"The impact of ESG inclusion on price, liquidity and financial performance of Indian stocks: Evidence from stocks listed in BSE and NSE ESG indices"

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BUSINESS PERSPECTIVES

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THE IMPACT OF ESG INCLUSION ON PRICE, LIQUIDITY AND FINANCIAL PERFORMANCE OF INDIAN STOCKS: EVIDENCE FROM STOCKS LISTED IN BSE AND NSE ESG INDICES

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Abstract

In recent years, investors have perceived that Environmental, Social, and Governance (ESG) practices significantly increase the value of companies' stocks. This study investigates the impact of ESG inclusion on the price, liquidity and financial performance of stocks listed in the Indian ESG indices. Two major Indian benchmark ESG Indices, the BSE100 ESG and Nifty 100 ESG, were considered for the study. A total sample of 64 firms from the BSE100 ESG index and 86 firms from the Nifty100 ESG index were selected. The market model of the event study methodology was employed to measure AAR and CAAR and to demonstrate the effect before and after the inclusion of the stocks in the ESG indices. The empirical results show a highly significant negative AAR on the announcement day, i.e., on (day = 0) for BSE100 ESG index stocks and an insignificant positive AAR for Nifty100 ESG index stocks. In addition, the results also document a significant negative CAAR for BSE 100 ESG stocks and a positive insignificant CAAR for Nifty100 ESG stocks. Moreover, the liquidity test results revealed a considerable liquidity enhancement in the stocks posts their inclusion in the BSE100 ESG. At the same time, there were no significant changes in the liquidity ratio of stocks after being included in the Nifty100 ESG index. This study concludes that there will be a substantial improvement in the companies' financial performance as indicated by EPS and market capitalization after their inclusion in the ESG indices.

Keywords	stock markets, event studies, sustainability, environmental development
JEL Classification	G10, G14, G56

INTRODUCTION

The stock price reaction when it is included in the index is critical for investors. Moreover, stock inclusion is associated with increased visibility and investor awareness that instigates them to buy and hold the index stock for their diversification benefits. Further, it decreases their shadow cost, resulting in a permanent price change (Merton, 1987). Any announcement of information concerning the inclusion of a stock in an index causes considerable changes in its features. Changes in a stock when it is included in an index are several. Theories in the past have empirically established that its demand curve gets significantly affected when it is included in an index. Besides, if its demand is perfectly inelastic, the stock can attract additional buying (Selling), affecting its price to move away from its equilibrium point. In addition, Chang et al. (2012) emphasized that when a stock is included in an index, a significant change in its price, volume and performance is witnessed due to rebalancing activities.

Stock qualifying into the Environmental, Social and Governance (ESG) indices indicates to the market that it is committed to the values and practices of the ESG. However, it is still uncertain that the stock inclusion may bring about any considerable changes in its price, volume and firm performance. High-value investors consider some metrics to see the strategic ESG intent of an organization. Technically, a high ESG indicator reflects better financial performance and value creation for shareholders. Firms with ESG intent are expected to be strategic value creators with an ESG advantage. Nevertheless, there is inconclusive evidence in the Indian context of how markets react to such stock inclusion news in thematic benchmark sustainability indices, especially concerning a sustainability index like the ESG. This study empirically investigates how stock inclusion announcements in Indian thematic benchmark indices like the ESG indices affect stock returns and liquidity. In addition, it also aims to examine how stock inclusion in the ESG indices leads to improved financial performance.

1. LITERATURE REVIEW

Extensive studies have been conducted in the last few decades to document the empirical evidence that the inclusion of a stock in any market index brings about a considerable enhancement in its price and liquidity. Some of them include Shleifer (1986), Harris and Gurel (1986), Prem C. Jain (1987), Lynch and Mendenhall (1997), Erwin and Miller (1998), Hegde and McDermott (2003), and Chen et al. (2004). These studies have principally employed the event study methodology and examined the impact of a stock's inclusion in a benchmark index on its price and trading volume.

