ISSN : 2349-7165

Sustainable Business Practices and Stock Performance: A Study of BSE Greenex and its Constituents

Abhay Raja
Associate Professor (Finance), Shanti Business School, Ahmedabad
drabhayraja@gmail.com

ABSTRACT

This study aims at measuring performance of BSE Greenex vis-à-vis performances of BSE Sensex and BSE – 100 indices. The study also focuses on measuring performance of portfolio of constituents of BSE Greenex with the performances of the portfolio of their control companies, i.e. the companies which are comparable to the constituents of BSE Greenex but not part of the BSE Greenex.

Six years monthly data from March 2012 to March 2018 were analyzed. The Sharpe's, Treynor's and Jenson's performance indices are used for performance measurement of portfolios and indices. Statistical tests for equality of means and tests for paired differences were employed to test if the returns of both the portfolios differ significantly.The study found that performances of BSE Greenex and its constituent companies were not better than the performances of other indices and control companies.

Keywords: BSE Greenex, Control Companies, Portfolio Performance Evaluation, Sustainable Business Practices

INTRODUCTION

In the quest for survival, sustainability has moved to corner. In recent years, lot of talks for climate change and global warming are heard. Sustainable business practices are not just need of the hour, but are inevitable looking at the widely spread pollution level. According to report of World Economic Forum (2011), in the six years from 2004 to 2010 global fresh investment in clean energy increased from USD 52 billion to USD 243 billion.

With the initiatives of sustainable stock exchanges, capital markets world over are becoming concerned about green practices. Globally the quest for green capital markets began in 2011 with the launch of first green index, the Living Planet Green Tech Europe Index1. In India, Bombay Stock Exchange (BSE) has launched BSE Greenex and BSE Carbonex in 2012. These indices include companies based on their environmental performance and carbon emission.

The notion of investors' reaction and stock returns to sustainable corporate practices is always debated. Many investors prefer green investing but they may not be ready to compromise on returns. This study presents research on returns of BSE Greenex and portfolio of its constituent companies vis-à-vis returns of other indices and portfolio of control companies.

This section is followed by literature review on green practices and financial performance and green practices and market returns. Research methodology is explained in the next section followed by data analysis and discussion and conclusion.

REVIEW OF LITERATURE

The research efforts for linking green practices and performance commenced almost before three decades. By en large, majority of the studies fall into two different categories; one, that link green practices and financial performance, and two, which link green practices and stock returns. This research is not intended to study green practices and financial performance but the fact that financial performance eventually impacts stock returns is evident. Hence, following section presents literature study in two sub parts; one green practices and financial performance, and two green practices and stock returns.

Green Practices and Financial Performance

There are many benefits to companies for going green. Many customers willing to consume more currency if production process follows green practices (Coddington, 1990; Suchard and Polonsky , 1991). PWC report of 2008 noted that any failure to go green may result into negative response by consumer and investor. Schatzki (2008) cited that not just companies but society at large is also benefitted by green initiatives which can lead to various macroeconomic benefits. Brown's case study (2009) mentioned example of large refineries in California that received benefits of going green by gaining market share as well as profits. Boulatoff and Boyer (2009) studied hundred firms and concluded that sector is important factor in deciding association between environmental efficiency and performance. The benefits of going green are well spread in cost saving, competitive advantage, employee retention, customer loyalty etc. (Graci and Kuehnel). Videen (2010) inferred that environmental announcements by corporate have effect on financial valuation of the firm.

Lopez et al. (2007) found negative correlation between sustainable performance and financial performance. Chih et al. (2010) also had similar finding where they found that financial performance and is not related with corporate social responsibility. They also found that larger firms are more into CSR and sustainable practices in comparison of smaller firms.

Green Practices and Stock Returns

Findings of Diltz (1995) were significant in regard to environmental performance and stock returns. He studied twenty eight companies for ten years from 1981 to 1991 and found that environmental performance improves portfolio performance as significantly. Cohen et al. (1997) inferred that environmental performance is indifferent to the portfolio returns portfolio returns neither improved nor reduced.

Lewis and Mackenzie (2000) argued that investors, while constructing the portfolio would be willing to sacrifice on returns part if the firm is consistent in ethical practices. Lewis (2001) also presented the same argument. The study by Konar and Cohen (2001) concluded negative relationship between bad environmental performance and value of the firms. They studied the sample of S&P 500 firms to arrive at the conclusion. Scheuth (2003) emphasized that even though the objective of investors is to generate better returns, some investors also stress on firms to follow sustainable practices. Derwall et al. (2005) found that portfolios with high environment rating stocks generated significantly better returns.

