Impact of Inclusion and Exclusion in National Index Nifty50 on Stocks Price: A Statistical Study

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ABSTRACT

This article investigates the impact of stock inclusion and exclusion from the National Index Nifty50 on stock performance. It combines qualitative and quantitative approaches to explore the relationship between financial performance, stock price fluctuations, and the dynamics of the National Index. The article highlights the significance of the National Index as an economic indicator, emphasizing the connection between overall economic performance and the success of enterprises. Utilizing statistical techniques such as the Anova Test, correlation analysis, and regression analysis, the study examines the relationship between stock prices, index prices, and the overall movement of the index. Time series charts are used to visualize stock movements during inclusion and exclusion events. Additionally, the quarterly financial performance of included and excluded stocks is assessed to evaluate their influence on the National Index. Importantly, the study does not aim to predict stock movements or offer investment advice, but instead contributes to the academic understanding of the Indian National Stock Market. By combining qualitative insights with quantitative analysis, this research enhances comprehension of the factors impacting stock price movements and the role of the National Index. The findings provide valuable insights into the relationship between financial performance, stock movements, and the dynamics of the National Index, paving the way for further research in this field.

Keywords: *National Index; Nifty 50; Stock performance; Financial indicators; Market dynamics; Quantitative analysis.*

INTRODUCTION

The National Index is a crucial indicator of a nation's economic performance, reflecting the overall health and progress of its economy. As the backbone of any nation's economy, the enterprises, industries, and companies play a pivotal role in determining the nation's economic well-being. A direct correlation exists between a nation's economic prosperity and the performance of its companies and industries. Hence, the financial performance of individual companies serves as a reliable measure of the overall success of an enterprise.

Considering the significance of financial performance in evaluating the health of enterprises, it can be deduced that the financial performance of companies directly affects their inclusion or exclusion from the National Index Nifty50. The National Index, being a representation of the nation's economy, is highly dependent on the performance of its constituent companies. Therefore, the inclusion or exclusion of a company from the National Index should logically be influenced by its financial performance.

To gain a deeper understanding of the effects of inclusion and exclusion from the National Index Nifty50, it is essential to study the price and volume movement of stocks both before and after these events. Such analysis provides valuable insights into how the inclusion or exclusion from the Nifty50 impacts stock performance. By analyzing the price and

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volume trends surrounding these events, it becomes possible to gauge the extent of influence exerted by inclusion or exclusion on the stock movement.

Furthermore, examining the effects of both inclusion and exclusion from the National Index offers valuable insights into whether these events genuinely impact stock movement or if the movement is predominantly driven by a company's financial performance. By studying the relationship between inclusion/exclusion (Hence forth called as '***event***') and stock movement, it becomes possible to assess whether the National Index serves as a catalyst for stock fluctuations or if stock movement is primarily based on the financial performance of the respective companies.

METHODOLOGY

The stocks in Nifty50 are revised every six months. Last ten stock that have been included and ten stocks that have been excluded along with the date of inclusion or exclusion are identified for the study.

ANOVA Test of Stock Prices Before and After Inclusion/Exclusion from Nifty 50. ANOVA test provides the impact of inclusion or exclusion from the Nifty 50 on stock prices. If the ANOVA test shows a statistically significant change, it suggests that the inclusion or exclusion from the Nifty 50 has a discernible effect on stock prices.

Correlation Analysis Between Stock Prices and Nifty 50 Prices: Correlation analysis helps us understand the relationship between stock prices and the Nifty 50 prices. The correlation coefficient measures the strength and direction of the relationship. A positive correlation implies that as the Nifty 50 prices increase, stock prices tend to increase as well, indicating a positive association between the two variables. Conversely, a negative correlation signifies an inverse relationship, suggesting that stock prices move in the opposite direction to changes in Nifty 50 prices.

Linear Regression Analysis with Nifty as Independent Variable and Stock Price as Dependent Variable: Linear regression analysis allows us to model the relationship between Nifty 50 prices (independent variable) and stock prices (dependent variable) using a linear equation. This analysis helps us understand how changes in Nifty 50 prices impact stock prices. The regression model provides insights into the magnitude and direction of the relationship, with the coefficient estimate indicating the change in stock price for a unit change in Nifty 50 price.

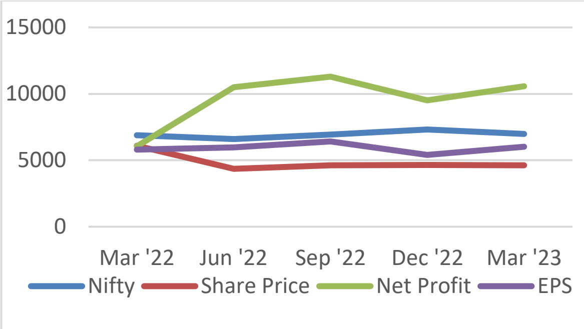
Time Series Plot of Company Quarterly Net Profits, Stock Prices, and the Nifty Prices: The time series plot provides a visual representation of the quarterly net profits of a company, its stock prices, and the Nifty prices over a specific period. By examining these plots together, we can identify potential patterns and relationships. Comparing the company Financials, Sock price and the nifty 50 price plots, we can infer if the stock price movement is correlated to the financials or the nifty movements.

