ABSTRACT
This paper investigates the impact of corporate environmental performance on its economic performance. The environmental performance has been measured by using environmental ratings extracted from CSR Hub, while financial performance has been measured by using both accounting and market based measures - Earnings per share (EPS), Price-Earnings Ratio (P/E ratio) and Return on Assets (ROA). The multiple regression analysis is conducted to examine this relationship. The paper also used two control variables - Size of the firm (proxied by firm’s market capitalization) and firm’s growth (proxied by Price to Book value ratio). The sample consists of top 50 companies listed on National Stock Exchange (NSE) commonly referred to as NIFTY companies. The study found that environmental ratings have positive association with P/E ratio & ROA and negative relationship with EPS. However the relationship is not significant with any of the three variables.

Keywords: Corporate Sustainability; Environmental Performance; Economic Performance; Environmental Reporting; Socially Responsible Investment (SRI)

INTRODUCTION
The stakeholders in today’s era not only judge a company by the amount of profit or revenue it generates, but also considers how ethical and socially responsible the company is. The rapid surge in ethical or sustainable investing has caused an increase in the adoption of sustainable initiatives by firms (Waddock& Graves, 1997; Lo &Sheu, 2007). Gupta and Kumar (2012) believed that environmental activities lead to the creation of a favourable brand image and reputation for the firm as an eco-friendly and sustainable business. This influences the behaviour of consumers, community and other stakeholders by developing trust, confidence and belief in the firm’s products and services. Thus, corporate sustainability acts as a tool that strengthens the relationship between the firm and the society in which it operates, and consequently leads to superior firm performance through creation of several marketing, management and operations opportunities, and improvement in the efficiency of overall organizational functions. The linkage between sustainability, brand image and firm performance is shown in the Figure - 1 below.
Source: Gupta and Kumar (2012)

Figure 1. Linkage between Sustainability, Brand Image and Firm Performance

Robinson et al. (2011) suggested that the reputation of being a sustainable firm (as signaled by the inclusion of firm in the prestigious sustainability index) is an important intangible asset for the firm. The sustainable companies are also able to charge high prices for their products and also get easy and cheaper access to external financing, and thus, reduce their overall costs. Prior literature examining the nature of relationship between environmental performance and the company’s performance provided mixed results. This may be due to lack of objective measures for environmental performance (Moneva & Cuellar, 2009).

In this paper, we are assessing the relationship between environmental and economic performance using regression analysis in Indian context using NIFTY companies. The subsequent section discusses about concept of socially responsible investment, environmental reporting and sustainability indices.

CONCEPTUAL BACKGROUND

Socially Responsible Investment

‘Socially Responsible Investing’ (SRI) or ‘Sustainability Investing’ is a long-term investment approach that integrates economic, environmental and social considerations into financial analysis for the selection and retention of investments. In other words, the conscious investors take into account environment, social and governance (ESG) aspects of company while taking investment decisions. The US SIF Foundation’s 2012 Report on Sustainable and Responsible Investing Trends in the United States found that SRI has grown at a rate of around 22 percent from 2010-12. In November 2009, the UNGC, the UNCTD, the UN PRI and the UNEP FI had jointly setup Sustainable Stock Exchanges (SSE). The SSE aims at exploring how exchanges can collaborate with business firms, investors and market watchdogs to strengthen comprehensibility and clarity of business (through improved disclosures and reporting) and its sustainable performance along economic, social and governance dimensions, and to boost long-term sustainable investment. White (2012) reported that the five stock exchanges – NASDAQ in the US, the Brazilian BM&FBOVESPA, the Johannesburg Stock Exchange (JSE), the Istanbul Stock Exchange and the Egyptian Exchange have voluntarily agreed to cooperate with shareholders, financiers, firms and regulatory bodies to elevate long-term sustainable investment, to enhance ESG performance and disclosure thereof among companies listed on their exchanges. The confirmations were received during the SSE Global Dialogue in 2012. The Bombay Stock Exchange (BSE) also joined this initiative in October, 2012.

Environmental Reporting

Environmental Reporting means communicating the impacts of organization’s activities on environment, such as water, air, land and noise pollution. ISO 14063 is the international standard for
environmental communication and reporting. The main purpose of environmental reporting is to transparently provide information about the corporate environmental impacts and efforts done by companies to reduce the harmful effects (Gray et al, 1996). It also aims at achieving a socially responsible image (Lindblom, 1993).

