EFFECT OF INFORMATION SHOCKS TO GREEN STOCKS: A COMPARATIVE STUDY IN CONTEXT OF BSE GREENEX

Aashna Aggarwal

Priyam Kumar Singh

Jaskiran Arora

Chitrakalpa Sen

Abstract

Increasing awareness about the climate change issues in recent years has put significant emphasis on the need of production processes with reduced carbon footprint. Empirical studies have shown evidence for the fact that green stocks are more stable, especially during crisis and also, yield a higher than average return in the market. This study aims to look at the effects of information shocks in Indian context of green stocks. For this purpose, BSE-GREENEX is considered. 18 important events in Indian market, from Jan 2015 till May 2016 has been selected. The results revealed that although GREENEX seems to be less sensitive than BSE200, the difference is marginal.

1. INTRODUCTION

Going green is referred to as activities of corporate enterprises, which involve deliberate efforts with an aim to reduce emission of pollutants, produce products which are environment friendly and using technology that will promote protection of the environment. With an increase in consciousness about the environment, companies are increasingly focussing on such sustainable and environmental-friendly practices. More so, because of this increased awareness, there has been a great amount of pressure on companies to take environmental factors into consideration when making investment decisions and also to take responsibility for the same.

However, adoption of greener production methods are often met with significant resistance by the firms. From a producer's perspective, greener technologies are expensive and are often long term propositions, as a result having an adverse impact on the firm's profit in a competitive market. Therefore, a profit-maximizing producer will invest in greener technologies only when there is an incentive to it. Although it is commonly known that green investment results in positive returns in long run, most corporations has a more short-run vision in mind. If it can be shown that green stocks perform better under stress than regular, "grey" stocks, the intrinsic robust and stable nature of green assets can be proved, which will confirm the risk-free nature of these stocks.

Therefore, the investment in greener technologies will also increase. This study aims to look at one of the stability aspects of green stocks, namely the effects of external shocks on returns. If it can be shown that green stocks are relatively less sensitive to external shocks than regular ones, one aspect of the underlying robustness and investment worthiness of the green assets can be proved. The findings will help investors in taking decisions regarding investments and whether investing in green stocks is profitable or not. The literature review in the study reveals a general lack of research towards the effect of events on green stock market particularly. This study aims to fulfil that gap.

2. LITERATURE REVIEW

With an increase in awareness regarding the importance of the preservation of the environment, companies have started to look for new ways to become environmentally friendly (Eyraud et al, 2012). Going green has many benefits associated with them like public relations, cost savings and tax credits. Studies have shown that organizations benefit from going green on three aspects, which are in terms of social costs, environmental

benefits and financial gain. Bansal & Roth (2000) present three motivations for companies to go green – competitiveness, legitimation and ecological responsibility. Gupta & Goldar (2005) examined the impact of environmental rating of certain industries on their stock prices and found that the market generally penalised for behaviour that was not environment friendly and announcements of such a nature led to negative abnormal returns of upto 30%. Reports have also shown that failure to go green can lead to negative consequences such as regulatory action as well as consumer and investor backlash (PWC 2008).

Derwall, et al. (2005) undertook a study where they compared stocks with high environmental rating with those having low ratings and found that portfolios with higher environmental ratings have given substantially higher returns when compared with portfolios having lower environmental ratings. The study revealed a positive and somewhat asymmetric relationship between operating performance and eco-efficiency. Firms which were considered to be eco-efficient had a smaller superior return on assets when compared to the control group. On the other hand, the least eco-efficient companies showed high

operational underperformance. They concluded to suggest that all levels of transaction costs, incremental benefits of socially responsible investing (SRI) are substantial. (). Some other studies by (Preston & Martel, 2008;, Galema, et al., 2008) suggested that investing in green stocks provides hedging properties, investing in companies who save resources provides hedging against resource price spikes i.e. it gives benefit when prices of energy increases.

