

# Do Telecom Sector Stocks Respond to Index Calls? An Empirical Analysis of Exclusion and Inclusion in Nifty

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ARTICLE INFO	ABSTRACT
Received: 02-04-2021 Received in revised form: 20-05-2021 Accepted: 24-05-2021 Available online: 30-06-2021	Stock Market Efficiency has been a topic of study for more than a half century and the contention that markets are very efficient in incorporating new information very quickly has been one of the established facts. In the year 2013, E. F. Fama got the Nobel Prize for his contribution to the field of stock market studies termed as Efficient Market Hypothesis (1970) and of the opinion that no investor is smart to make a better return than the market and it is better to run with the market portfolio (Index) and advocated the
<b>Keywords:</b> Index Composition; Nifty; Telecom sector; Abnormal Returns; Market Efficiency.	concept of maex runds to have a parity of fisk with feturits when the portfolio manager selects Index Funds for investing. Index Fund Investing i a commonly followed practice worldwide. Investing in index funds is extremely popular among fund manager and the telecom sector is one o India's fastest-growing industries. It is intended to study the effect o Telecom sector stock exclusion from and inclusion to Nifty index by taking a period of twenty years from inception of Nifty. Event Study Methodolog was adopted to observe any abnormality in return generation and it is found that exclusion from Nifty resulted in reduced return generation as a resul of reduction in valuations and increased returns were observed in case o inclusion to Nifty to evidence the importance of telecom sector in the index The non-sustainability of event impact during post event period evidenced semi strong form of market efficiency.

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#### **1.0 INTRODUCTION**

Stock market indices are regarded as measures of economic growth and capital allocation. Fama (1970) propounded the concept of Stock market efficiency by proving that the market reflects all historical information proved by random nature of share prices and claimed that the market is in its weak form of efficiency. Market assimilates any new information very quickly and found that there

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is no smart way to make any returns in excess the market and termed it as Semi-strong form of efficiency. He was the expert who recommended the index fund approach to invest in line with the market portfolio for which he was awarded the Nobel in Economic Sciences in 2013. Worldwide stock market indices play a vital role in having Index Fund Portfolios, an investment allocation exercise in which the fund managers are interested in having their portfolios as of the market so that they can reap the return in line with the market. Therefore, the fund managers are in constant touch with index and companies form index to balance their portfolios whenever a composition change occurs in index. The companies included in index are expected to have better returns as a result of index fund purchases by fund managers thereby increasing the demand for such included companies shares.

Telecom sector in India consist of telephone, internet and television broadcast activities and there are 1.21 billion telephone/mobile phone users in India, which makes it the world's second-largest industry. The growth of Telecom industry in India has been quite phenomenal to have a compound average growth rate of 20% in the first 15 years of the current century. Since the Telecom sector also form part of index participation, the present study is indented to explore into the index composition change of telecom sector shares as a result of exclusion from and inclusion to Nifty Index.

#### **1.1 Review of Literature**

The study reviewed the literature from some developed markets and the literature which was available in India concerning market efficiency in general and index composition changes in particular.

Rajagopalan (2019) listed detailed historical information content in stock prices by covering a period of more than 80 years to support the weak form efficiency. In their study, Aatola *et al.*, (2010) the weak and semi-strong forms of efficiency of information in EU ETS markets has been examined. The study concluded that EU ETS was semi-strong informational efficient. Likely, Kutchu (2012) has tested the semi-strong form of Indian stock market efficiency, using event study methodology, concluded that there was a chance to make abnormal returns and the effect 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, 2012a; Rajagopalan and Shankar, 2012b; Rajagopalan and Shankar, 2013) analysed the buyback information impact on the stock returns in Indian stock market to find undervaluation signaling particularly on buybacks offered through open market purchases and differing returns during different market conditions, having differing implication and concluded that the market was semi strong form efficient. Market efficiency in semi strong form was very well documented by Rajagopalan again (Rajagopalan, 2014; Rajagopalan, 2015) in case of a shocking news outbreak with respect to Satyam Accounting Scam and related information.

A study by Duque and Madeira (2004) found that the inclusion of the Stocks of Lisbon's PSI 20 index had temporary positive effects, while its exclusion had temporary negative effects. Chen *et al.*, (2004) have revealed that prices of newly included companies in the S&P 500 index increased over time, but declined over time for the companies that were dropped from the 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". Jain (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 unfavourably to the stocks included and excluded from NSE S&P CNX Nifty Index. (Baba and Rajagopalan, 2017; Baba and Rajagopalan, 2019; Baba and Rajagopalan, 2020) 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. They found reduction in valuation as a result of exclusion of Industrial Equipment sector stocks form Nifty and observed upward trend in prices as a result of inclusion of Entertainment sector stock from the same index.