The first environmental reports were published in the late 1980s by companies in the environmentally sensitive and polluting industries, such as chemical manufacturing, paper manufacturing, mining industry, etc. Also the companies with good Environment Management System (EMS) were among the early reporters. The number of companies which publish information on their environmental impacts has surged significantly (Kolk, 2004). Pahuja (2009); United Nations Conference on Trade and Development (UNCTD, 1998); Eccles and Krzus (2010) observed that the past 20 years came across a global concern for long-term negative impact of industrial activities on the environment which trickles down on economic performance of a firm and country as a whole. This potential impact has resulted in an increased requisition for assessment of firm’s operations and environmental impacts, which include greenhouse gas emissions, toxic and ozone-depleting substances, common pollutants, solid waste generation, and the use of pesticides and fertilizers. This information should be disclosed in public to the diverse stakeholders. Disclosure of such information portrays the company’s commitment to accountability and environment sustainability.

**Sustainability Indices**

The increasing investor awareness and rapid growth of SRI have both led to the creation of various sustainability indices in different parts of the world. The most popular among these are the Dow Jones Sustainability Index (DJSI), the FTSE4Good Index, the Johannesburg Stock Exchange (JSE) SRI Index, the Domini Social Index, the ECPI Index, the Axia Index, etc.

The DJSI, a collaboration of S&P and RobecoSAM, was formed in 1999 to provide recognition to companies committed towards sustainable development and to reject the non-sustainable ones. More than 2500 companies from different parts of the world are listed on this index. The UK-based FTSE Group came up with FTSE4Good Index in 2001 which comprises of four tradable and five benchmark indices - Global, European, US, Japan and UK markets.

**RELATED LITERATURE**

A large number of studies have been conducted in past to analyze the relationship between environmental responsibility and corporate financial performance. However, there is dearth of research done in context of developing countries. Hassel et al. (2005) proposed two theories on the association between environmental responsibility and economic performance. The first being the ‘cost-concerned approach’ which suggests that environmental initiatives involve heavy outlay and thus, has a detrimental impact on firm’s financial performance. The second theory is the ‘value-creation approach’ which suggests that eco-efficiency gives companies an edge over their competitors leading to greater profits.

Ganzi et al. (2004) extensively reviewed the literature examining the linkage between environmental and financial performance, and observed an overall positive or, at minimum, neutral association, but not negative association. The findings indicated that environmental information has value relevance and it facilitates precise assessment of company performance and efficient financial decision-making. They further suggested that Socially Responsible Investment (SRI) is a significant factor that drives companies to undertake environmental reporting. However, they also found that most companies still do not appropriately and sufficiently disclose information on their environmental performance. They concluded that there is a need for a clear conceptual framework to enable companies to systematically integrate environmental information into management, operation and capital investment decisions and to communicate the risks and opportunities to stakeholders.

Murphy (2002) reviewed various researches in this context from 1994-2001 and concluded that there exists a positive correlation between environmental performance ratings and market value of the firm.
Erfle and Fratantuono (1992) used disclosures regarding compliance with environmental regulations and related policies, practices and programs with respect to waste management, reuse, recycling, etc., to examine the relationship between environmental and financial performance of firms (based on accounting measures such as ROA, ROE, and ROS), and suggested a positive and significant correlation between them.

Porter and Van der Linde (1995); Reinhardt (1999) argued that a company can be simultaneously both environment-friendly as well as competitive. They theorized that good environmental performance leads to certain benefits such as cost reduction, increase in efficiency, decrease in environmental liabilities and regulatory actions and costs (penalties, fines, litigations, etc.).

Derwall et al. (2003) analyzed the linkage between the eco-efficiency scores (provided by Innovest) of US companies and their firms’ performance. They controlled for risk, investment style and industry-effects, and found positive and significant association between the high environmental scores and high performance. Specifically, they found that high-ranked portfolio outperformed the low-ranked portfolio.

All the above mentioned studies connoted positive association; however, some researchers have different opinion. Barth and McNichols (1994); Blacconiere and Northcut (1997); Cormier and Magnan (1997); Hughes (2000) suggested a negative relationship. Aggarwal (2013) observed that environmental ratings have significant negative impact on financial performance (measured by ROA, ROE, ROCE), while the impact on Profit before tax and Growth in Total Assets is negative but insignificant. Moneva and Cuellar (2009) adopted a new approach to examine the relationship between environmental responsibility and market value of companies. The overall findings of the study suggested that financial environmental disclosures (environmental costs, liabilities, provision for contingencies) have value relevance, since they have a negative influence on the market value of firms. However, the non-financial environmental disclosures are not value-relevant. Further, the study showed that the introduction of compulsory reporting caused an increase in the value relevance of environmental reporting. The results also indicated that the non-financial information disclosures regarding environmental policies and EMS have positive and statistically significant value relevance for companies belonging to environmentally sensitive industries. Some researchers found no statistically significant association between environmental and company performance (Cormier & Magnan, 2007; Jacobs et al., 2010; Deegan, 2004; Gonzalez-Benito, J., & Gonzalez-Benito, O., 2005; Moneva & Cuellar, 2009).