LTIM included on 12 Jul 2023

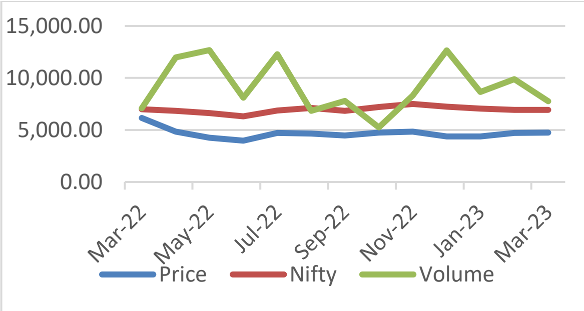
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
57.49531402	**3.68022E-07**	4.380749692
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.833313467	0.688299561	1.79598E-14
t Stat	***P-value***	**F Stat**
10.65920419	**1.79598E-14**	**113.6186339**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded and Nifty Price plot



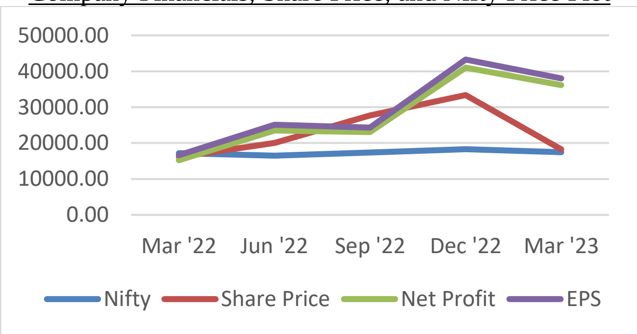
ANOVA shows significant difference before and after inclusion. Correlation is 83.3%. Regression relation is also statistically significant. Plots show the price movement is not as per the financial performance. The volumes are affected by the inclusion for a short duration.

ADANIENT included on 30 Sep 2022

Table of Test Values / Quotients

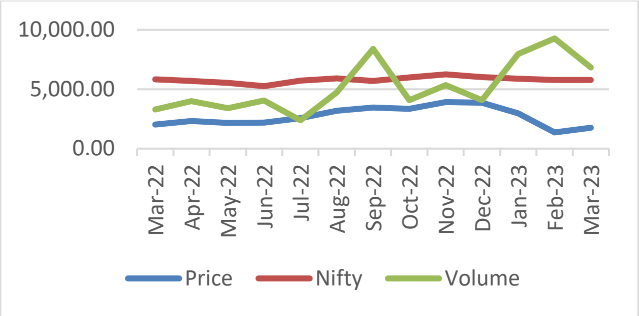
ANOVA F	ANOVA P-value	ANOVA F crit
2.352477325	**0.137643191**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.581508675	0.325174934	4.96574E-06
t Stat	***P-value***	**F Stat**
5.104606472	**4.96574E-06**	**26.05700724**

Company Financials, Share Price, and Nifty Price Plot



(IJTBM) 2023, Vol. No. 13, Issue No. IV, Oct-Dec e-ISSN: 2231-6868 p-ISSN: 2454-468X

Share Price, Share Volumes traded and Nifty Price plot



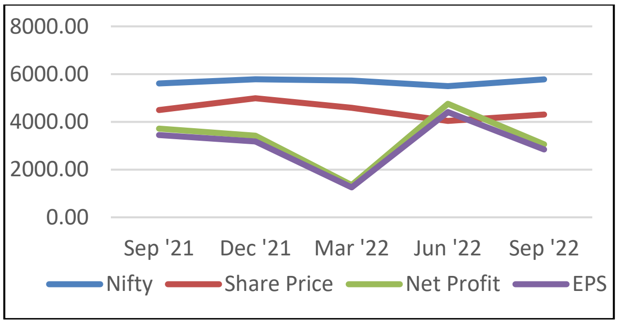
ANOVA does not show significant difference before and after inclusion. Correlation is 58.2%. Regression relation is statistically significant. Plots show the price movement is not as per the financial performance. The volumes increased for increased for a short duration after inclusion.

APOLLOHOSP included 31 Mar 2022

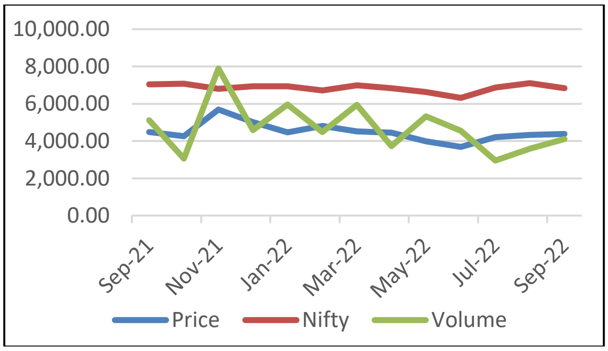
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
23.03554552	**6.26405E-05**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.513890147	0.24965334	8.29476E-05
t Stat	***P-value***	**F Stat**
4.278002028	**8.29476E-05**	**18.30130136**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



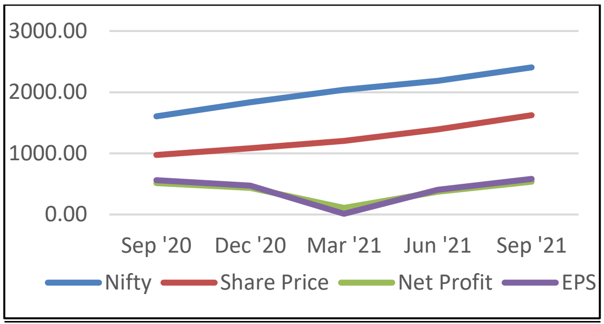
ANOVA shows significant difference before and after inclusion. Correlation is 51.4%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes are not affected by the inclusion.