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 in Telecom sector.

#### **1.2 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 Telecom stocks 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.

## 1.3 Objectives of the Study

- 1) To enquire into the valuation implication in stocks based on returns around exclusion of telecom companies from the Nifty 50.
- 2) To study the valuation implication in stocks based on returns around inclusion of telecom companies to Nifty 50.
- 3) To test the stock market efficiency during events of exclusion from and inclusion to Nifty 50.

## 1.4 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 telecom companies in Nifty 50 for excessive downward or upward valuation. Semi-strong form of the market efficiency was also tested.

## 1.5 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.

## **2.0 METHODOLOGY**

## 2.1 Exclusion from and Inclusion into the Index

The study has been undertaken to know the effect of inclusion to and exclusion from Index 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 analysing 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.

#### 2.2 Selection of Companies in Telecom Sector

The selection of sample companies in Telecom sector was done very carefully by adopting purposive sample method. During the study period, a total of 10 events in telecom sector (4 exclusions and 6 inclusions) took place and accordingly the 10 events and the companies involved were considered for the study.

## 2.3 Event Study Methodology

Event Study Methodology suggested by Mackinlay (1997) has been used to analyse the returns around the select event and the following procedure has been followed as prescribed by Rajagopalan and Shankar (2012a).

**Step 1:** The firms' exclusion or inclusion dates were retained as "event day". The "event window" has been defined as the 20 days prior and after the event day [ before 10 days (-10) and after 10 days (+10)]. The estimate window has been defined as 250 days earlier to the first day of the event window, or -261 days to -11 days prior to the event day.

**Step 2:** The results of Nifty 50 were taken as a market proxy, since it represents a widely diversified portfolio.

**Step 3:** 250 days returns of the relevant shares' return (RJ) during the 'estimation window' were regressed against the Nifty 50 returns (RM) to obtain the constant as well as coefficient of regression in order to compute the anticipated returns throughout the event window (Market Model).

**Step 4:** The variation of actual and predicted returns (as calculated in step 3) throughout the course of the event window is referred as the 'Abnormal Returns' (ARs).

**Step 5:** On a day basis, Average Abnormal Returns (AARs) were computed across stocks by taking a good average of the companies examined during the event window.

**Step 6:** CAARs (Cumulative Average Abnormal Returns) were also evaluated. In the event window, the Average Abnormal Returns as well as Cumulative Average Abnormal Returns were analysed using 't' test to determine whether they are statistically different from zero to identify statistically significant abnormal returns, indicating extreme decreasing or increasing valuation in the context of value implication.

#### **3.0 CALCULATIONS**

The Return of individual securities are calculated as

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

Where,  $R_{st}\,is$  the security returns 's' at time 't'

 $P_{st} \mbox{ is the security price 's' at time 't' }$ 

 $P_{\text{st-1}}$  is the price of security 's' at previous time observed

The following regression equation is used to estimate the returns in the event window based on estimated constant and coefficient.

$$R_{st} = \alpha_j + \beta_s R_{mt} + \varepsilon_{st}$$

Where,  $R_{st}$  represents the predictable security return 's' on day 't'

 $\boldsymbol{\propto}_s$  is the term intercept for security 's'

 $B_{\text{s}}$  is a component of security 's' that represents systematic risk.

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

 $\epsilon_{st}$  is noisy term of error of security 's' on day 't' with a constant variance and zero mean.

The Abnormal Returns are calculated as,

$$AR_s = R_{st} - R_{mts}$$

Where, AR<sub>s</sub> is Abnormal Return of the security 's'

 $R_{st}$  is the Return of the security 's' at time 't' arrived at after regressing security return with market returns  $R_{mts}$  and

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

Where, I<sub>mt</sub> is Closing Market Index at time't'

I<sub>mt-1</sub> 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,

$$AAR_{t} = \left(\frac{1}{n}\right)\sum_{s=1}^{n} AR_{t} = \frac{(AR_{s1} + AR_{s2} + \dots + AR_{sn})}{n}$$

Where, AAR<sub>t</sub> is Average Abnormal Returns at time 't' for the sample stocks

AR<sub>s1</sub> is Abnormal Returns observed in security 1 at 't'

AR<sub>s2</sub> is Abnormal Returns observed in security 2 at 't'

AR<sub>sn</sub> is Abnormal Returns observed in security n at 't'

CAARs are the simple sum of daily AARs throughout the event period.