OBJECTIVES

The primary objective of the paper is to examine the nature and degree of association between environmental responsibility of the company and its economic performance. The paper also studies the sectorial trends of environmental ratings of NIFTY companies over a period of 3 years.

HYPOTHESES

The hypotheses have been developed on the basis of results derived from review of literature. The previous researches had mixed findings (positive, negative, insignificant, mixed relationship) which suggested that there is no conclusive relationship between environmental responsibility and corporate financial performance. Aligning these findings with our objectives the following three alternate hypotheses have been formulated:

Ha1: Corporate environmental ratings have a significant impact on EPS.
Ha2: Corporate environmental ratings have a significant impact on ROA.
Ha3: Corporate environmental ratings have a significant impact on P/E ratio.
SAMPLE AND DATA

The intention of authors was to conduct the given study in the context of listed Indian companies. The CNX Nifty Index represents about 68.99% of the free float market capitalization of the stocks listed on NSE and hence it was chosen as the sample. Initially the sample comprised of all 50 companies from NIFTY index but due to lack of availability of financial data or environmental data, 6 companies were later excluded from the sample. Therefore, the final sample consists of 44 companies.

Two sets of data have been used in this study. Both are secondary in nature the financial data has been retrieved from livemint.com and the environmental ratings data have been extracted from CSRHub.com. In order to enable cross-sectional analysis, the paper uses an average of data ranging from financial year 2010-11 to 2012-13. The variables used in this study have been described in table 1 below.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measure</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Performance</td>
<td>Environmental Ratings</td>
<td>ENV (%)</td>
<td>Covers a company’s interactions with the environment at large, including use of natural resources, and a company’s impact on the Earth’s ecosystems. The rating is done on 3 parameters: Energy and Climate Change Environment Policy and Reporting Resource Management</td>
</tr>
<tr>
<td>Financial Performance</td>
<td>Earnings Per Share</td>
<td>EPS (Rs.)</td>
<td>The portion of a company's profit allocated to each outstanding share of common stock and serves as an indicator of a company's profitability.</td>
</tr>
<tr>
<td></td>
<td>Return on Assets</td>
<td>ROA (%)</td>
<td>An indicator of how profitable a company is relative to its total assets. It gives an idea as to how efficient management is at using its assets to generate earnings.</td>
</tr>
<tr>
<td></td>
<td>Price-Earnings Ratio</td>
<td>P/E Ratio</td>
<td>A valuation ratio of a company's current share price compared to its per-share earnings.</td>
</tr>
<tr>
<td>Control Variable</td>
<td>Firm Size (Market Capitalization)</td>
<td>Mkt Cap (Rs. in crores)</td>
<td>Market capitalization is calculated by multiplying a company's shares outstanding by the current market price of one share. It is used to determine a company's size, as opposed to sales or total asset figures.</td>
</tr>
<tr>
<td></td>
<td>Firm’s Growth (Price-to-Book Ratio)</td>
<td>Price/BV</td>
<td>A ratio used to compare a stock's market value to its book value.</td>
</tr>
</tbody>
</table>

Regression Model

The paper has applied multiple regression analysis using MS Excel. To test the hypotheses stated above the following three regression equations have been formulated:

\[
\text{EPS} = a + b_1 \cdot \text{ENV} + b_2 \cdot \text{Mkt Cap} + b_3 \cdot \text{Price/BV} \] ................................. (1)

\[
\text{ROA} = a + b_1 \cdot \text{ENV} + b_2 \cdot \text{Mkt Cap} + b_3 \cdot \text{Price/BV} \] ................................. (2)

\[
\text{P/E ratio} = a + b_1 \cdot \text{ENV} + b_2 \cdot \text{Mkt Cap} + b_3 \cdot \text{Price/BV} \] ................................. (3)
Environmental Trend Analysis

The NIFTY companies have been classified on the basis of sector and the trend in environmental ratings over the period of 3 years from F.Y. 2010-11 to 2012-13 has been analysed and presented in form of charts. These are shown below in figure 2 to 10.

**Figure-2: Construction & Manufacturing Sector**

**Figure-3: Cement Sector**

**Figure-4: IT & Telecom Sector**

**Figure-5: Consumer Goods Sector**

**Figure-6: Metals Sector**

**Figure-7: Automobile Sector**
RESULTS

The results of descriptive statistics, correlation matrix and regression analysis have been tabulated below in table 2,3,4 respectively.