Shleifer (1986) examined the impact of stock inclusion in the S&P 500 index on its price between 1966 and 1983. Employing the event study methodology, the author found a substantial increase in the stock price and liquidity due to increased demand. In addition, the findings of his study reported a significant presence of abnormal returns in the stock after its inclusion in the market index. Another important study by Harris and Gurel (1986) analyzed the price and volume impact of stocks concerning their inclusion into the S&P 500 index between 1973 and 1983. The authors ascertained that there was a large enhancement in the price and volume of the stock on the first trading day after its inclusion in the index. However, their study concluded that the price and volume effects existed only for a very short duration. Moreover, Prem C. Jain (1987) explored the index inclusion effect on the price behaviour of stocks from the S&P 500 index between 1977 and 1983. Interestingly, the results of the study reported both the short and long-term effects and exhibited that stocks included in a market index experienced a significant abnormal return on the first trading day post its inclusion into the index.

Furthermore, Lynch and Mendenhall (1997) investigated the price and volume impact of stocks regarding their inclusion in the S&P 500 index for the period between 1990 and 1995. The key findings of their study include a large positive abnormal return on the Proclamation Day of stock inclusions and the presence of a significantly positive announcement impact. Erwin and Miller (1998) probed the liquidity effect of the stocks added to the S&P 500 index between 1984 and 1988. Employing the bid-ask spread measure, the authors found that the bid-ask spread declined when the stocks get included in the market index in consensus with the liquidity hypothesis. In addition, Hegde and McDermott (2003) studied the liquidity effect of stocks after their inclusion in the S&P 500 index from 1993 through 1998. The authors found a consistent enhancement in the trading volume of the included stocks. In conclusion, the authors stated that the decline in the direct transaction cost and the asymmetric information effect caused the enhancement in the liquidity of the added stocks. Moreover, Chen et al. (2004) also examined the price and volume impact of stocks after their inclusion in the S&P 500 index between 1962 and 2000. The results of their study demonstrated a permanent enhancement in the stock price of companies added to the market index. In addition, the results also revealed that the awareness level of the stock among the investors increases considerably after its inclusion in the market index.

Nevertheless, similar studies have been conducted employing the event study methodology in other global stock markets to establish the index effect phenomenon. In this regard, Masse et al. (2000) examined the price movement of the stocks added to the TSE 300 index of the Canadian stock market between 1984 and 1994 and found a significant positive reaction to the stock inclusions. Besides, Opong and Hamill (2002) investigated the index inclusion impact on the stock's price and volume in the United Kingdom's FTSE 100 index from 1984 to 1999 and established that their findings were consistent with Price-Volume-Hypothesis. Further, Qiu and Pinfold (2008) studied the effect of stock inclusion in the Australian S&P/ASX 100 and 300 indices on its price during 2000 and 2002 and documented no significant evidence of abnormal stock returns concerning the stock additions. Hanaeda and Serita (2003) analyzed the price and volume impact when the stocks were added to the Japanese Nikkei 225 Index during the year 2000. The authors found a significant positive abnormal return in the stock prices and a significant enhancement in its trading volume post its inclusion into the Nikkei 225 Index. In addition, Wilkens and Wimschulte (2005) explored the price and volume effects during the announcement of major changes (stock additions and deletions) to the German stock indices in March 2003. The results of their study reported that stocks experience a cumulative positive average abnormal market-adjusted returns in their prices and a significant decline in their average trading volume. Concerning the Indian stock markets, Vijaya and Vedpuriswar (2003) examined the dynamics around the reconstitution of the BSE Sensex index and reported an insignificant permanent price impact regarding the stock inclusions and deletions. Furthermore, Selvam et al. (2012) studied the inclusion effect of stocks in the CNX Nifty index of the National Stock Exchange and found no evidence of abnormal returns and permanent stock price effect. Their study concluded that the NSE responded unfavourably to the additions and deletions of stocks to and from the CNX Nifty index.

All the aforementioned studies have investigated the stock inclusion phenomenon across global stock markets during varied time periods and have established that the stock price and its liquidity experience a significant impact after its inclusion into conventional stock market indices. However, in recent times similar studies have been evolving with respect to sustainability indices. Studies such as (López et al., 2007); (Consolandi et al., 2008); (Doh et al., 2010); (Robinson et al., 2011) and (Białkowski & Sławik, 2021) have examined the impact of stock returns after its inclusion in the sustainability indices and documented some significant evidence during their study period. A brief review of the same is presented below.

