

Exploring the Association between Environmental Cost and Corporate Financial Performance: A Study of Selected NIFTY Companies

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Abstract

Purpose: The environment is assuming an important socio-economic and political issue all over the world. The world is facing the dilemma of promoting economic development and, at the same time, protecting the environment. At this juncture, proper accounting of the environmental impact on economic development is a pre-requisite to sustainable development. This study mainly endeavours to confirm whether there is any important connection between environmental cost incurred by the company and its profit earning ability.

Methodology: This research relies on secondary data collected from different web sources and annual reports of companies covering a period of 5 years i.e. from 2010-11 to 2014-15. In order to achieve the objective of the study, to find out the impact of environmental expenditure on the financial performance of the selected companies (NTPC, NHPC, Hindalco, TATA Steel and NMDC), the data has been collected for the dependent variable i.e. environmental cost (EC) and independent variables i.e. EPS, ROCE and P/E ratio (being good indicators of financial performance). Environmental cost has been directly sourced from the annual reports of the respective companies; the data for the independent variables and control variables has been obtained from

the companies' and database websites. The analysis incorporates firm size (in terms of market capitalization) and price-to-book value ratio as the control variables.

Findings and Conclusion: Based upon the sample data and its analysis using regression analysis, it has been found that there is no significant relationship between environmental expenditure of the company and its financial performance. Besides, it has also been found that companies with higher market capitalization are spending more on environmental issues.

Practical implications: It is evident from the findings that environmental expenditure has no significant impact on profit earning ability of companies. Thus, companies are not motivated to incur environmental expenditure. To encourage companies to spend on conservation of the environment, the government may consider providing some tariff concessions or tax benefits to companies which are conscious about the environment.

Keywords: *Environment, Environmental Cost, Corporates, Financial Performance*

JEL: Q01, Q51, Q56 & Q58

Introduction

In the era when sustainability is a key issue globally, the performance of a corporate entity cannot be judged only on financial standards; other parameters include social and environmental impact of its operations. 'Environmental issues have become a significant variable in the models used by the investors and creditors to determine the risk associated with their investment' (Gupta). (Environmental Accounting Guidelines, 2005) mentions environmental accounting as a procedure that allows a company to identify the cost of environmental conservation during the normal course of business, identify benefits gained from such activities, provide the best possible means of quantitative measurement (in monetary value or physical units) and support the communication of its results. EA is a broad-based term that refers to the incorporation of environmental costs and information into accounting practices. Naturally environmental accounting system includes both national and business accounting, and deals with both financial and non-financial information (Schaltegger, 1997).

Accounting for the environment helps in accurate assessment of costs and benefits of environmental preservation measures of companies (Schaltegger, 2000). Environmental Accounting facilitates costs and benefits analysis of a project on environmental issues which guides managers in decision making and striking a balance between ecology and economy (Kumar & Pandey, 2015). It provides a common framework for organizations to identify and account for past, present and future environmental costs to support managerial decision-making, control and public disclosure (KPMG & UNEP, 2006). Ecological cost accounting directly locates a cost on every ecological facet and determines the cost of the associated action. Environmental activities include contamination prevention, ecological visualization and administration (Yakhou & Dorweiler, 2004).

Ecological costs comprise of both interior and exterior costs, and relate to all costs of relative environmental impairment and defence. Environmental defence costs encompass costs for prevention, disposal, designing, command, moving actions and impairment repair that can happen at companies and sway authorities or persons (UN 2001). (Pramanik, 2002) states that companies have divided environmental costs into six broad categories - capital investment, operating cost, research and development cost, environment administration and planning costs, expenses for remediation measures and recovery expenses.

The IFAC, 2005 categorizes environmental related charges into four kinds as follows:

1. Environmental activity type costs such as waste prevention and control.
2. Costs that represent traditional accounting such as labour and materials.
3. Environmental domain type costs such as land, air or water.
4. Costs which reflect data visibility in the accounting records such as hidden and obvious costs.