Table 2. Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>ROA (%)</th>
<th>EPS (Rs.)</th>
<th>P/E ratio</th>
<th>Env Ratings (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>10.28</td>
<td>47.85</td>
<td>22.65</td>
<td>48.55</td>
</tr>
<tr>
<td>Median</td>
<td>7.54</td>
<td>26.55</td>
<td>18.52</td>
<td>47.67</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>8.81</td>
<td>44.06</td>
<td>18.15</td>
<td>8.03</td>
</tr>
<tr>
<td>Range</td>
<td>30.43</td>
<td>166.09</td>
<td>114.89</td>
<td>27.67</td>
</tr>
<tr>
<td>Observations</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
</tbody>
</table>
Table 3. Pearson’s Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>ROA</th>
<th>EPS</th>
<th>P/E ratio</th>
<th>Price/BV</th>
<th>Env Ratings</th>
<th>Mkt Cap</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>0.054</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P/E ratio</td>
<td>0.013</td>
<td>-0.29</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price/BV</td>
<td><strong>0.68</strong>*</td>
<td>-0.096</td>
<td>0.203</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Env Ratings</td>
<td>0.069</td>
<td>-0.127</td>
<td>0.08</td>
<td>-0.102</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mkt Cap</td>
<td>0.19</td>
<td>-0.074</td>
<td>-0.005</td>
<td>0.085</td>
<td><strong>0.338</strong></td>
<td>1</td>
</tr>
</tbody>
</table>

Note: *Significant @ 5% level of significance

Table 4. Regression Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Multiple R</th>
<th>R square</th>
<th>F</th>
<th>Significance of F</th>
<th>Beta Coefficient (b1)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS</td>
<td>0.17</td>
<td>0.03</td>
<td>0.39</td>
<td>0.76</td>
<td>-0.72</td>
<td>0.44</td>
</tr>
<tr>
<td>ROA</td>
<td><strong>0.70</strong></td>
<td><strong>0.49</strong></td>
<td>12.78</td>
<td><strong>5.34746E-06</strong>*</td>
<td>0.12</td>
<td>0.39</td>
</tr>
<tr>
<td>P/E Ratio</td>
<td>0.24</td>
<td>0.06</td>
<td>0.78</td>
<td>0.51</td>
<td>0.28</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Note: *Significant @ 5% level of significance

FINDINGS AND CONCLUSION

The following key findings can be retrieved from above tables:

- The mean environment rating of NIFTY companies is 48.5% which implies that there is a lot of scope for Indian companies to improve their environmental performance.
- The correlation between growth variable and ROA is 68% which is significant at 5% level of significance. Thus, growth of the company does affect its returns.
- The correlation between market capitalization and environment ratings is 33.8% which suggests that there exists some relationship between the size of the firm and its environmental performance.
- There are some companies whose environmental ratings have sharply risen over 2010-13: Hindustan Unilever Ltd., Jindal Steel and Power Ltd., Bajaj Auto Ltd., Hero MotoCorp.
- While some companies showed significant fall over the test period: Infosys, TCS, IndusInd Bank, Kotak Mahindra Bank, NMDC.
- The F value is significant and coefficient of determination is quite large (49%) in case of ROA for second regression equation.
- Environmental ratings have negative association with EPS and positive association with ROA and P/E Ratio.

This paper does not find any conclusive evidence to support the relationship between environmental responsibility and economic performance. Hence all the three alternate hypotheses are rejected.

LIMITATIONS

The paper suffers from following limitations:

- The sample covers only top 50 companies listed on NSE, however, other listed and unlisted companies have not been included in this study.
The data only represents a period of three years. Thus the results may be valid only in short run.

The environment ratings have been retrieved from a secondary source and thus subject to errors which may exist in their ratings methodology.

The paper has employed only 3 proxies for measuring financial performance. There can be several other measures.

The paper has controlled for only 2 factors – size and growth. Other control variables have been ignored.

RECOMMENDATIONS FOR FUTURE RESEARCHERS

Although much has been done and talked about in the area of environmental responsibility but still there is dearth of research studies in the context of developing countries. The future researchers should explore more measures for environmental performance such as level of emissions, energy efficiency, use of recycled materials, environmental penalties and fines and amount of investment done in this area. Further a longitudinal study covering a larger span of time may be useful in providing better results. Also other measures of financial performance such as market value of equity, economic value added (EVA), market value added (MVA), etc and other control variables may be incorporated in future studies.

REFERENCES


