

IMPACT OF COP26 ON INDIAN STOCK INDICES: AN EVENT STUDY APPROACH

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ABSTRACT

The study aims at measuring impact of Indian government commitment on ESG100 index and BSE Manufacturing Index of Bombay Stock Exchange. The study uses the Event study approach to compare pre-event and post-event Abnormal return and cumulative abnormal return. The Bootstrapping and Wilcoxon tests has been used for comparison. There is no significant difference found in abnormal return of both of the index. Mean adjusted cumulative abnormal return of both of the index es has significant differences. In BSE ESG100 index, Market adjusted cumulative abnormal return has no significant difference. In BSE Manufacturing index, Mean adjusted cumulative abnormal return has significant difference. The carbon neutrality deadline is long away, so Indian investors do not consider CoP26 seriously.

KEYWORDS: Stock Market, Conference of Parties, Event Study.

Introduction

With rapid social and economic development, a huger equirement of energy has led to burning of a huge amount of fossil fuels, causes sharp increase in carbon dioxide emissions and leading to the deterioration of the climate (Verbeke and Hutzschenreuter, 2021). The old industrialisation model based on high energy consumption, cannot be part of long-term sustainable development (Zhang et al., 2021). Reducing carbon dioxide emissions on a large scale is therefore essential for sustainable growth, especially in countries where carbon emissions are more severe (An et al., 2015). Now almost all the countries in the globe aims at carbon neutrality to promote long run sustainable development. Global warming and climate change are causing prompt efforts by countries to reduce carbon footprint. Consequently, in recent years, most countries have come together to cooperate to reduce greenhouse gas emissions (Hao et al., 2015). For example, the UN Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming highlighted the need to become carbon-neutral by the middle of the century. The European Union, China, Canada, Japan, and other countries have made carbon-neutral commitments to achieve the goal of zero net emissions (Zhang et al., 2021; Maroufmashat and Fowler, 2018). Subsequently, several firms, including HSBC and Google, began developing their own CSR plans and introducing carbon-neutral initiatives, which are seen as key to their brand image in the 21st century. Other well-known international companies have also adopted CSR practices regarding carbon neutrality (Goud, 2022), including Apple, Microsoft, Amazon, the Swiss Re-insurance Company and the US ice cream company Ben & Jerry's (Gianfrate, 2018; Jones, 2018). India is the fifth the largest economy in the world. India's contribution in world carbon emission is significant. In recent year,

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government of India announced carbon neutrality by 2070, increase non-fossil energy capacity to 500 GW by 2030, meet 50 percent of India's energy need from renewable energy source by 2030, reducing projected carbon emission by one billion tonnes by 2030, and reduce carbon intensity by 45 percent by 2030 in Conference of the parties 26 in Glasgow in Germany in 2021 November (*National Statement by Prime Minister Shri Narendra Modi at COP26 Summit in Glasgow, 2021*).

This paper aims at following

- Measuring impact of Indian government commitment on ESG100 index of Bombay Stock Exchange.
- Measuring impact of Indian government commitment on Manufacturing index of Bombay Stock Exchange.

Literature Review

Global warming is caused by the increase in greenhouse gas emissions due to the growth in industrial and transportation activities. Several international climate agreements/treaties have been signed and many countries have implemented measures of environmental regulation to force industries to cut down their CO₂ emissions. Such steps cause to cut off the use of Fossil fuel. The cutting off the use of fossil fuel will hamper the production process initially. Production cut off significantly affect the stock performance. (Pham et al., 2019) has found significant impact of Paris climate change agreement on polluted industries in terms of risk and return. (Li et al., 2023) found that carbon neutrality initiatives have a significant average abnormal return of 0.99% on the announcement date and a positive long-term impact on shareholder value. This equity return is more pronounced for smaller firms with higher social ratings, and the stock market reacts less positively to firms that announce carbon neutrality initiatives in social responsibility reports. The stock market does not react strongly to manufacturing firms' carbon neutrality initiatives. (Yadav et al., 2015) found positive impact of Newsweek green ranking score on US firm values. (Gupta & Goldar, 2005) has also found that unfriendly environmental behaviour of firm has negative impact on stock value. Covid-19 pandemic also slowed the manufacturing and other activity. (Ganie et al., 2022) has found significant impact of Covid-19 on stock market. (Sharma & Bora, 2022) has studied the impact of Covid-19 on stock market and found significant difference in CAAR during pre and post event period. Company announcement also has impact on stock market. (Pandey et al., 2022) has studied the impact of corporate announcement on stock return using t-test and found the impact is not similar in different companies. (Cao et al., 2018) has studied the impact of corporate information release on stock value.

The Event study approach consider number of variables. (Sutar et al., 2022)(Chauhan & Kaushik, 2017) has studied the impact of Demonetization on Indian stock market using market risk adjusted abnormal return, mean adjusted abnormal return and Cumulative abnormal return. (He et al., 2020) has found adverse impact of Covid-19 on mining, transportation, electricity & heating, and environment industries using t-test for comparing pre and post abnormal rate of return respectively. (Nisar & Yeung, 2018) found short term relationship between Political sentiment and FTSE100 movement using z-test and ANOVA. (Oyadeyi et al., 2024) has studied the impact of Russia-Ukraine war on African Stock market. (Angelovska, 2017) has studied the impact of earning announcement on Stock price using t-test. (Di & Mazzuca, 2023) has put both Bootstrapping and Wilcoxon to compare the non-normal distributed abnormal return.