In the Indian context, a number of studies present discussions on relative performance of the Green Index. Prasad & Kumar (2015), too observed that S&P BSE GREENEX performed better than BSE Sensex. Similar studies have also been carried out by other researchers which involved analysing the performance of BSE-GREENEX index vis-à-vis BSE-Sensex and BSE-500 to find out whether it was financially rewarding to invest in green stocks. It was found that the mean daily returns on GREENEX were consistently higher than for the other two indices. This study too showed the rewards and long term value gained by investing in green stocks (Bhattacharya, 2013). Tripathi & Bhandari (2014) found that despite higher systematic risk, socially responsible stock portfolios had lower relative risk and performed better during the crisis as well as the post-crisis period. GREENEX provided positive net selectivity returns which was an indication that diversification was rewarded well in terms of greater returns. A study by Chakrabarti and Sen (2015) has pointed towards the fact that Green stocks lend to a greater stability to portfolios and therefore are safer choice, especially in times of crisis.

However, Walley and Whitehead (1994) reasons that the cost of adhering to ethical standards translates into higher product prices and therefore leads to competitive disadvantage and lower profitability. Cohen et al. (1997) compared the financial performance of companies which were considered as heavy polluters and those that were considered as light polluters and suggested that investing in companies that seem to have high environmental consciousness neither improve nor reduce overall portfolio returns. Similarly, Tripathi & Bhandari (2012), report no significant difference in the returns of green and non-green stocks portfolios during the pre-crisis period and post crisis i.e. period between April 2000 to March 2012.

This study aims to look at one of the stability aspects of green stocks, namely the effects of external shocks on returns. For this purpose, BSE GREENEX has been chosen for India. To compare the performance of GREENEX, BSE200 has also been chosen as a reference. The performance of both the indices are investigated vis-à-vis the performance of the market index, BSE SENSEX. The period in consideration is from January 2015 till June 2016. The findings will help investors in taking decisions regarding investments and whether investing in green stocks is profitable or not. The literature review in the study reveals a general lack of research towards the effect of events on green stock market particularly. This study aims to fulfil that gap.

3. DATA AND SAMPLE PERIOD

For the purpose of this study, BSE GREENEX has been chosen for India. To compare the performance of GREENEX, BSE200 has also been chosen as a reference. The performance of both the indices are investigated vis-à-vis the performance of the market index, BSE SENSEX. The period in consideration is from January 2015 till June 2016. Daily returns have been chosen for all three.

- BSE-GREENEX Index has the top 25 companies from the BSE-100 Index which perform well in terms of their carbon emissions, market capitalization (free-float) as well as their turnover.

- BSE200 includes the top 200 companies (based on size and liquidity) listed under Bombay Stock Exchange.

- BSE SENSEX is a free-float market weighted stock index, including 30 companies.

3.1. MAJOR EVENTS IN INDIA

To identify the impact of external information, 18 events during the sample period has been identified which may have potential impact on the market. These events range from Reserve Bank of India's interest rate announcements to political, diplomatic and technological policy announcements. The events are listed below in Table 1. (**Refer Table No.1**)

4. DUMMY VARIABLE REGRESSION MODEL

To capture the effect of each event, a dummy variable regression model is used. Each event corresponds to a dummy variable and the day on which the event

took place and on all consequent dates, the dummy takes the value of 1, and all dates before that the value of 0 or that dummy.

The dummy variable regression model for GREENEX returns can be written as –

$$GREENEX = \alpha + \sum_{i=1}^{11} \beta_i INT_i + \beta_{12} DIGI_i + \beta_{13} EASE_i + \beta_{14} BUDGET16_i + \beta_{15} BUDGET15_i + \beta_{16} AAP_i + \beta_{17} CHAB_i + \beta_{18} SS_i + u_i$$

$$\ldots \quad \ldots \quad \ldots \quad (1)$$

And the dummy variable regression model for BSE200 returns can be written as –

$$BSE200 = \gamma + \sum_{i=1}^{11} \delta_i INT_i + \delta_{12} DIGI_i + \delta_{13} EASE_i + \delta_{14} BUDGET16_i + \delta_{15} BUDGET15_i + \delta_{16} AAP_i + \delta_{17} CHAB_i + \delta_{18} SS_i + u_i$$

$$\ldots \quad \ldots \quad \ldots \quad (2)$$

5. ANALYSIS

First, all three return series, GREENEX, BSE200 and SENSEX is checked for possible non- stationarity using Augmented Dickey Fuller test. The result indicates that all three return series are stationary in nature. **(Refer Table No.2)** Given the stationary nature of the three return series, we now proceed to the regression. The first regression results show that the second, third and sixth interest rate announcements, alongwith the 2016 union budget on 29th