TATA CONSUM included 31 Mar 2021

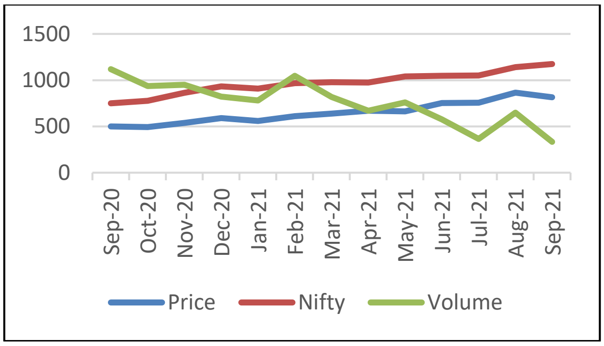
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
539.3276862	**1.94014E-18**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.942526069	0.88616628	6.17407E-26
t Stat	***P-value***	**F Stat**
20.14464313	**6.17407E-26**	**405.806647**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



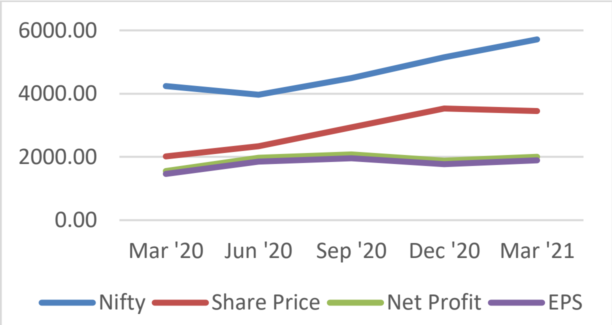
ANOVA shows significant difference before and after inclusion. Correlation is 94.3%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes are not affected by the inclusion.

DIVISLAB 25 Sep 2020

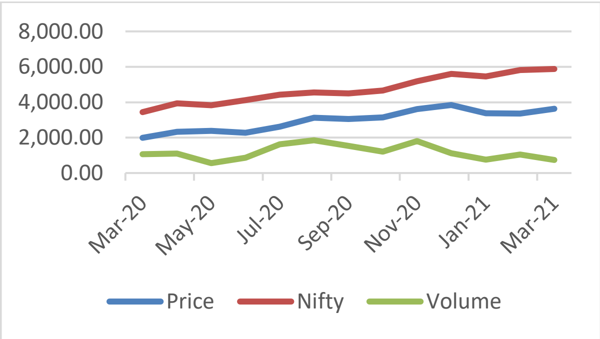
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
102.2559389	**2.55884E-10**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.892078313	0.791799869	3.16056E-19
t Stat	***P-value***	**F Stat**
14.09821579	**3.16056E-19**	**198.7596886**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



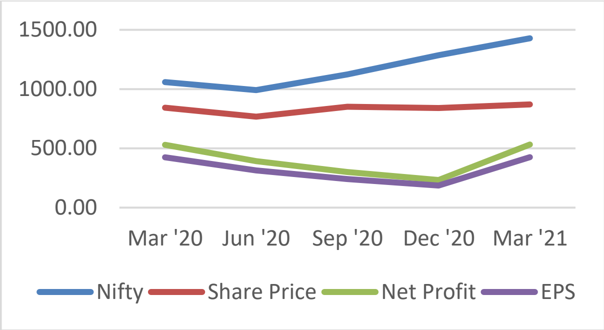
ANOVA shows significant difference before and after inclusion. Correlation is 89.2%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes are not affected by the inclusion.

SBILIFE Included on25 Sep 2020

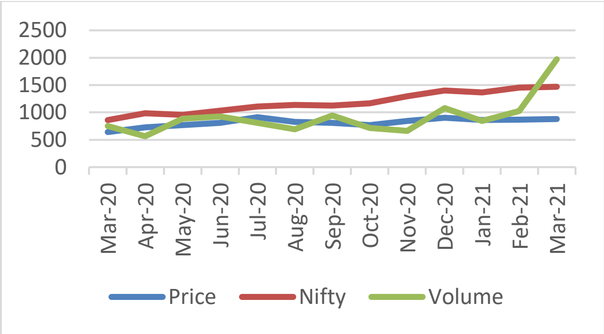
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
50.20867046	**1.99333E-07**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.80684224	0.644151154	3.00035E-13
t Stat	***P-value***	**F Stat**
9.753433283	**3.00035E-13**	**95.1294608**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



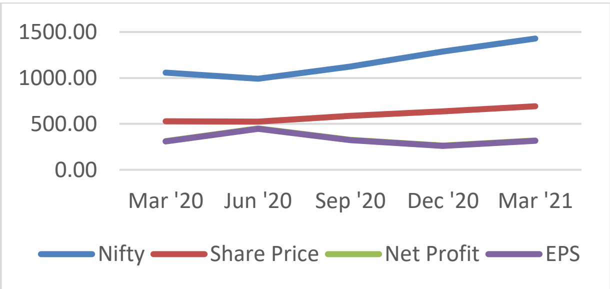
ANOVA shows significant difference before and after inclusion. Correlation is 80.7%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes are not affected by the inclusion.