Environmental Cost and Profitability: Both profitability as well as corporate financial performance were used by a number of researchers as explanatory variables for differences in disclosure level. However, the relationship between corporate financial performance and corporate social and environmental disclosure is arguably one of the most controversial issues yet to be resolved (Choi, 1998).

The proponents argue that there are additional costs associated with social and environmental disclosure, which, in turn, reduce profitability of the reporting company. Some researchers used log of profits; among these researchers, (Roberts, 1992) found a positive relationship between the profitability level of a company and corporate social and environmental disclosure. However, (Patten, 1991) fails to find any

significant positive relationship between profitability and corporate social and environmental disclosure.

(Derwall, Guenster, Bauer, & Koedijk, 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 a positive and significant association between high environmental scores and high performance. Specifically, they found that a high-ranked portfolio outperformed a low-ranked one.

Literature Review

According to the "United States Environmental Protection Agency", an important function of environmental accounting is to bring environmental costs to the attention of corporate stakeholders who may be able and motivated to identify ways of reducing or avoiding those costs, while at the same time, improving the environmental quality. The implementation of environmental accounting can help achieve the objective of corporations and other stakeholders in reducing the costs and decreasing pollution respectively.

(Gray, Javad, Power, & Sinclair, 2001) examined the relation between corporate characteristics and environmental disclosures by taking a sample of 100 UK companies drawn from the Center for Social and Environmental Accounting Research (CSEAR). The authors observed that the volume of disclosure is related to the turnover, capital employed, number of employees and profit, as larger and more profitable firms have disclosed more environmental information.

(Minimol & Makesh, 2014) intended to find out the major environmental parameters reported by Indian corporates as part of their environmental reporting practice. The study focused on the extent to which Indian corporates practice voluntary environmental

reporting with regard to the environmental parameters identified. The study developed a model which specifies six aspects to be covered in environmental accounting in order to measure the ultimate environmental performance of the organisation. The study finds that even though Indian corporates comply with the rules and regulations with regard to environmental protection, so far, no clear cut policies have been framed and formulated at the national, state or even at the company level, for ensuring the level of compliance to environmental norms.

(Oza & Patel, 2011) make an attempt to study the extent of EMA system and practices prevalent in select Indian business firms with ISO 14001 certification, and make suggestions to strengthen it further on the basis of results. The study reveals that for majority of firms, the aspect of Physical Environmental Management Accounting (PEMA) system is well developed, but there is a lot of scope for the usage of the Monetary Environmental Management Accounting (MEMA) system. The findings are in line with previous studies. The intervention of the Institute of Cost and Works and Accountants of India (ICWAI) for making wide application of MEMA and its integration with PEMA can go a long way in making EMA a very effective tool for making Indian business firms sustainable. The issue of guidelines on EMA in the Indian context can be the right step in this direction.

According to (Nigam & Maheshwari, 2015), despite the fact that many laws were made to promote environmental accounting since liberalization in 1991, implementation of those laws was weak. There are no standards for such accounting as there are for financial accounting in India. Only a few companies are compelled to show environmental related information, which is not sufficient to calculate environmental degradation. Hence, it is mandatory

to draft and implement stringent standards and methods to calculate environmental degradation which is affecting our environment on a daily basis. Moreover, there must be an independent regulatory body to govern and monitor the activities of the organization and provide them solutions on a periodical basis.

(Shukla & Vyas, 2013) find that the disclosure of environmental related information is mandatory in nature and there should be a proper accounting system which determines environmental related costs, liabilities and expenditure. The company should be asked to submit all the information regarding environmental issues; if the company does not do so, action must be taken by a regulatory body against the company.

(Murphy, 2002) reviewed various research studies in this context from 1994-2001 and concluded that there exists a positive correlation between environmental performance ratings and market value of the firm.

(Erffle & 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 a firm (based on accounting measures such as ROA, ROE, and ROS), and suggested a positive and significant correlation between them.

(Porter & Van der Linde, 1995) and (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.).

(Moneva & 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.