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

Where, during the event window -10 to +10 is denoted by -k to +k

In composition of index, the information content of changes is analysed by using AARs (Average Abnormal Returns). The changes of prices to new information are analysed by using CAARs (Cumulative Average Abnormal Returns). A student 't test' was used to assess the effectiveness of the market. The goal is to determine whether there are any AARs and CAARs. The null hypothesis is used to ensure that the AARs and CAARs statistically insignificant from "0".

 $H_{01}: AAR_t = 0$ 

The test statistics is

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

 $H_{02}$ : CAAR<sub>t</sub> = 0

The test statistics is

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

#### 3.1 Exclusion Effect of Telecom Sector Companies

The AAR and CAAR, together with their corresponding values and statistical significance at 1%, 5 % and 10 % levels, are examined for the exclusion of four (04) telecom sectors are included for the research throughout the event period and are given in the Table 1.

Out of the 21 day considered, there were significant AARs observed for 2 days. The event day observed an AAR of negative 1.444 % which was significant at 5 % levels means that the exclusion had negative impact on market valuation and also there was an abnormal return. During the preevent period, on -3<sup>rd</sup> day there was a negative AAR of 1.294 % significant at 10 % level, which denoted that there was negative effect as well as abnormal returns. But during the post-event period though there were some high negative AARs but none of them were found significant, indicating that though there had been some negative impact but no abnormality of returns was found.

DAYS	AARs	t-value	Sig.	CAARs	t-value	Sig.		
-10	0.447	0.402	0.714	0.447	0.402	0.714		
-9	-1.097	-1.396	0.257	-0.649	-0.633	0.572		
-8	3.343	2.216	0.114	2.694	3.811 <sup>b</sup>	0.032		
-7	-0.510	-0.799	0.483	2.184	2.611 <sup>c</sup>	0.080		
-6	-0.443	-0.444	0.687	1.740	1.401	0.256		
-5	0.344	0.910	0.430	2.085	1.355	0.268		
-4	-1.537	-1.084	0.358	0.547	0.250	0.819		
-3	-1.294	-2.753c	0.071	-0.746	-0.336	0.759		
-2	-1.075	-1.583	0.212	-1.821	-0.663	0.555		
-1	0.091	0.038	0.972	-1.730	-0.355	0.746		
0	-1.444	-3.352 <sup>b</sup>	0.044	-3.175	-0.629	0.574		
1	0.475	0.419	0.703	-2.700	-0.579	0.603		
2	-0.132	-0.381	0.729	-2.831	-0.643	0.566		
3	-0.913	-0.717	0.525	-3.744	-0.882	0.443		
4	-0.868	-0.965	0.406	-4.612	-1.132	0.340		
5	-3.616	-1.334	0.274	-8.229	-1.265	0.295		
6	-0.111	-0.131	0.904	-8.339	-1.394	0.258		
7	-1.188	-0.64	0.568	-9.527	-1.451	0.243		
8	-2.782	-1.225	0.308	-12.309	-1.446	0.244		
9	-0.268	-0.632	0.572	-12.577	-1.516	0.227		
10	0.229	0.303	0.781	-12.349	-1.625	0.203		
"a-Significant at 1% level", "b-Significant at 5% level" & "c-Significant at 10% level"								

Table 1 – AARs and CAARs of the Excluded Telecom Sector Companies

**Source:** The collection of data is compiled from the www.nse.com

The event day observed the CAAR of negative 3.175%, which was not significant. During the pre-event phase there were significant AARs for the 2 days with  $-8^{th}$  day having CAAR of 2.694 % significant at 5 % level and  $-7^{th}$  day having CAAR of 2.184 % significant at 10 % level. The pre-event

period recorded positive CAAR for 6 day and the remaining days observed negative CAARs. The negativity of CAARs increased from 3.175 % on event day to 12.249 % on the last day of the event window. The results of CAAR have shown that the effect was persistent from the -3<sup>rd</sup> day of the preevent period and effect had increased and was sustained to a great extent at the end of the event window. The reduction in the valuation from the -5<sup>th</sup> day of the pre event window continued till the end. The absence of any statistical significance level of CAARs showed that the market was semi strong form efficient, though there were statistically significant positive CAARs for the two days in the pre event window, which were not significant at strict 1% level. The exclusion had information content, but the absorption of information was very smooth to have persistent reduction in the valuation of Telecom stocks and the valuation in valuation was so steep after the event day. The CAARs of the excluded telecom sector companies are presented graphically in Figure 1.



Figure 1 – CAARs of the Excluded Telecom Companies

## 3.2 Inclusion Effect of Telecom Sector Companies

The AAR and CAAR, together with their relative values and statistical significance at 1%, 5% and 10% levels, are examined six (06) telecom sector are included for the research throughout the event period and are given in the Table 2.

