.850	-2.468^b	0.016	-0.341	-0.387	0.7
-3	-0.160	-0.586	0.56	-0.501	-0.569	0.571
-2	-0.542	-1.415	0.162	-1.043	-1.055	0.295
-1	-0.568	-1.585	0.118	-1.611	-1.505	0.137
0	-0.122	-0.381	0.704	-1.733	-1.701^c	0.094
1	0.264	0.741	0.462	-1.470	-1.338	0.186
2	-0.249	-0.885	0.379	-1.718	-1.634	0.107
3	-0.324	-0.995	0.324	-2.042	-1.788^c	0.079
4	0.167	0.504	0.616	-1.875	-1.537	0.129
5	0.519	1.226	0.225	-1.356	-1.022	0.311
6	0.468	1.124	0.265	-0.888	-0.628	0.532
7	0.102	0.259	0.796	-0.786	-0.532	0.597
8	0.137	0.422	0.675	-0.649	-0.407	0.686
9	-0.211	-0.946	0.348	-0.860	-0.523	0.603
10	-0.019	-0.075	0.94	-0.879	-0.522	0.603
a-Significant at 1% level, b-Significant at 5% level and c-Significant at 10% level						

Source: Compiled from Data collected from the www.nse.com

On the event day negative CAAR of 1.733 per cent was observed which was significant at 10 per cent level. No significant CAAR was found during the pre-event period. On the +3rd day during the post event period, a negative CAAR of 2.042 per cent was observed, which was significant at 10 per cent. The effect of exclusion was persistent from the -4th day. It may be because of the information available to the market about the exclusion of the companies. The transformation of CAAR into negative in the post event period from positive in the pre-event period was empirical evidence that the information content in the exclusion had negatively affected the market valuation of the companies and the negative effect was sustained to a fair extent at the end of event window. The CAAR from the -4th day in the pre-event window turned to negative and the reduction in the valuation continued up to +10 day in the post event window. By observing only the two days with statistically significant CAARs (-4th day and +3rd day) that too at 10 percent level, the results supported

the semi-strong efficiency of the market and the effect of exclusion of companies from the index resulted in reduction in valuation of such excluded companies. The reduction in valuation is attributed to index fund phenomenon and it is also observed that there was a reversal of valuation reduction in quantum during the post event window, which might be attributed to purchase of stocks of recently excluded companies by investors on their portfolios. The CAARs of the exclusion are presented graphically in Figure 1

Figure 1
CAARs of the Excluded Companies



Source: Table 2

Stock Valuations around Inclusion Day

It is assumed that when a company is added to an index in the stock exchange, its share price has reacted positively. Wurgler(2010) has inferred that the stocks which have been added to the S & P 500 index, has nearly nine percent increase in their share prices, between 1990 and 2005. Same type of attempt has been made to explore the reaction of the stocks prices when the stocks are added to the nifty 50 index, in national stock exchange during 1996-97 to 2015-16. The following paragraphs elaborate the reaction of the share prices on the inclusion of the stocks in the index.

The AAR and CAAR with the respective values along with statistical significance at 1 per cent, 5 per cent and 10 per cent levels are analysed for the data set for inclusion for 63 companies considered for the study during the event window and is presented in Table 3.

Table 3
AARs and CAARs of the Included Companies

DAYS	AAR	t-statistics	p-value	CAAR	t-statistics	p-value
-10	0.109	0.234	0.816	0.109	0.234	0.816
-9	0.050	0.147	0.884	0.160	0.261	0.795
-8	-0.216	-0.648	0.519	-0.056	-0.075	0.94
-7	0.180	0.519	0.606	0.124	0.166	0.869
-6	-0.359	-1.362	0.178	-0.236	-0.285	0.777
-5	0.167	0.541	0.591	-0.068	-0.077	0.939
-4	-0.182	-0.414	0.68	-0.250	-0.26	0.796
-3	0.429	0.809	0.422	0.179	0.171	0.864
-2	0.245	0.722	0.473	0.424	0.376	0.708
-1	0.339	0.931	0.355	0.763	0.629	0.532
0	0.646	1.609	0.113	1.409	1.109	0.272
1	-0.383	-1.131	0.262	1.027	0.81	0.421
2	-0.293	-0.883	0.381	0.734	0.524	0.602
3	-0.660	-2.146^b	0.036	0.074	0.053	0.958
4	-0.297	-0.813	0.419	-0.222	-0.156	0.877
5	-0.332	-0.838	0.405	-0.554	-0.37	0.712
6	0.151	0.553	0.582	-0.403	-0.253	0.801
7	-0.048	-0.151	0.881	-0.451	-0.274	0.785
8	0.261	0.787	0.434	-0.189	-0.111	0.912
9	-0.189	-0.272	0.787	-0.379	-0.19	0.85
10	0.109	0.221	0.826	-0.269	-0.14	0.889
a-Significant at 1% level, b-Significant at 5% level and c-Significant at 10% level						