HDFC Life Insurance Company Ltd Included 31 July 2020

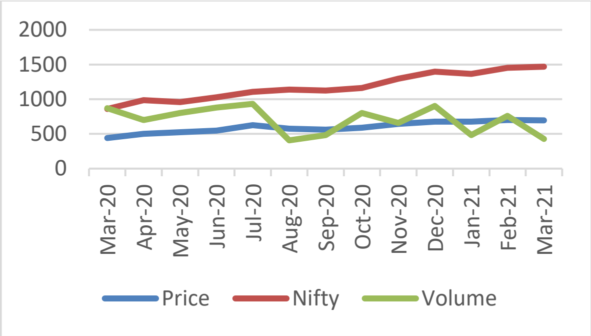
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
97.56101878	**4.11127E-10**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.936577706	0.87476952	7.07787E-25
t Stat	***P-value***	**F Stat**
19.08492534	**7.07787E-25**	**364.234375**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



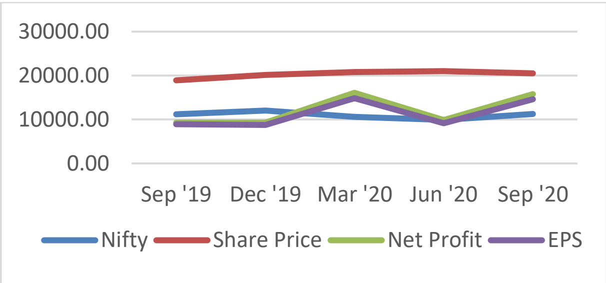
ANOVA shows significant difference before and after inclusion. Correlation is 93.7%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes are not affected by the inclusion.

Shree Cement Ltd included on 19 Mar 2020

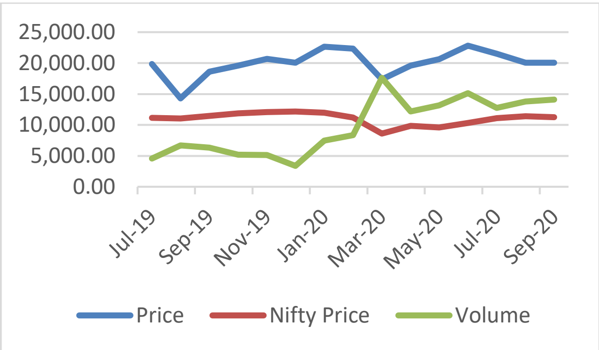
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
1.001186882	**0.326610538**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.505859971	0.241304002	0.000111529
t Stat	***P-value***	**F Stat**
4.187917229	**0.000111529**	**17.53865072**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



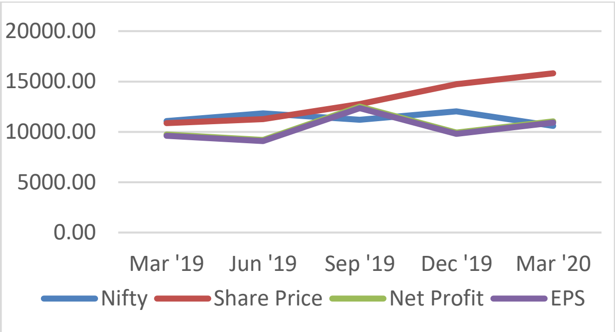
ANOVA does not show significant difference before and after inclusion. Correlation is 50.6%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes increase for short duration after inclusion.

Nestle India Ltd included on 27 Sep 2019

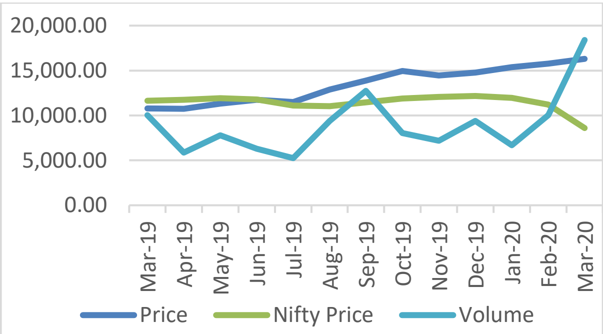
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
27.58649213	**1.9429E-05**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.504392028	0.239791932	0.000117639
t Stat	***P-value***	**F Stat**
4.171609509	**0.000117639**	**17.4023259**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



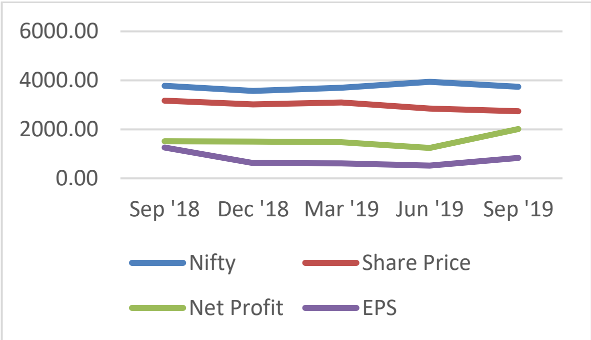
ANOVA shows significant difference before and after inclusion. Correlation is 50.4%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes increased for short duration after inclusion.

Britannia Industries Ltd included on 29 Sep 2019

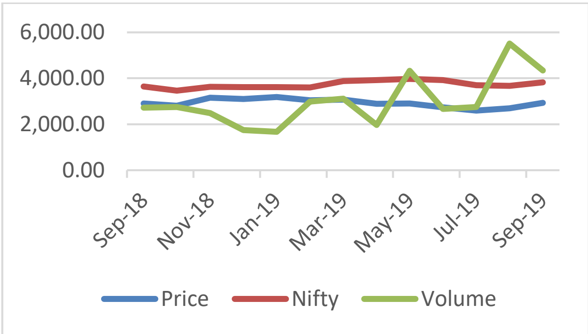
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
24.14320333	**4.66157E-05**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
-0.022607889	-0.019086705	0.872342496
t Stat	***P-value***	**F Stat**
-0.161493895	**0.8723**	**0.026080278**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



ANOVA shows significant difference before and after inclusion. Negative Correlation of --0.02%. Regression relation is statistically not significant. Plots show the price movement is not correlated to the financial performance. The volumes increased for short duration after inclusion.