Brammer et al. (2006) found negative relationship between corporate sustainable performance and stock returns. Firms with higher scores on social performance generated lower returns in comparison of the firms with lower corporate sustainable performance scores. The study was based for UK firms and environment, employment, and community activities were taken as proxy for social performance. They extended their inference to cite that various aspects of social performance indicator should be examined separately to achieve more reliable outcomes. Jones et al. (2007) based their study in Australian context and correlated sustainable reporting with stock returns. They found that most of the results were statistically insignificant. However, relationship between sustainable reporting and stock returns was found negative.

Olsson (2007) in his study based for thirty US industry portfolios found that environmental efficiency of portfolios does not enable portfolios to generate better and statistically significant returns. Semenova and Hassel (2008) associated environmental performance and market value by taking riskiness as differentiating variable. They found that market value in high risk industry is more affected by environmental performance than the low risk industry.

Dunn (2009) related environmental efficiency with earnings which affects returns. He found that firms with better environmental efficiency may have better earnings resulting into better returns. Dixon (2010) found that sustainability themed investment generates more risk and may result in improved returns.

Tripathi and Bhandari (2012) studied portfolios of Indian stock market for twelve years from 2000 to 2012 and found that green portfolio significantly outperformed non green stocks portfolio and market portfolio during crisis period. They also found that green portfolio had lower systematic risk than non green portfolio. Bammi (2013) employed event study methodology to investigate investors' reaction to the announcement of stock being included in BSE Greenex and found negative returns during the study window, which means investors do not welcome inclusion of stock in Green indices.

The above discussion presents two insights; one, researches present three view points, positive impact of green practices on market returns, negative impact, and indifferent relationship, which means more research efforts are needed andtwo, less research efforts are made in Indian context. This study is another effort to contribute into green practices and market returns in Indian perspective. The present study investigated relationship of green practices and market returns for index returns as well as for stock returns.

RESEARCH METHODOLOGY

The principal aim of this study is comparing performance of BSE Greenex vis-à-vis performances of BSE Sensex and BSE-100 indices. In order to arrive at more reliable inferences, the study is further extended to compare the performances of constituent companies of BSE Greenex and control companies. Control companies were defined as companies that are comparable to the constituents of BSE Greenex but they are not part of BSE Greenex as they are not carbon efficient. The criteria for selection of control companies were;

1. The companies comparable to the constituent companies of BSE Greenex on net sales basis
2. The companies that are not part of BSE Greenex

The researcher assumes that carbon efficient companies are also a better investment choice.

To measure the performances of constituent companies of BSE Greenex and control companies, two different portfolios were constructed. Portfolio 1 (Constituent companies of BSE Greenex) includes 25 companies and Portfolio 2 (Control companies) includes 2 companies because, in Automobiles – Cars and Jeep industry, only one company Hind Motors was taken as control company for Mahindra and Mahindra as well as Maruti Suzuki. These companies in the portfolios were weighted according to free float market capitalization methodology with a maximum weight of six percent (since it is the condition in BSE Greenex).

The monthly closing values of indices and companies were analyzed for the period six years from March 2012 to March 2018. The data of indices and sample companies were extracted from investing.com. Sharpe ratio was used to compare performances of indices. Treynor's performance index and Jenson's alpha were used to compare the two portfolios of BSE Greenex companies and control companies. The following formulae were used for comparing performances of indices and portfolios.

- Sharpe's Performance Index $S = (Rm - Rf) / \quad m$
- Treynor's Performance Index $T = (Rp - Rf) / \quad p$
- Jenson's Performance Index $= (Rp - Rf) - \quad p\,(Rmg - Rf)$

Where;

- Rm = Weighted monthly return of market index for six years
- Rp = Weighted monthly return of portfolio for six years
- Rf = Risk free rate (364-days T-bills rate as on 16th May 16, 2018, i.e. 6.67 percent)
- m = Standard deviation on index returns
- p = Portfolio Beta
- Rmg = Average monthly return of BSE Greenex

Further, statistical tests were used to check if the returns of both the portfolios differ significantly. For this purpose tests for equality of means (independent sample tests) and tests for paired differences (paired sample tests) were employed. Before applying statistical tests, the data were checked for normality by using Kolmogorow-Smirnov and Shapiro-Wilk tests. It was found that according to both the tests series of returns of control companies found normal and series of returns of BSE Greenex companies was found not normal. Hence, instead of modifying the data to make it normal, the researcher applied both parametric and non-parametric tests. For equality of means, independent sample t test and Mann-Whitney tests were employed. For paired difference, paired t test and Wilcoxon Singed Rank test were used.