López et al. (2007) conducted a comparative study to examine whether the addition of stocks to sustainable indices has a significant effect on their price or not. For this, the authors considered a sample of stocks listed on the DJSI and Non-DJSI indices and ascertained that the stocks on the DJSI index experienced a short-term negative decline throughout the early years of their inclusion in the index. In conclusion, the authors stated that the same may be due to the costs allied with being added to the index.

Consolandi et al. (2008) investigated the price impact of stocks concerning their inclusion in the Dow Jones Sustainability Stoxx Index (DJSSI) for the period between 2002 and 2006. Employing the event study model, the authors determined that the inclusion of stocks in the DJSSI index impacted its price positively. Besides, the study documented a statistically significant impact on the stock returns for stock inclusion.

Doh et al. (2010) analyzed the price reaction when the stocks were added to and deleted from the Calvert social index for the period between 2000 and 2005. They found that the abnormal returns for additions were not statistically significant and for the deletions, the stock prices experienced a significant decline a day after the announcement. The study concluded that the difference in the results was due to the disproportion concerning the information accessibility among the companies that would likely publish about the additions and unlikely to publish about their deletions.

Robinson et al. (2011) studied the short and mid-term effects of stock addition to the Dow Jones Sustainability World Index (DJSI) on stock returns of North American companies between 2003 and 2007. The authors employed the event

study model and found that there existed a positive price change and statistically significant positive impact when the examined stocks were added to the DJSI index.

Białkowski and Sławik (2021) examined the stock price impacts with regard to the inclusion of the stocks in the RESPECT (the first sustainability index of Central and Eastern Europe) between 2009 and 2019. Employing the event study approach to compute abnormal returns, the authors found a profound negative impact on the prices of the stocks included in the RESPECT index. However, the impact existed in the short term but was statistically significant.

In the most recent times, the role of sustainable stocks and indices has become significant in the financial markets across the globe. As per Eurosif (2020), Sustainable and Responsible Investment (SRI) is a method that involves fundamental analysis along with the assessment of Environmental, Social and Governance (ESG) aspects in the selection of stocks during the investment process. Thus, ESG indices provide the investment community with the opportunity to associate their investments with the ESG theme. To date, there have been very few studies that investigate whether the inclusion of stocks in such a thematic sustainable index like the ESG indices has any considerable effect on the stock price and returns. Nonetheless, in the last few years, studies have been conducted to assess the impact of stock returns after the inclusion in the ESG indices.

In this regard, Cui and Docherty (2020) analyzed the stock returns of the firms listed in the US stock markets during some significant ESG news announcements between 2000 and 2018. Employing the event study approach to compute the cumulative abnormal returns, the authors found that the markets overreacted to the ESG news announcements due to unfavourable implications concerning the market efficiency and investors' behaviour.

Torre et al. (2020) examined the impact of ESG constituents on the stock returns of the firms listed in the Eurostoxx50 index during the time period between 2000 and 2018. The results of their study reported that the stock returns of the examined firms were not affected in terms of their ESG commitments.

Existing studies have principally aimed to investigate how variations to the constitution of an index can affect the returns of the companies whose stocks were included in or deleted from the index. However, these studies largely dealt with the conventional stock market indices and emphasized mostly developed financial markets such as European and American, etc. Through a comprehensive review of academic literature, it was determined that there is still a deficiency of studies concerning the impact on stock price resulting from its inclusion into thematic indices like the ESG indices in emerging markets and particularly in a single-country setting.

Therefore, the purpose of this study is to empirically investigate how stock inclusion announcements in Indian thematic benchmark indices like the ESG indices affect stock returns and liquidity of Indian firms. In addition, it also aims to examine how stock inclusion in the ESG indices leads to improved financial performance.