Source: Compiled from Data collected from the www.nse.com

The event day recorded an AAR of 0.646 per cent, which was not significant showing that on the day of inclusion, the effect was positive but the presence of abnormal returns was ruled out. During the pre-event period there was no such AAR which was significant and for 7 days the effect was positive. The positive effect on the event day had reversed on the next day and on +3rd day negative AAR of 0.659 per cent, was found which was significant at 5 per cent level, showing the negative effect and the scope of abnormality of returns also. During the post-event period there was the majority of negative effect with 7 day of negative AAR, which implies that the positive effect during the pre-event period had reduced and reversed into the negative effect during the post event period. The inclusion of companies to index did not affect the valuation abnormally but AAR of 0.109 percent turned to 0.646 percent on the event day suggests that the inclusion information had little information content

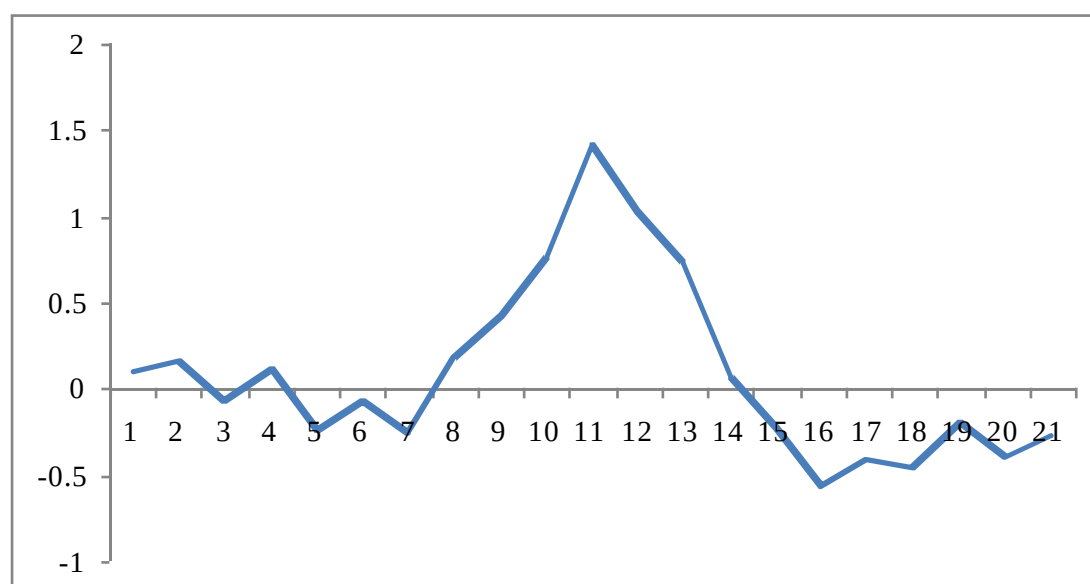
to boost up the valuations. A near same AAR of negative 0.660 percent on +3rd day denoted quick reversal in valuations. It means the inclusion to index information effect was only short lived and the new valuation did not persisted. In spite of the fact that the valuations got increased to a certain extent and got reversed within 3 days (day 0 and +3rd day), it did not offer any scope for abnormality except on the negative side on + 3rd day.

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An observation of the CAARs has revealed that no significant CAAR was recorded during the event window of 21 days. The event day observed a CAAR of 1.409 per cent, which was not significant. During the pre-event period six CAARs were positive and the remaining were negative. The effect was persistent from the -3rd day up to the event day. The positive effect before the actual event day can be attributed to the reason that the information is being available about the inclusion in the market. During the post-event period the CAAR was negative for 7 days and the remaining were positive. The shift of trend of the positive CAARs from pre-event period into the negative CAARs during the post-event period showed that the effect was temporary and it was negotiated by the adjustment of information into the prices. The overall effect can be better understood by studying the CAARs which have changed from 0.109 per cent on -10th day, through 1.409 per cent on event day to

negative 0.269 per cent on the last day of event window. The cumulative effect of valuation observed through CAARs hinted that the purchase pressure phenomenon from -3rd day to +1st day caused the increase. The reduction in valuation (reversal of increased valuations) was attributed to sell pressure phenomenon to cause reversal to original valuations. The non-statistically significant CAARs supported semi strong efficiency of the market; thereby did not allow any abnormality in return generations as a result of inclusion to index. The CAARs of the inclusion are presented graphically in Figure 2.

Figure 2
CAARS of the Included Companies



Source: Table 3

CONCLUSION

Change in the composition of an index provides a unique opportunity to study the various effects caused. The study is aimed to study to effect on the companies' valuation due to the change in the composition of the index. The study was conducted for the period of 20 years spanning from 1996-97 to 2015-16, taking the Nifty 50 index as the proxy of the market. A total of 126 such events were selected, where a company has been excluded from or included into the index. The value implication of index exclusion and inclusion on stocks involved was as expected lines as the former resulted in downward valuation and the latter resulted in upward valuation. The study evidenced a negative effect on the valuation of the

companies excluded from the index, but the effect was short lived and having the absence of excessive downward valuation to confirm the semi-strong form of market efficiency. After having a downward valuation, the excluded stocks recorded reversal as a result of purchase pressure by non index fund investors to purchase recently excluded stocks. In case of inclusion, after having upward valuations, reversal of returns was recorded, with increased selling pressure by the index fund investors. Both the downward valuation of stocks excluded and upward valuation of stocks included did not sustain even during a short period considered. This is the result of active participation of index funds and non index funds investors and the value exchange had occurred among them. The study in the both cases has confirmed the semi-strong form of efficiency.

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