DATA ANALYSIS AND DISCUSSION

Table 1 Descriptive Statistics on Portfolios

Descriptive Statistics		
	Portfolio 1 BSEGreenex	Portfolio 2 Control Companies
Mean Return(in percentage)	1.59	1.33
Standard Deviation(in percentage)	1.00	0.97
Std. Error Mean	0.20	0.19
Kolmogorow-Smirnov	0.2290	0.0980
Sig.	0.0020	0.2000
Shapiro-Wilk	0.8450	0.9680
Sig.	0.0010	0.5930
N	25	25
Correlation	0.3220	
Sig.	0.1170	

Mean monthly return for portfolio 1 was 1.59 percent with standard deviation of 1 percent. While for the portfolio 2 mean monthly return was 1.33 percent with standard deviation of 0.97 percent. The researchers' assumption that carbon efficient companies are better investment alternative is validated here as the return on portfolio 1 is more. To check whether these differences are significant, tests for equality of means and test for paired differences were used. Before applying statistical tests, both the series were checked for normality and it was found that series portfolio 1 was not normal and portfolio 2 was found normal. The correlation between both the series was found positive and significant.

Table 2 Tests for Equality of Means

Tests for Equality of Means			
	T-test Statistic	df	Sig. (2-tailed)
Portfolio 1 & Portfolio 2	0.9250	48	0.3590
	Mann-Whitney Test Sig. Value		0.4150

Since one series was normal and the other was not normal, the researcher has employed both parametric and non parametric tests for equality of means. However, the results of both the tests were similar. The null hypothesis of no significant difference between returns of both the portfolios was failed to reject as per independent sample T test and Mann-Whitney test. This infers that there is no significant difference between returns of both the portfolios.

Table 3 Tests for Paired Differences

Tests for Paired Differences				
		Paired T-test Statistic	Df	Sig. (2-tailed)
Pair	Portfolio 1 & Portfolio 2	1.1230	24	0.2720
		Wilcoxon Signed Rank Test Sig. Value		0.2880

Tests for paired differences were employed with the logic that portfolio 2 was formed after assigning arguments for control companies to the selection process. Hence, tests for paired differences were also employed to check if there is a significant difference between the returns of both the portfolios. It was found that null hypothesis of no significant difference between returns of both the portfolios was failed to reject. The results of tests for equality of means and tests for paired differences were found matching and they infer no significant difference between returns of both the portfolios.

Table 4 Portfolio Performance Evaluation

Portfolio Performance Evaluation		
	Portfolio 1 (BSE Greenex)	Portfolio 2 (Control Companies)
Weighted Return	1.5468	1.3355
Portfolio Beta	0.9653	1.0930
Treynor's Performance Index	1.5332	1.1608
Jenson's Performance Index	0.6448	0.3230

Treynor's performance index and Jenson's performance index validated researchers' assumption that carbon efficient companies are also better investment alternatives. As per Treynor's and Jenson's performance index the performance of portfolio 1 was better in comparison of portfolio 2. Portfolio beta stated that control companies were more sensitive to the market movement as the beta value was 1.0930 in comparison of 0.9653 beta of portfolio 1.

Table 5 Comparative Performance of Indices

Performances of Indices			
	BSE Sensex	BSE – 100	BSE Greenex
Mean Return (in percentage)	0.97	1.03	0.93
Standard Deviation (in percentage)	3.89	4.10	4.19
Volume (in '000)	266.09	1008.50	244.73
Sharpe Performance Index	0.2311	0.2355	0.2067

The performance of BSE Greenex was found lower in comparison of performance of BSE Sensex and BSE – 100. The Sharpe performance index indicated the lowest value for the BSE Greenex. Mean return on BSE Greenex was lowest at 0.93 percent and its standard deviation was highest at 4.19 percent across all three indices. However BSE – 100 was found to be the best performing index with Sharpe ratio of 0.2311 and mean return and standard deviation of 1.03 percent and 4.10 percent respectively.

CONCLUSION

The study infers interesting insights. The portfolio performance of BSE Greenex companies was better as per Treynor's and Jenson's performance indices. However, the results of tests for equality of means and tests for paired differences presented that the returns of both portfolios were not significantly different. Nevertheless, it is important to note that portfolio performance indices takes into consideration other factors also, such as beta, market return, risk free return etc.,while statistical tests were employed only on returns. In that case the results of portfolio performance indices are more reliable.