2. METHODOLOGY

To verify the impact of stock inclusion in ESG indices on stock return and liquidity, this study considers all the constituent stocks of the BSE100 ESG Index and Nifty100 ESG Index. The BSE100 ESG was launched on October 26, 2017, whereas NSE100 ESG was on March 27, 2018. The total sample of the study consists of 64 firms of BSE100 ESG and 86 firms of Nifty100 ESG indices. Announcement date, daily closing price, and trade volume data of the index constituent stocks were collected from BSE and NSE websites. Further, the study examines the pre- and post-stock inclusion financial and market performance using key indicators presented in the variables table for the period of three years before and after stock inclusion. Also, the performance of mutual funds tracking the ESG indices in India is studied for the last year and since its inception. For this purpose, quarterly financial data for the period before the launch and after the launch of the indices were collected from the CMIE Prowess database. Using the market model under the event study methodology, the impact in the pre-and post-period of its inclusion in ESG indices has been verified.

2.1. Information and liquidity hypothesis

In this study, the information and liquidity hypotheses are tested. As per the information hypothesis, stock inclusion information is expected to bring price change as it confirms organizational commitment toward ESG. The event of index inclusion may result in two types of price impacts. There could be two possible impacts of Index inclusion. That is a short-term price effect, which is temporary in nature and is expected to occur around the announcement day. As per the demand hypothesis, the demand curve is downward-sloped in the short run and horizontal in long run. When a stock qualifies to be part of a benchmark index, the fund houses tracking it would buy stock, thus creating additional demand and resulting in an upward price trend. The information content of the inclusion event in the long term from the fundamental value perspective on the hypotheses that price effects persist even after the actual index inclusion is also verified. The study uses financial and market indicators to measure the performance of stocks under the standard event study approach.

2.2. Variables of the study

Table 1. Table exhibiting the variables of the study and its respective acronyms and measurements

Variables	Acronyms	Measurement
Market Capitalisation	MCAP	Market capitalization is calculated by multiplying the number of outstanding equity shares by its current market price
Price to Book Ratio	P/B Ratio	Current Market Price divided by the book value per share
Book Value Per Share	BVPS	Book Value Per Share is calculated by dividing the equity net worth by total outstanding shares
Stock Return	Return	The change in the quarterly Closing price of the stock in BSE is considered
Earnings Per Share	EPS	PAT for equity shareholders divided by the number of outstanding shares
Turnover	TRN	Turnover is the total number of shares traded in value
Abnormal Return	AR	Excess return measured using the market model
Cumulative Avg. AR	CAAR	Cumulative of average abnormal return for the window period
Stock Liquidity	LIQ	Measured using the Amihud (2002) and Barardehi et al. (2021) ratio

2.3. Event study model

In this paper, an event study approach, which is a standard method to study the impact of an event in the pre-and post-period on stock price (Fama, 1970), is followed. Market reaction for stock inclusion is measured by using excess return criteria. Past studies observed that there was no universal consensus with regard to the length of the event period. A three-period window is created for this purpose. Announcement date effect (AD_0): The immediate effect is observed on the announcement date, and if there is any significant abnormal return on this day, it confirms the information content of the event. Pre-event window (AD_{-1} to AD_{-10}): This window provides information on the existence of any abnormal return before the formal announcement of the event. If there is any abnormal return found in this period, it confirms that there is information asymmetry and insider trading with few who have access to private information, leading to abnormal returns. The event window used here is the (-10,0) (-5,0) and (-2,0) days prior to the inclusion of stocks into the ESG indices. Post announcement window (AD_{+1} to AD_{+10}): As per the tradable range hypothesis, a larger section of the market participants has access to the event information only after the official announcement. This leads to improved liquidity and change in return dynamics. The presence of abnormal returns in this window affects shareholder wealth positively. However, sustaining the return is questioned, due to profit booking and stock price adjusting itself to its normal price. Using the market model, an estimation window of 100 days is considered to derive the expected return in a normal period, and the abnormal return is expressed as follows:

$$AR_{i,t} = R_{i,t} - \left(\alpha_i + \beta_i R_{m,t} \right). \tag{1}$$

The Nifty index is considered as a market portfolio ($R_{m,t}$). α and β are estimated by using a period of AD_{-10} days to a AD_{-100}. OLS method is used to obtain the coefficients. The cross sectional Average Abnormal Returns for all firms are computed as follows:

$$AAR_t = \frac{1}{n} \sum_{i=1}^{n} AR_{I,t}. \tag{2}$$

Further, Cumulative Average Abnormal Returns (CAAR) for the -10 days to +10 days have been