Feb 2016 and the Aam Aadmi Party's winning the election in Delhi have significant impact on GREENEX return. The results also indicate that the second and sixth interest rate announcement, alongwith the Chabahar port announcement and PM Modi's announcements on social security schemes have significant impact on the return of BSE200. **(Refer Table No.3)** However, in the first regression, a number of dummy variables exhibit a high degree of insignificance. To improve the explanatory power of the model, we keep dropping the highly insignificant dummy variables and re-run the regression. After the adjustment, the regression is run again. The result is summarized in table 4 below. **(Refer Table No.4).** Table 4 suggests that although a number of events (INT2, INT6, BUDGET16 and AAP) has an impact on both GREENEX and BSE200, BSE200 is more sensitive to shocks. BSE200, within a span of 17 months is affected by 9 shocks, compared to 6 by GREENEX. However, the significance of the shocks here are considered at 10% level. If the significance level is considered to be at 5% level, both BSE200 and GREENEX would have six significant shocks each, albeit at different dates. Interestingly, SENSEX returns do not seem to have a significant impact on

GREENEX returns or BSE200 returns. For GREENEX, the event with the largest impact is INT6, which is the interest rate announcement by the RBI on 4th August, 2015. RBI announced that the interest rate will be maintained at 7.25%. This had a large negative impact on the GREENEX return, as there was a widespread expectation that RBI will cut interest rate followed by slow industrial growth. For GREENEX, the win in Delhi election by the Aam Aadmi Party (AAP) was a close second in terms of impact, although negative. The interest rate cut by the RBI in June 2 has had the largest favorable impact on the market. On BSE200, however, the largest impact (also positive) was the announcement of the pact between India and China to develop the Chabahar port. It was a strategically important policy which helped counter Pakistan and China's alliance in the region. RBI's interest rate announcement on 3 Feb 2015 had the largest negative impact on BSE200.

6. CONCLUSION

In this study, we wanted to investigate whether and how at the national level, information shocks influence the returns of GREENEX and BSE200. The results suggest that GREENEX is less sensitive to policy announcements than BSE200. This may tempt us to imply that green stocks are safer bets when there are significant information shocks in the marketplace. However, considering the level of significance at 5%, the number of events that changes GREENEX return significantly is not much different than the number of significant events in BSE200. Sometimes, the impact of the same event is opposite in nature, which is confounding. This may stem from the fact that this is a somewhat simplistic model and return of green indices may depend on a variety of other macroeconomic and environmental parameters like greenhouse gas emissions, laws relating to vehicle pollution, etc. which could further be taken into consideration, which gives us a future scope to extend this study. As the concept of 'going green' is gaining popularity, the aim of this study was to see if there were effects of announcements and shocks on green stocks in India. Through the study it can be said though announcements in India have only a marginally different impact on the green indices. However, this study may present a simplistic and a case in isolation. In order to truly understand the inherent robustness of green stocks, if any, a much larger canvas would be more appropriate.

7. BIBLIOGRAPHY

Bhattacharya, R., 2013. Effect of Going Green on Stock Prices: A Study on BSEGREENEX. International Journal of Computer Applications, pp. 32-37.

Chakrabarti, G & C. Sen, 2015, Green Investig: The Case for India, SpringerBriefs in Finance.

Cohen, M. A., Fenn, S., & Naimon, J. S. (1995). Environmental and financial performance: are they related?. Investor Responsibility Research Center, responsible investment. Journal of Banking & Finance, 32(12), p. 2646–2654.

Gupta, S. & Goldar, B., 2005. Do stock markets penalize environment-unfriendly behaviour? Evidence from India. Ecological Economics, 52(1), pp. 81-95.

Ioannidis, C. & Kontonikas, A., 2006. Monetary Policy and the Stock Market: Some International Evidence. Business School - Economics, University of Glasgow, p. 25.

Prasad, M. S. & Kumar, S. A., 2015. Issues in Trends in Sustainability Reporting by Indian Companies as per Global Standards.

Environmental Information Service.Derwall, J., Guenster, N., Bauer, R. & Koedijk, K., 2005. The eco-efficiency premium puzzle. Financial Analysts Journal, 61, pp. 51-63.