However, the comparative performance check of BSE Greenex with BSE Sensex and BSE – 100 gave clearer results. As per Sharpe ratio performance of BSE – 100 was found better in comparison of other two indices. This presents an inference that perhaps while searching for an investment (and trading also) option, market

participants do not look whether the company is carbon efficient. Preferably if the trading interests of market participants also go with companies' carbon efficiency, the results will support the efforts to boost sustainable business practices.

As noted in literature review section, literature studied for this research presented substantially diverse inferences. Hence, inferences of this study are also in line with some studies (Coehn et al, 1997; Dixon, 2010) and contradicting to a few (Derwall et al., 2005; Dunn, 2009; Tripathi and Bhandari, 2012).

REFERENCES

1. Bammi, R. (2013). BSE Greenex Impact on Indian Stock Market Performance: An Event Study. *International Journal of Research Excellence in Management*.2 (1) 7-12.
2. Boulatoff, C., & Boyer, C.M. (2009). Green Recovery: How are Environmental Stocks Doing? *Journal of Wealth Management*, 12, 9-20.
3. Brammer, S., Brooks, C., & Pavelin, S. (2006). Corporate Social Performance and Stock Returns: UK Evidence from Disaggregate Measures. Financial Management, 35(3), 97-116. http://dx.doi.org/10.1111/j.1755-053X.2006.tb00149.x
4. Brown, J, L. (2009). "The Market Effects of Going Green: Evidence from California's Wholesale Reformulated Gasoline Market". *The Energy Journal*, 30(3).
5. Chih, H. L., Chih, H. H., & Chen, T. Y. (2010). On the Determinants of Corporate Social Responsibility: International Evidence on the Financial Industry. *Journal of Business Ethics*, 93, 115-135. http://dx.doi.org/10.1007/s10551-009-0186-x
6. Coddington, W. (1990). It's No Fad: Environmentalism is Now a Fact of Corporate Life. Marketing News, 15, 7.
7. Cohen, M.A., Fenn, S.A., & Konar, S. (1997). Environmental and Financial Performance: Are they Related? Working paper, Vanderbit University
8. Derwall, J., Guenster, N., Bauer, R., & Koedijk, K. (2005). The Eco-Efficiency Premium Puzzle. *Financial Analysts Journal*, 61, 51-63.
9. Diltz, J.D. (1995). The Private Cost of Socially Responsible Investing. Applied Financial Economics, 5, 69-77.
10. Dixon, R. (2010). A Framework for Monitoring the Performance Impact on a Global Equity Portfolio. Mercer Consultancy, available at www.mercer.com/articles/1382280.
11. Dunn, J. (2009). A Framework for Environmental Social and Governance Considerations in Portfolio Design. Working paper, AQR: Capital Management.
12. Graci, S. and Kuehnel, J. "How to Increase Your Bottom Line by Going Green". White paper. Green Hotels and Responsible Tourism Initiative.
13. Konar, S., & Cohen, M. A. (2001). Does the Market Value Environmental Performance? *The Review of Economics and Statistics*, 83(2), 281-289. http://dx.doi.org/10.1162/00346530151143815
14. Lewis, A. (2001). A Focus Group Study of the Motivation to Invest: "Ethical/green" and "ordinary" investors compared. *Journal of Socio-Economics*, 30, 331-341.
15. Lewis, A., & Mackenzie, C. (2000). Morals, Money, Ethical Investing and Economic Psychology. Human Relations, 53, 180-191.
16. Lopez, V. M., Garcia, A., & Rodriguez, L. (2007). Sustainable Development and Corporate Performance: A Study Based on the Dow Jones Sustainability Index. *Journal of Business Ethics*, 75, 285-300. http://dx.doi.org/10.1007/s10551-006-9253-8
17. Jones, S., Frost, G., Loftus, J., & Van der Laan, S. (2007). An Empirical Examination of the Market Returns and Financial Performance of Entities Engaged in Sustainability Reporting. *Australian Accounting Review*, 17(41), 78-87. http://dx.doi.org/10.1111/j.1835-2561.2007.tb00456.x