calculated. CAAR for event day's t1 to t2 were obtained as follows:

$$CAR_{(t_1, t_2)} = \sum_{t=1}^{t_2} AR_{i,t}, \qquad (3)$$

$$CAAR = \frac{1}{N} \sum_{t=1}^{t_2} CAR_{(t_1, t_2)}. \qquad (4)$$

The cross-sectional t-test as proposed by Brown and Warner (1985) for N observations for each day 't' in the event window is calculated as follows:

$$t_i = \frac{AAR_i}{\dfrac{S^2}{\sqrt{N}}}. \qquad (5)$$

2.4. Model to measure the liquidity effect

There are different measures used as proxies to represent the liquidity phenomenon of a stock. It can be transaction cost-based or volume based. Transaction cost data is not accessible for all indices except for Nifty 50 indices in India. Popularly, there are three proxies to measure different dimensions of liquidity Bid Ask Spread, illiquidity and turnover base. In this study, we verify the liquidity effect using Amihud (2002) illiquidity ratio for the event window. Amihud's ratio calculates the liquidity level of the market, by taking the average illiquidity of all the stocks. It is computed as follows:

$$ILLIQ = \frac{1}{t} \sum_{i=1}^{t} \frac{|R_i|}{DVOL_i}. \qquad (6)$$

As there are different approaches to measuring liquidity; this study confirms the results of liquidity conditions using the Barardehi et al. (2021) liquidity ratio. The ratio provides a trade-time-based liquidity measure that reflects the per-dollar price impacts of fixed-dollar volumes.

$$LIQ = \frac{t}{\sum_{i=1}^{t} \dfrac{|R_i|}{DVOL_i}}. \qquad (7)$$

3. EMPIRICAL RESULTS

Table 2 shows the fund houses in India benchmarking the Nifty100 ESG index and their performance for the previous year and since its inception. It is observed that the Axis ESG fund and Mirae Asset ESG sector Leaders ETF have performed with the highest return 17.08% and 15.51%, respectively, as compared to other fund houses. It is relatively higher than the Nifty 50 (13.5%) index return for the last 10 years in India. This indicates that the ESG stocks are outperforming the non-ESG stocks.

Table 3 shows the financial and market performance during the pre-inclusion and post-inclusion periods of the BSE100 ESG Index and NIFTY ESG100 stocks in India. This study examines the financial impact of stock inclusion by verifying key financial indicators such as EPS, BVPS and market indicators such as market capitalization of outstanding shares of a firm, price book ratio and stock return and stock turnover. Table 3 shows the pre- and post-values of each of these indicators. The variables considered were financial indicators, i.e., BVPS, EPS, and market ratios, i.e., M.Cap, P/B, Stock Returns (SR), and Turnover (TR). This study tests for cross-sectional mean difference for aforesaid indicators and observes that statistically significant mean difference exists in pre- and post-EPS and Market Capitalization. This confirms that the financial performance improves as indicated by EPS and shareholders' market wealth post-inclusion of stock in the ESG index.

Table 2. Mutual fund schemes tracking NIFTY 100 ESG indices

Schemes	Benchmark	Year of Inception	Investment Performance	
			1 Year	Since Inception
Aditya Birla Sun Life ESG Fund	NIFTY 100 ESG Total Return Index	24/12/2020	4.01%	9.58%
Axis ESG Fund	NIFTY 100 ESG Total Return Index	12/02/2020	0.77%	17.08%
ICICI Prudential ESG Fund	Nifty 100 ESG TRI	09/10/2020	−6.15	11.99
Kotak ESG Opportunities Fund	Nifty 100 ESG TRI	18/12/2020	−5.32	6.16
Mirae Asset ESG Sector Leaders ETF	Nifty 100 ESG Sector Leaders TRI	17/11/2020	4.94%	15.51%
Quantum India ESG Equity Fund	Nifty 100 ESG Sector Leaders TRI	12/07/2019	15.00%	−4.24%
SBI Magnum Equity ESG Fund	NIFTY 100 ESG Total Return Index	01/01/2018	2.92	12.99