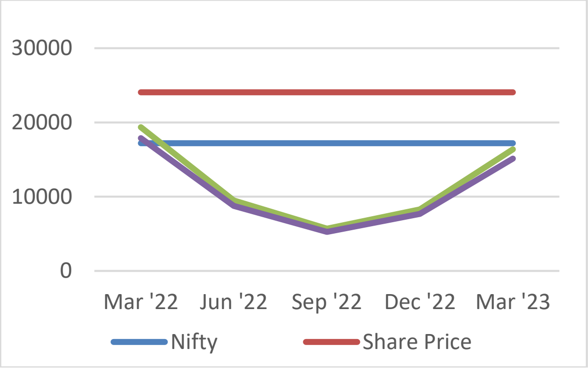
Exclusion

SHREECEM Excluded on 30 Sep 2022

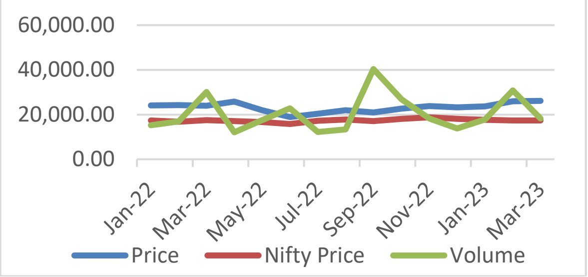
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
8.693848	**0.006831**	4.241699
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.536712	0.275116	1.68E-05
t Stat	***P-value***	***F Stat***
4.717383	**1.68E-05**	**22.2537**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



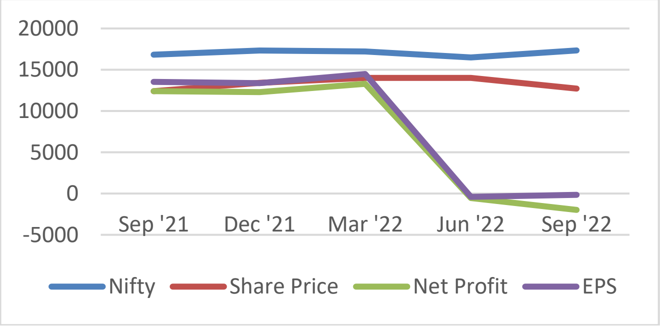
ANOVA shows significant difference before and after inclusion. Correlation is 53.7%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes increased for a short duration after exclusion.

IOC Excluded on 31 Mar 2022

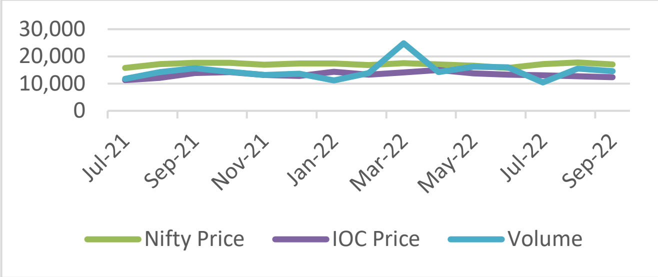
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
1.107776537	**0.302633061**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
1.107776537	**0.302633061**	4.24169905
t Stat	***P-value***	***F Stat***
4.717383068	**1.67902E-05**	**22.25370301**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



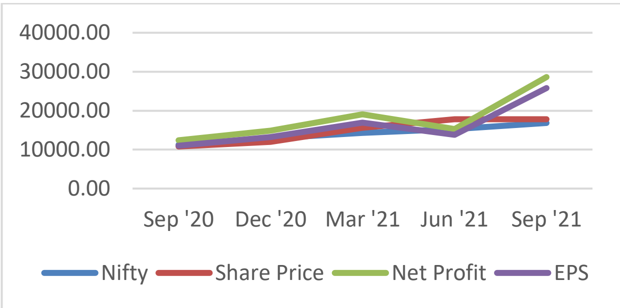
ANOVA does not show significant difference before and after inclusion. 100% Strong Correlation . Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes increased for a short duration after exclusion.

GAIL Excluded on 31 Mar 2021

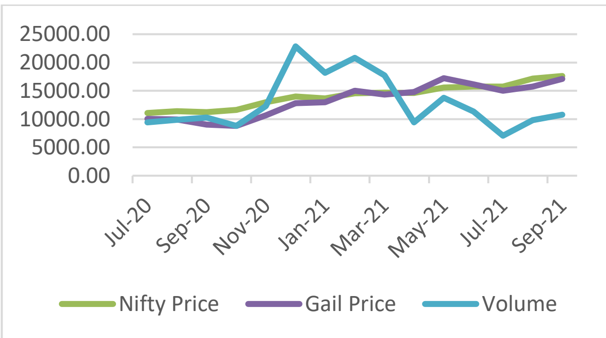
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
83.60560267	**1.89165E-09**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.911031908	0.82688785	8.08192E-23
t Stat	***P-value***	**F Stat**
16.38565574	**8.08192E-23**	**268.4897141**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



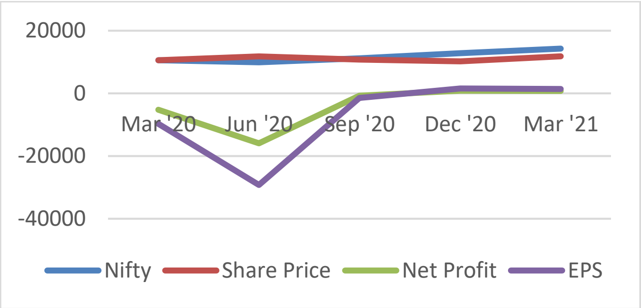
ANOVA shows significant difference before and after inclusion. Correlation is 91.1%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes not affected by Exclusion.