18. Price Waterhouse Coopers. (2008). "Going Green: Sustainable Growth Strategies". Technology Executive Connections. Volume 5. February 2008
19. Schatzki, T. (2008). An Economic Perspective on the Benefits of Going Green. Harvard Electric Policy Group. Atlanta. Georgia. December 11, 2008
20. Scheuth, S. (2003). Socially Responsible Investing in the United States. *Journal of Business Ethics*, 43, 189-194.
21. Semenova, N., & Hassel, L.G. (2008). Industry Risk Moderates the Relation Between Environmental and Financial Performance. Working paper, Sustainable Investment Research Platform.
22. Suchard, H.T., & Polonsky, M.J. (1991). A Theory of Environmental Buyer Behavior and its Validity: The Environmental Action-Behaviour Model. AMA Summer Educators' Conference Proceedings, 2, 187-201.
23. Tripathi, V. & Bhandari, V. (2012). Green is Good for Indian Stock Market. *International Journal of Theory and Practice*. 3(2), 11-30.
24. Videen, G. (2010). Effects of Green Business on Firm Value. University of Minnesota.

Annexure 1 – Descriptive Statistics of Companies of Portfolios

Constituent Companies of BSE Greenex and their Descriptive Statistics				
Sr. No.	**Company**	**Average Return**	**Weights**	**Beta**
1	Aurobindo Pharma Ltd	0.0375	2.0846	0.65
2	Bharti Airtel Ltd	0.0062	3.7394	0.55
3	Cipla Ltd/India	0.0103	2.7002	0.93
4	DLF Ltd	0.0094	1.7164	1.54
5	Dr Reddy's Laboratories Ltd	0.0051	2.4747	0.62
6	Eicher Motors Ltd	0.0413	3.1124	1.02
7	Gail India Ltd	0.0093	2.8858	0.93
8	Grasim Industries Ltd	0.0148	3.2725	1.50
9	HCL Technologies Ltd	0.0218	3.7155	0.39
10	Hindalco Industries Ltd	0.0134	2.8664	1.44
11	Hindustan Petroleum Corp Ltd	0.0282	2.3103	1.46
12	Housing Development Finance Corp	0.0157	6.0000	1.35
13	ICICI Bank Ltd	0.0114	6.0000	1.14
14	ITC Ltd	0.0088	6.0000	0.64
15	Kotak Mahindra Bank Ltd	0.0207	6.0000	1.11
16	Larsen & Toubro Ltd	0.0149	6.0000	1.38
17	Lupin Ltd	0.0077	2.1703	0.49
18	Mahindra & Mahindra Ltd	0.0126	5.1782	0.87
19	Maruti Suzuki India Ltd	0.0305	6.0000	0.81
20	Power Grid Corp of India Ltd	0.0096	3.4762	0.17
21	State Bank of India	0.0069	5.6507	1.28
22	Sun Pharmaceutical Industries Ltd	0.0108	3.9721	0.63
23	Tata Consultancy Services Ltd	0.0147	6.0000	0.58
24	Tata Motors Ltd	0.0078	4.1849	1.41
25	UPL Ltd	0.0286	2.4893	1.18

Control Companies and their Descriptive Statistics				
Sr. No.	**Company**	**Average Return**	**Weights**	**Beta**
1	Divis Labs Ltd	0.0188	3.9971	0.88
2	Idea Cellular Ltd	0.0024	3.5882	1.75
3	Alkem Lab Ltd	0.0180	3.3306	0.43
4	HUDCO Ltd	0.0027	2.6665	1.20
5	Torrent Pharma Ltd	0.0217	3.2000	0.96
6	Force Motors Ltd	0.0371	2.6840	1.41
7	ONGC Ltd	0.0030	6.0000	1.18
8	Century Textiles Ltd	0.0225	3.1400	1.00
9	Wipro Ltd	0.0076	5.5851	0.53
10	Nalco Ltd	0.0084	3.1252	2.05
11	Indian Oil Corporation Ltd	0.0178	5.7001	1.06
12	LIC Housing Fin Ltd	0.0146	4.0457	1.52
13	HDFC Bank Ltd	0.0194	6.0000	0.93
14	Kothari Products Ltd	0.0168	2.5567	0.76
15	Axis Bank Ltd	0.0154	6.0000	1.83
16	Bharat Heavy Electronics Ltd	-0.0027	3.6424	1.38
17	Glenmark Ltd	0.0112	3.3111	0.19
18	Hind Motors Ltd	0.0077	2.5554	1.75
19	NTPC Ltd	0.0042	6.0000	0.95
20	Punjab National Bank Ltd	0.0016	3.5864	1.15
21	Piramal Enterprises Ltd	0.0263	4.6527	0.59
22	Infosys Ltd	0.0094	6.0000	0.69
23	Ashok Leyland Ltd	0.0301	4.7999	1.17
24	Tata Chemicals Ltd	0.0119	3.8327	1.39