Table 3. Firm performance during the pre-and post-inclusion period of the BSE100 ESG Index and NIFTY ESG100 stocks

Variables	Period	BSE100 ESG Index			NIFTY ESG100		
		Mean	Variance	t-stat	Mean	Variance	t-stat
BVPS	Pre	−0.021	0.003	−0.396	0.292	0.003	−0.796
	Post	−0.010	0.002		0.311	0.002	
Clgprice	Pre	−0.015	0.006	0.331	0.306	0.006	0.361
	Post	−0.037	0.003		0.284	0.003	
EPS	Pre	−0.002	0.027	1.692	0.319	0.027	2.192*
	Post	−0.220	0.121		0.101	0.121	
MCAP	Pre	0.032	0.005	1.974*	0.353	0.005	1.994*
	Post	−0.005	0.001		0.316	0.001	
P/B	Pre	−0.003	0.005	0.661	0.318	0.005	0.961
	Post	−0.035	0.003		0.286	0.003	
TRN	Pre	−0.897	0.629	0.690	−1.818	0.629	0.740
	Post	−1.029	0.941		−1.350	0.941	

Note: * Significance at 5%.

However, other indicators such as BVPS and P/B have improved, but this is not statistically significant. The turnover indicates the liquidity of the stock, and no significant change in the mean turnover ratio post-inclusion of a stock has been found. This confirms there was no liquidity improvisation.

3.1. Price and liquidity effect

Table 4. Average abnormal return (AAR) for the event window

	BSE100 ESG		Nifty100 ESG	
	AAR	t-stat	AAR	t-stat
−10	−0.027	−8.59303*	0.006	2.077663*
−9	−0.02611	−8.31245*	0.00146	0.505688
−8	−0.02917	−9.28426*	0.001988	0.688498
−7	−0.02442	−7.77414*	0.003635	1.258819
−6	−0.02291	−7.29267*	−0.00404	−1.39744
−5	−0.02816	−8.96498*	0.002132	0.738334
−4	−0.02535	−8.06943*	−0.00145	−0.50244
−3	−0.02385	−7.59144*	−0.00134	−0.46233
−2	−0.02625	−8.35483*	0.001626	0.562945
−1	−0.02895	−9.21373*	−0.00026	−0.09099
0	−0.02577	−8.20289*	0.000455	0.157541
1	−0.0198	−6.3013*	0.000304	0.105122
2	−0.02253	−7.172*	0.004	1.384956
3	−0.02435	−7.74955*	0.004546	1.574079
4	−0.02707	−8.61753*	0.000346	0.11996
5	−0.01977	−6.29441*	−0.00144	−0.50011
6	−0.02874	−9.14882*	0.004329	1.498941
7	−0.02263	−7.20201*	−0.00215	−0.74583
8	−0.02856	−9.09108*	−0.00027	−0.09229
9	−0.0245	−7.7973*	−0.00111	−0.38565
10	−0.02182	−6.94537*	−0.00329	−1.1398

Note: * Significance at 5%.

Table 4 shows the Average Abnormal Return (AAR) for the event window. The immediate effect of stock inclusion was verified at AD_0, and pre-announcement at -1 to -10 days, and post-announcement +1 day to +10 days was taken to verify the impact on the stock price. The result shows a highly significant negative AAR for AD_0 for BSE100 ESG indices stocks and an insignificant positive AAR for Nifty100 ESG indices stocks. In the pre-event window of -10 days, a highly significant negative AAR for BSE100 ESG is found, which confirms that the event was anticipated and there was information leakage about the stock to be included. On the contrary, in the pre-event window, an insignificant positive AAR for Nifty100 ESG except for the -10th day, which had a significant positive AAR, was found, confirming that there was information leakage causing price reaction. In the post-event window, i.e., +10 days, a negative and highly significant AAR for BSE100 ESG is observed. However, for Nifty100 ESG, a positive insignificant AAR for +4 days is found, and later price reversal is observed, and it is insignificant.

Table 5 shows the CAAR of stocks for the pre-event window of -2, -5, -10, and post-event of +2, +5, +10. The results document a significant negative CAAR for BSE 100 ESG stocks, while a positive insignificant CAAR for Nifty100 ESG.