Bharti Airtel Ltd. Excluded on 25 Sep 2020

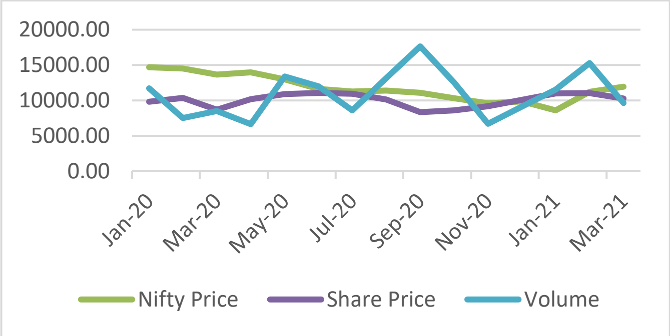
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
7.618756235	**0.010657305**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.219423791	0.030840378	0.101012297
t Stat	***P-value***	**F Stat**
1.667938645	**0.101**	**2.782019322**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



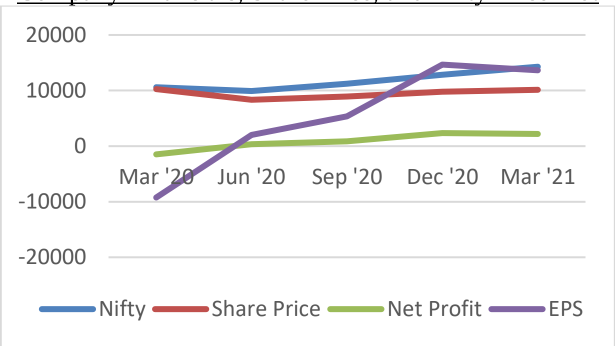
ANOVA shows significant difference before and after inclusion. Weak correlation of 21.1%. Regression relation is also statistically not significant. Plots show the price movement is not correlated to the financial performance. The volumes increase for short duration after exclusion.

ZEEL Excluded on 25 Sep 2020

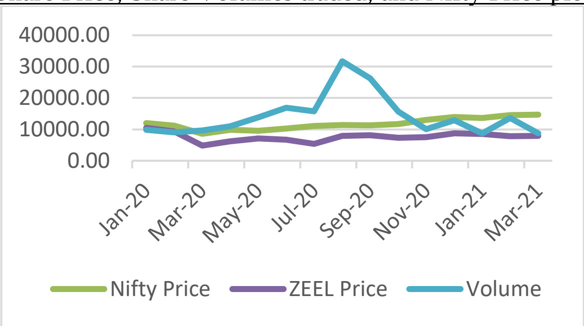
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
77.69709327	**3.83652E-09**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.774870193	0.593158794	1.5122E-12
t Stat	***P-value***	**F Stat**
9.090975811	**1.5122E-12**	**82.64584119**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



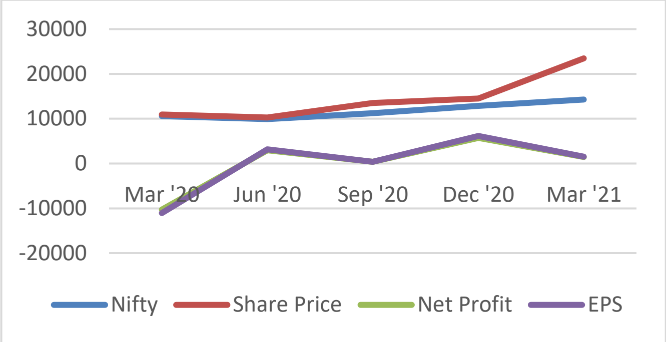
ANOVA shows significant difference before and after inclusion. Correlation is 77.5%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes increase for short duration after Exclusion.

Vedanta Ltd. Excluded on 31 July 202

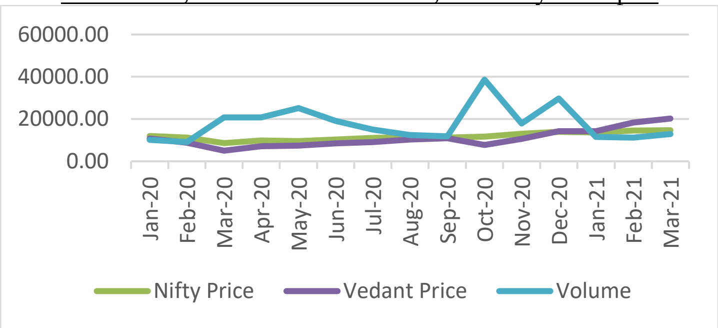
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
21.43967738	**9.71463E-05**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.904102622	0.814081579	5.79496E-22
t Stat	***P-value***	**F Stat**
15.69099672	**5.79496E-22**	**246.207378**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



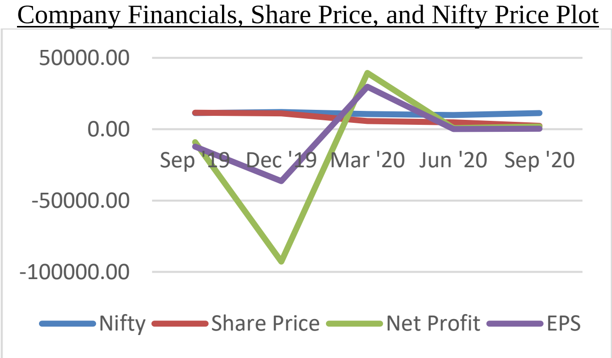
ANOVA shows significant difference before and after inclusion. Correlation is 77.5%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes not affected by Exclusion.