Methodology

Event study mainly examines the abnormal changes of sample stock prices (or abnormal returns) after a specific event occurs. We used event study in this article to examine the impact of the CoP26 on the stock market. There are three main models for calculating abnormal returns: the average adjusted return rate model; the market index adjusted return rate model(He et al., 2020); and the company valuation model(Di & Mazzuca, 2023). The average adjusted rate of return model has a large deviation, when a bull or bear market occurs on the event day. The market index adjusted return model has a strong relationship assumption, which is not applicable in most cases. Market valuation models are the most commonly used and have good predictive power. In this article, we used the valuation model, which is outlined as follows.

Return on Stock Price

$$Return = \left(\frac{CLOSE_{it} - CLOSE_{i(t-1)}}{CLOSE_{i(t-1)}} \right) * 100.. (i)$$

Calculate the normal rate of return:

$$R_{it} = \alpha + \beta R_{Mt} + \varepsilon \dots\dots\dots(ii)$$

Abnormal rate of return from Adjusted market risk:

$$AR_{it} = R_{it} - (\alpha + \beta R_{Mt}) \dots\dots\dots(iii)$$

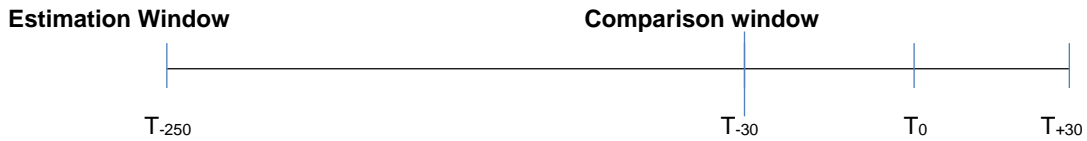
Abnormal rate of return from Mean adjusted risk:

$$AR_{it} = R_{it} - \bar{R}_{it} \dots\dots\dots(iv)$$

Cumulative abnormal Return (Stock valuation)

$$CAR_{it} = \sum_{t=1}^N AR_{it} \dots\dots\dots(v)$$

The ESG100 index and Manufacturing index data are collected from Bombay Stock Exchange Website from 20th September 2020 to 20 December 2021. Data from 20th September 2020 to 20th September 2021 were used for estimating Beta and average mean of the indexes. The rest data were used to calculating Abnormal rate return and cumulative rate of return. the event took place on 2nd November 2021 For the purpose of comparison of pre and post event, Wilcoxon and Bootstrapping test were applied (Di & Mazzuca, 2023).



Discussion and Analysis

The estimation windows give beta value and mean of returns of ESG100 index and manufacturing index. The beta value for ESG100 index is 0.9653 and for Manufacturing Index is 0.74463. the average mean of returns are 0.1918 and 0.1610 for ESG100 and Manufacturing Index respectively.

Table 1: The P-value of the Bootstrapping and Wilcoxon test for ESG100 Index

ESG100 INDEX				
	ABMR	ABME	CARMR	CARME
BOOTSTRAPPING	0.673	0.325	0.109	0
WILCOXON	0.556	0.377	0.08	1.041e-7

Table 2: The P-value of the Bootstrapping and Wilcoxon test for BSE Manufacturing Index

Manufacturing Index				
	ABMR	ABME	CARMR	CARME
BOOTSTRAPPING	0.919	0.452	0.007	0.007
WILCOXON	0.877	0.664	0.0032	0.003

ABMR- Market risk adjusted abnormal return, ABME- mean adjusted abnormal return, CARMR- Cumulative Market Adjusted Abnormal Return, CARME- Cumulative mean Adjusted Abnormal Return

Bootstrapping and Wilcoxon confirms that there is no significant impact of CoP26 on risk adjusted abnormal return of BSE ESG100 index and BSE Manufacturing Index. Both tests also confirms that there is no significant impact of CoP26 on mean adjusted abnormal return of BSE ESG100 index and BSE Manufacturing Index. Both Bootstrapping and Wilcoxon confirms that there is no significant impact of CoP26 on risk adjusted Cumulative abnormal return of BSE ESG100 index. There was a significant difference found in mean adjusted cumulative abnormal return of BSE ESG100 index with p value less than 0.005. BSE Manufacturing Index has significant difference in risk adjusted cumulative abnormal return and mean adjusted cumulative abnormal return due to CoP26 event. Statistically significant differences are highlighted.

Conclusion

The stock market fluctuates due to investing and trading activities. At abnormal return, both Market risk adjusted abnormal return and mean adjusted abnormal return, of BSE ESG100 Index and

BSE Manufacturing Index are not significantly different. The mean adjusted cumulative abnormal return of BSE ESG100 Index and BSE Manufacturing Index has significant difference. The mean adjusted cumulative abnormal return of BSE ESG100 Index has no significant difference. BSE Manufacturing Index has significant difference in mean adjusted cumulative abnormal return. As Indian government has decided to attend carbon neutrality by 2070, the Indian investors have not considered the same seriously. The accumulated small difference arises in abnormal return makes the cumulative abnormal return significant different.

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