Table 6 shows the Amihud (2002) and Barardehi et al. (2021) liquidity ratio for ESG indices for the -10, +10, -11, +11, -5, +5, -2, +2 and overall, 21 days

Table 5. Cumulative average abnormal return of BSE ESG 100 and Nifty ESG 100

Source: Authors.

Window	BSE 100 ESG		Nifty100 ESG	
	CAAR (%)	t-value	CAAR (%)	t-value
Pre-event				
(−2)	−5.52	−12.47*	0.14	0.34
(−5)	−13	−18.95*	0.07	0.11
(−10)	−26	−26.50*	0.98	1.07
(0, −10)	−29	−27.75*	1.02	1.07
Post-event				
(+2)	−4	−9.57*	0.43	1.06
(+5)	−11	−16.23*	0.78	1.21
(+10)	−24	−24.23*	0.53	0.58
(0, +10)	−27	−25.59*	0.57	0.60
Overall	−53	−36.80*	1.55	1.17

Note: * Significance at 5%.

Table 6. Stock liquidity for the pre- and post-event window

Source: Authors.

Window	BSE100 ESG		Nifty100 ESG	
	ILLIQ	LIQ	ILLIQ	LIQ
−10	0.007686	591.5154	0.000298	12489.76
+10	0.004633	883.4157	0.000302	11691.64
−11	0.007541	605.6128	0.000289	12685.77
+11	0.004766	878.593	0.000292	11927.37
−5	0.017191	493.3658	0.000285	12758.27
+5	0.004512	1232.386	0.000337	10922.28
−2	0.005769	928.2564	0.0003	17783.09
+2	0.004434	1847.298	0.000301	16863.9
21	0.006156	680.1664	0.000295	11565.21

window. The ratio shows the illiquidity, and it is observed that the illiquidity for BSE100 ESG has significantly reduced for –10, +10, –11, +11, –5, +5, –2, +2 days, confirming considerable liquidity enhancement after the inclusion of a stock in ESG indices. Also, the overall illiquidity is observed, which is close to zero. The findings were further confirmed using the liquidity ratio as given by Barardehi et al. (2021), and it is confirmed that liquidity enhanced after stock inclusion. On the contrary, for the Nifty 100 ESG index, there are no significant changes in the liquidity ratio.

4. DISCUSSIONS

Results documented in this research work are mainly concerned with the stock price reaction, liquidity effect and firm performance of stock inclusion announcement. As shown in Table 2, fund houses having mutual fund schemes and bench-marking ESG indices for tracking their performance have posted higher returns than the Nifty50 indices and thus confirm the superior return and enhanced liquidity. Funds having higher asset allocation towards ESG stocks have outperformed their peers. In answering the question of whether stock inclusion affects price and liquidity, it is observed that there is a significant negative relationship between stock inclusion and stock returns for BSE100 ESG. Theoretically, how firms react to stock inclusion into ESG indices is a debatable question, since firms and investors perceive the ESG benefits based on what they perceive to be the value creators. Notably, decision-maker beliefs vary across the sector depending on the business value as perceived by them by changing the process and policies of the organization for the betterment of the ESG ratings (Clementino & Perkins, 2021). At the same time, price reactions to stock inclusion in ESG indices also depend on the nature of the business, and the policies that can be tuned to ESG metrics. Further,

it is not clear whether ESG indicators alone can be sufficient to judge the performance of organizations or the fund selection process, especially ETFs. The empirical findings of Folger-Laronde et al. (2020) confirm that sustainability alone cannot be the factor for evaluating the fund performance, and this cannot assure future performance too.

Table 3 shows the pre- and post-inclusion financial and market ratios. Firms adopting ESG principles and qualifying into the ESG indices attract capital investments and the attention of focused group clients, and thus experience a shift in financial performance in the long run. Findings confirm improved EPS and shareholders' market wealth post-stock inclusion. However, although BVPS and P/B have improved, it is insignificant. Firms adopting ESG principles encounter complex project selection standards for capital investments as they may have to forgo projects that do not fit into the ESG philosophy. Firms with ESG practice need to further compromise on new projects to align with their ESG philosophy, which slows down their growth in the initial years. Opportunity cost and rebalancing business models in the short run fling financial turbulence deterring overall firm performance in the short run. Nevertheless, it is expected to generate long-term returns to sustain individual and institutional investors' attraction to investments. In emerging markets like India, ESG indices are still in their nascent stage of growth. Practically, it is expected that when a stock qualifies for a benchmark index, it results in more volume and facilitates additional liquidity as portfolio managers rebalance their holdings. Fund houses and individuals still do not accept ESG indices as a benchmark, and thus there is no conclusive evidence of short-run liquidity improvement post-inclusion of stocks.