Yes Bank Ltd. Excluded on 19 Mar 2020

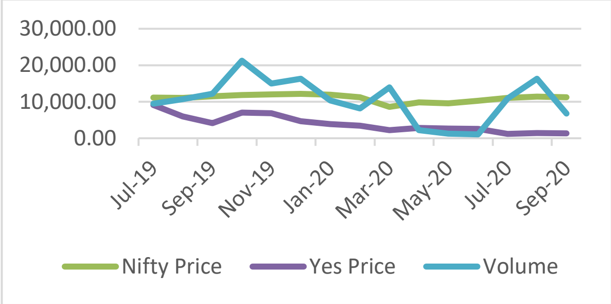
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
317.797682	**1.00021E-15**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.396862501	0.14218166	0.002239727
t Stat	***P-value***	**F Stat**
3.206538174	**0.00224**	**10.28188706**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



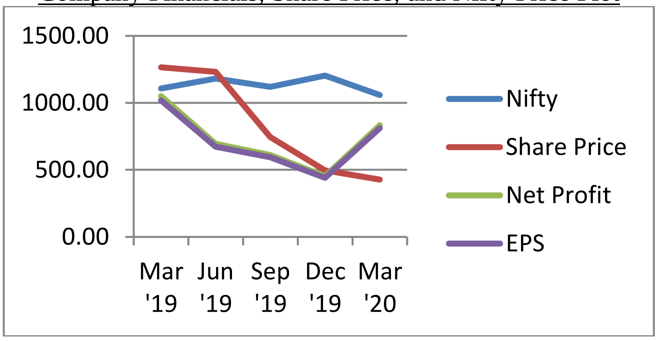
ANOVA shows significant difference before and after inclusion. Correlation is 39.5%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes decreases for short duration after Exclusion.

Indiabulls Housing Finance Ltd. Excluded on 27 Sep 2019

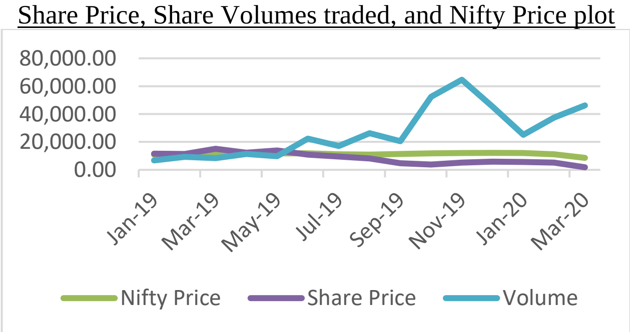
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
376.7451609	**1.36894E-16**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.289891487	0.067383203	0.028717001
t Stat	***P-value***	**F Stat**
2.24635225	**0.0287**	**5.046098429**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



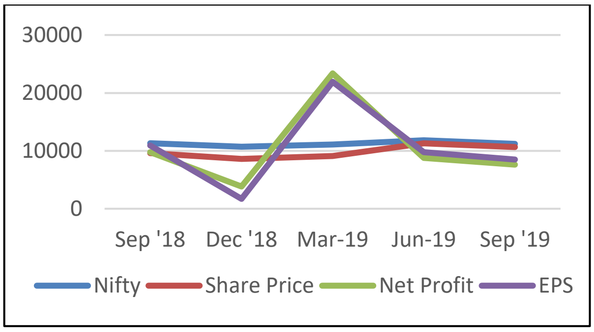
ANOVA shows significant difference before and after inclusion. Correlation is 29.1%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes increase for short duration after Exclusion.

Hindustan Petroleum Corporation Ltd. Excluded on 29 Mar 2019

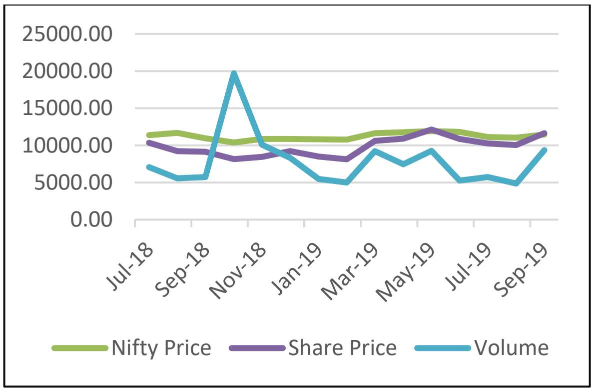
Table of Test Values / Quotients

ANOVA F	ANOVA P-value	ANOVA F crit
93.31083022	**6.41805E-10**	4.24169905
Nifty Correlation	**Adjusted R Square**	***Significance F***
0.847136182	0.712505888	9.90789E-17
t Stat	***P-value***	**F Stat**
11.82313824	**9.90789E-17**	**139.7865979**

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



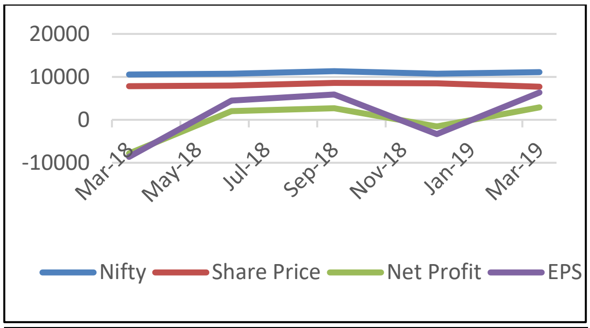
ANOVA shows significant difference before and after inclusion. Correlation is 84.7%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes not affected by Exclusion.