Event day observed an AAR of 3.523 % which was insignificant, indicating the good amount of favourable effect of inclusion but no abnormality of returns was found on the day. Out of the 21 days the significant AARs were found in 3 days only. There was a mixed reaction, mostly favourable, during the pre-event period. All the significant AARs were observed during the post-event period and they were negative. The significant AARs were, negative 3.010%, at 10 % level of significant, negative 1.995% at 5% level of significant and negative 1.612% at 5% level of significant on +3<sup>rd</sup> day, +4<sup>th</sup> day and +5<sup>th</sup> day respectively. The negative effect was dominant during the post-event period. The results showed that there had been an adverse effect and the abnormal returns were also there, to indicate value reversal in the post event window, but the pre-event results showed that there was a general increased selling pressure in the post event period.

DAYS	AARs	t-value	Sig.	CAARs	t-value	Sig.		
-10	2.213	1.190	0.288	2.213	1.190	0.288		
-9	-1.207	-0.783	0.469	1.006	2.208 <sup>c</sup>	0.078		
-8	0.319	0.370	0.726	1.326	1.572	0.177		
-7	0.482	1.198	0.285	1.807	3.039 <sup>b</sup>	0.029		
-6	-0.647	-0.674	0.530	1.161	1.032	0.349		
-5	0.113	0.206	0.845	1.274	0.993	0.367		
-4	-0.397	-0.412	0.697	0.877	0.466	0.661		
-3	3.377	0.930	0.395	4.254	1.185	0.289		
-2	-1.913	-2.306	0.069	2.342	0.661	0.538		
-1	-0.302	-0.428	0.686	2.040	0.539	0.613		
0	3.523	1.596	0.171	5.563	1.441	0.209		
1	-0.944	-0.694	0.518	4.619	0.964	0.379		
2	-1.085	-1.493	0.196	3.534	0.730	0.498		
3	-3.010	-2.274 <sup>c</sup>	0.072	0.524	0.131	0.901		
4	-1.995	-2.634 <sup>b</sup>	0.046	-1.472	-0.405	0.702		
5	-1.612	-2.673 <sup>b</sup>	0.044	-3.083	-0.881	0.419		
6	0.406	1.065	0.336	-2.677	-0.758	0.483		
7	-0.956	-0.925	0.398	-3.633	-1.03	0.350		
8	-0.292	-0.432	0.684	-3.925	-1.003	0.362		
9	0.263	0.340	0.748	-3.662	-0.860	0.429		
10	-1.891	-1.832	0.126	-5.553	-1.304	0.249		
"a-Significant at 1% level", "b-Significant at 5% level" & "c-Significant at 10% level"								

Table 2 – AARs and CAARs of the Included Telecom Sector Companies

**Source:** The collection of data is compiled from the www.nse.com

An observation of CAARs has indicated that there were significant CAARs for two days during the event window. Event day recorded a CAAR of 5.563 %, showing a positive effect on the date of inclusion. Throughout the period of pre-event, on the -9<sup>th</sup> day and -7<sup>th</sup> day, there was significant CAARs of 1.006% at 10% level of significant and 1.807% at 5% level of significant respectively. During the post-event period, the CAAR reversed from the +1<sup>st</sup> day and the negative effect went on increasing up to the last day of the event window. There was shift from positive effect to the negative from pre-event period to post-event period. The nature of shift can be understood better by the CAARs with CAAR of 2.213% on -10<sup>th</sup> day, CAAR 5.563% on event day and negative CAAR of 5.552 % on the +10<sup>th</sup> day of event window. The valuation had positive implication on the event day but the effect on valuation was very adverse from the post event day till the end. The only two statistically significant CAARs, those too at 5 % and 10 % levels confirmed the semi-strong type of market efficiency. The decreased valuations phenomenon of the post event window can well be attributable to increased selling pressure. The CAARs of the included telecom sector companies are presented graphically in Figure 2.



Figure 2 – CAARs of the Included Telecom Sector Companies

#### **4.0 CONCLUSION**

The study on effect of telecom sector stock exclusion from the benchmark index Nifty showed downward trend in valuation by recording a negative Average Abnormal Return of 1.44%. On the other hand, the shares of included companies recorded a positive Average Abnormal Return of 3.52% thereby showed upward trend in valuations, which was not sustained due to increased selling pressure and documented semi – strong market efficiency. However, the upward effect during inclusion was much higher than the downward effect during exclusion to conclude that the telecom sector has been much celebrated sector with respect to portfolio revision of fund managers, whenever the stocks are included and because of having strong fundamentals, the reduction in valuations are much less when the stocks are being excluded from Nifty.

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