The results of this research work contribute to the literature in different ways. First of all, it answers the question of whether there is a first-mover advantage for ESG benchmark indices. It is evident, that in India BSE100 ESG indices being the first ESG index had an initial advantage, as institutional funds were tracking this for performance in the early period. Subsequently, Nifty100 ESG indices emerged as broad-based indices for performance tracking. The stock inclusion price effect as indicated by AAR and CAAR confirms that BSE100 ESG stocks have a significant negative price effect, confirming that ESG indices inclusion is not hailed by stakeholders. On the contrary, Nifty100 ESG stocks had a positive effect thou it is statistically insignificant. This is largely attributed to the date of launch of these two indices wherein BSE 100 ESG is earlier than the Nifty100 ESG in which the same or similar firms are included. Also, the BSE 100 ESG indices effect is already been embedded in the prices of these stocks after they qualified to be part of Nifty100 ESG. Information asymmetry existed in the pre-event window, and it is noticed that the BSE100 ESG has a significant negative CAAR as compared to Nifty100 ESG. The findings do not concur with the results of Shleifer (1986). According to the liquidity hypothesis stock inclusion into benchmark indices leads to enhanced liquidity as it attracts more volume from broad-based participants. Specifically, the additional demand comes from investors who are particularly interested in benchmark index stocks. In this study, results do not concur with the liquidity hypothesis confirming changes in price and volume. Since Nifty 100 ESG is the benchmark for fund houses, and there are fewer funds tracking these indices, it is concluded that stock inclusion has no liquidity effect.

CONCLUSION

The study examines how a stock, when included in a thematic index like the ESG Index, affects stock price, liquidity and financial performance. In this regard, the response of the list of stocks that constitute BSE 100 ESG and Nifty 100 ESG was analyzed. Using the event study method under the market model with an event window of -10 and +10 days, the pre and post-inclusion impact was analyzed.

The empirical findings indicate the presence of excess returns on the announcement date and during pre- and post-announcement dates of -10 to +10 days. It also confirmed the information content of stock inclusion announcements. It is observed that there is a significant negative relationship between stock inclusion and stock returns for BSE100 ESG. However, for Nifty 100 ESG, insignificant positive returns

are documented. With regard to financial performance, the study documents improved EPS and shareholders' market wealth post-inclusion of stock in the ESG index. However, BVPS and P/B thou have improved, and it is statistically insignificant. Further, the turnover-based liquidity indicates no significant change after post-stock inclusion. When verified with the illiquidity ratio, it is observed that the illiquidity for BSE100 ESG has significantly reduced, which confirms considerable liquidity enhancement post-inclusion of stock into ESG indices. The findings were further confirmed using the liquidity ratio as given by Barardehi et al. (2021), and it is confirmed that liquidity enhanced stock post-inclusion. On the contrary, for the Nifty 100 ESG index, there are no significant changes in the liquidity ratio. Overall, the study found no permanent impact on the price and liquidity, though liquidity was highly significant.

The results of this study will be useful for traders and portfolio managers in stock selection and portfolio construction. As there is a price reaction for stock inclusion, expected returns are affected in the short run. Portfolio adjustments are needed when a stock qualifies for the ESG index. Similarly, liquidity dynamics change for stock inclusion, and hence informed investors should adjust the trading volume accordingly. Long-run firm performance change is witnessed around stock inclusion in the ESG index; hence, long-term investors consider stock inclusion information for fundamental analysis of a firm. Thus, understanding the effect of stock inclusion in ESG indices in India on price, liquidity and firm performance is imperative for traders and investors for stock evaluations.

AUTHOR CONTRIBUTIONS

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