Lupin Ltd. Excluded on 28 Sep 2018

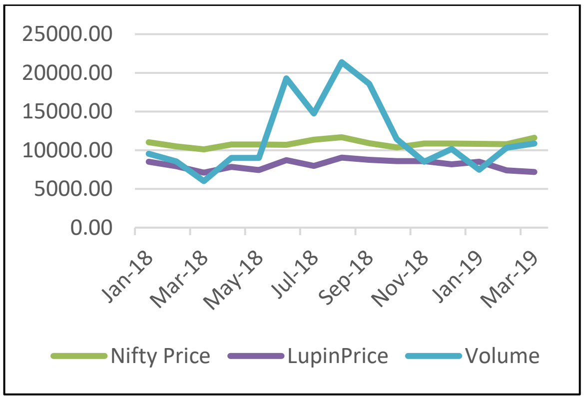
Table of Test Values / Quotients

ANOVA F	**ANOVA P-value**	**ANOVA F crit**
1.403949971	0.247205325	4.24169905
Nifty Correlation	Adjusted R Square	*Significance F*
0.371298214	0.122187134	0.004461329
t Stat	*P-value*	F Stat
2.965622738	0.004461	8.794918222

Company Financials, Share Price, and Nifty Price Plot



Share Price, Share Volumes traded, and Nifty Price plot



ANOVA shows significant difference before and after inclusion. Correlation is 37.1%. Regression relation is also statistically significant. Plots show the price movement is not correlated to the financial performance. The volumes not affected by Exclusion.

Table I. Summarized Statistical Quotients and Values

Share	Nifty Correlation	Adjusted R Square	*Significance F*	*F Stat*	*t Stat*	*P-value*	*ANOVA F*	*ANOVA P-value*	*ANOVA F crit*
				Included					
LTMI tree	0.83	0.69	1.8E-14	**113.62**	10.66	**1.8E-14**	**57.50**	**3.68E-07**	4.38
ADANI Ent	0.58	0.33	4.97E-06	**26.06**	5.10	**4.97E-06**	**2.35**	**0.137643**	4.24
Apollo Hosp	0.51	0.25	8.29E-05	**18.30**	4.28	**8.29E-05**	**23.04**	**6.26E-05**	4.24
TATA Consm	0.94	0.89	6.17E-26	**405.81**	20.14	**6.17E-26**	**539.33**	**1.94E-18**	4.24
DIVI Lab	0.89	0.79	3.16E-19	**198.76**	14.10	**3.16E-19**	**102.26**	**2.56E-10**	4.24
SBI LIFE	0.81	0.64	3E-13	**95.13**	9.75	**3E-13**	**50.21**	**1.99E-07**	4.24
HDFC LIFE	0.94	0.87	7.08E-25	**364.23**	19.08	**7.08E-25**	**97.56**	**4.11E-10**	4.24
Shree Cem	0.51	0.24	0.000112	**17.54**	4.19	**0.000112**	**1.00**	**0.326611**	4.24
Nestel	0.50	0.24	0.000118	**17.40**	4.17	**0.000118**	**27.59**	**1.94E-05**	4.24
Britannia	-0.02	-0.02	0.872342	**0.03**	-0.16	**0.8723**	**24.14**	**4.66E-05**	4.24
				Excluded					
Shree cem	0.54	0.28	1.68E-05	**22.25**	4.72	**1.68E-05**	**8.69**	**0.006831**	4.24
IOC	0.28	0.06	0.0325	**4.81**	2.19	**0.03**	**1.11**	**0.302633**	4.24
GAIL	0.91	0.83	8.08E-23	**268.49**	16.39	**8.08E-23**	**83.61**	**1.89E-09**	4.24
Airtel	0.22	0.03	0.101012	**2.78**	1.67	**0.101**	**7.62**	**0.010657**	4.24
Vedanta	0.90	0.81	5.79E-22	**246.21**	15.69	**5.79E-22**	**21.44**	**9.71E-05**	4.24
ZEEL	0.77	0.59	1.51E-12	**82.65**	9.09	**1.51E-12**	**77.70**	**3.84E-09**	4.24
YES Bk	0.40	0.14	0.00224	**10.28**	3.21	**0.00224**	**317.80**	**1E-15**	4.24
India Bulls	0.29	0.07	0.028717	**5.05**	2.25	**0.0287**	**376.75**	**1.37E-16**	4.24
HPCL	0.85	0.71	9.91E-17	**139.79**	11.82	**9.91E-17**	**93.31**	**6.42E-10**	4.24
Lupin	0.37	0.12	0.004461	**8.79**	2.97	**0.004461**	**1.40**	**0.247205**	4.24

Summarized Quotients of Statistical Analysis

CONCLUSION

- It is evident financial performance is not a major factor in ascertaining the market value of the shares.
- In maximum cases the ANOVA test revealed statistically significant variance in share prices before and after the event.
- But this variance is not caused by the event ie inclusion / exclusion.
- The share price is positively correlated with Nifty price, but few shares price moved contrary to the direction of the Nifty Movement.
- Share volumes were affected for a short duration and they came back to normal levels. In some instance the volumes increased even when shares were excluded from the Index.
- In a Hypothesis test using ANOVA there is sufficient evidence to reject Null Hypothesis. (Ho there is no significant difference between the values before and after the inclusion / exclusion.)
- But the variation cannot be attributed to inclusion / exclusion from the index.

- Further two sample T Test of the Price and Volumes before and after inclusion / exclusion is recommended for better understanding.
- For a better statistical understanding of the effect of inclusion / exclusion from the Index further studies using statistical forecasting the values and comparing with actual value is recommended.

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