Eyraud, L., & Clements, B. (2012). Going Green-Investment in environmentally friendly technologies is growing globally. Finance and Development-English Edition, 49(2), 34. Galema, R., Plantinga, A. & Scholtens, B., 2008. The stocks at stake: Return and risk in socially

Asian Journal of Research in Business Economics and Management, 5(7), pp. 57-64.

Preston, J. & Martel, B., 2008. Investment opportunities in clean energy. CFA Institute Conference Proceedings Quarterly, 25(1), pp. 5-13.

Tripathi, V. & Bhandari, V., 2012. Green is Good in Indian Stock Market. Colombo Business Journal, pp. 27-45.

Tripathi, V. & Bhandari, V., 2014. Socially responsible stocks: a boon for investors in India. Journal of Advances in Management Research, 12(2), pp. 209-225.

LIST OF TABLES:

TABLE 1. MAJOR EVENTS IN INDIA DURING 2015-16*

EVENT DATE	EVENT DESCRIPTION	SYMBOL
15-Jan-15	RBI lowers interest rate from 8% to 7.75%	INT1
3-Feb-15	RBI maintains the interest rate at 7.75%	INT2
4-Mar-15	RBI lowers interest rate from 7.75% to 7.5%	INT3
7-Apr-15	RBI maintains the interest rate at 7.5%	INT4
2-Jun-15	RBI lowers interest rate from 7.5% to 7.25%	INT5
4-Aug-15	RBI maintains interest rate at 7.25%	INT6
31-Aug-15	RBI lowers interest rate from 7.5% to 7.0%	INT7
29-Sep-15	RBI lowers interest rate from 7.25% to 6.75%	INT8
1-Dec-15	RBI maintains the interest rate at 6.75%	INT9
2-Feb-16	RBI maintains the interest rate at 6.75%	INT10
5-Apr-16	RBI lowers interest rate from 6.75% to 6.5%	INT11
1-Jul-15	Digital India programme launched	DIGI
26-Oct-15	India jumps 12 ranks in the ease of doing business ranking	EASE
29-Feb-16	Union budget 2016	BUDGET16
28-Feb-15	Union budget 2015	BUDGET15
10-Feb-15	Aam Aadmi Party coming into power in Delhi	AAP
6-May-15	India and Iran signs agreement to develop port in Chabahar	CHAB
9-May-15	The PM launches three large scale social security schemes	SS

* In case the stock index data was not available on the day of the event, the next available day has been chosen.

TABLE 2. ADF TEST RESULT

	t-Statistic	Prob.*
GREENEX	-17.433	0
BSE200	-17.2199	0
SENSEX	-17.3975	0

TABLE 3. FIRST REGRESSION MODEL

	GREENEX	BSE200
C	-0.27	0.01
SENSEX	-0.01	-0.05
INT1	0.50	0.39
INT2	0.56**	-0.91***
INT3	-0.79***	0.06
INT4	-0.13	-0.39
INT5	0.77	-0.44
INT6	-0.98**	0.85***
INT7	-0.49	0.53
INT8	0.67	-0.33
INT9	0.05	0.02
INT10	-0.12	-0.01
INT11	-0.16	0.06
DIGI	0.30	-0.51
EASE	-0.46	-0.11
BUDGET16	0.59	-0.44
BUDGET15	0.94***	0.27
AAP	-0.91***	0.85
CHAB	-0.05	1.09***
SS	0.16	-0.79***

* signifies significance at 10%, ** signifies significance at 5%, *** signifies significance at 1%

TABLE 4. SECOND REGRESSION RESULTS

	GREENEX
C	-0.27
SENSEX	0.00
INT1	0.49
INT2	0.57**
INT5	0.80**
INT6	-0.97**
INT7	-0.49
INT8	0.67
DIGI	0.30
EASE	-0.45**
BUDGET16	0.40**
AAP	-0.81***

	BSE200
C	0.01
SENSEX	-0.05
INT1	0.39
INT2	-0.91***
INT4	-0.38
INT5	-0.44
INT6	0.85***
INT7	0.53*
INT8	-0.41*
DIGI	-0.51**
BUDGET15	-0.38
BUDGET16	0.29*
AAP	0.85***
CHAB	1.09***
SS	-0.79**

* signifies significance at 10%, ** signifies significance at 5%, *** signifies significance at 1%