(Makori & Jagongo, 2013) attempted to establish whether there is any significant relationship between environmental accounting and profitability of selected firms listed in India. The data for the study was collected from annual reports and accounts of 14 randomly selected quoted companies on the Bombay Stock Exchange in India. The study shows that there is a significant negative relationship between Environmental Accounting and Return on Capital Employed (ROCE) and Earnings per Share (EPS), and a significant positive relationship between Environmental Accounting and Net Profit Margin and Dividend per Share.

(Chauhan & Kalola, 2014) made an endeavour to establish whether there is any significant relationship between environmental accounting and profitability of Reliance Industries Limited, Gujarat. The key findings of the study show that there is a significant negative relationship between Environmental Accounting and Return on Capital Employed (ROCE) and Earning Per Share, and a significant positive relationship between Environmental Accounting and Net Profit Margin and Dividend per Share. Based on this, it was recommended that the government should give tax credit to organizations that comply with its environmental laws and that environmental reporting should be made compulsory in India so as to improve the performance of organizations and the nation as a whole. Authors find that since the disclosures of environmental information are

voluntary, there is a diversity of reporting practice. Large companies tend to report more environment information in their annual reports than medium scale businesses; also the disclosures tend to be more qualitative than quantitative.

Research Objectives: The basic intent behind this work is to empirically validate whether there is any significant association between environmental cost incurred by the company and its profiting earning ability.

Research Hypotheses:

H₀1: There is no significant association between environmental cost and EPS.

H₀2: There is no significant association between environmental cost and PE Ratio.

H₀3: There is no significant association between environmental cost and ROCE.

Research Methodology

Sources of data: This research study relies on secondary data collected from different web sources and annual reports of companies. As the purpose of the researchers is to find out the impact of environmental expenditure on the financial performance of companies, the data has been collected for the dependent variable i.e. environmental cost, and independent variables i.e. EPS, ROCE, P/E ratio (being good indicators of financial performance). EC has been directly sourced from the annual reports of the respective companies and the data for the independent variables and control variables has been obtained from the web portal www.moneycontrol.com. The analysis incorporates firm size (in terms of market capitalization) and price-to-book value ratio as the control variables.

Nature of Data: Data of five companies was collected for five years, forming a panel, but when checked by

the researchers, it was found that the time effect was not significant; thus, there was no need to apply panel regression, as the result of pooled regression is equally valid.

Study Period: This work is based on the latest five-year data i.e. 2010-11 to 2014-15.

Statistical Tools: To assess the relationship between environmental cost and profitability, *multivariate OLS regression* analysis has been applied. Regression analysis is said to be the 'queen' of all statistical tools. 'Multiple regression modelling is now a mainstay of statistical analysis in most fields because of its power and flexibility' (Brant, 2007). 'Multiple regression analysis is a statistical tool for understanding the relationship between two or more variables. Multiple regressions also may be useful (1) in determining whether or not a particular effect is present; (2) in measuring the magnitude of a particular effect...' (Rubinfeld). For hypothesis testing, regression uses t-test which is also a robust test.

Sampling Units: Purposive sampling method has been used to select the sample unit and due care has been taken to select companies having presence in sectors like power and Iron & Steel as they are considered comparatively more environmentally prone. The following five companies have been selected from NIFTY:

- NTPC
- NHPC
- Hindalco
- TATA Steel
- NMDC

Defining Variables: Following are the indicators used for the performance of the companies.

Variables	Description
Earnings per Share	Net Income/Outstanding Shares Earnings per share serve as an indicator of a company's profitability. It is the portion of a company's earnings, net of taxes and preferred stock dividends, which are allocated to each share of common stock.
Profit Earning Ratio	It is the portion of a firm's profit allocated to each outstanding share of common stock. It also serves as an indicator of a company's profitability. $P/E \text{ ratio} = \text{price per share} / \text{earnings per share (EPS)}$ Where $EPS = \text{earnings} / \text{total shares outstanding}$.
Return on capital employed	Net capital employed is the total of fixed assets plus current assets less current liabilities. In other words it is the quantum of permanent capital expressed as non-current liabilities plus shareholders equity. Therefore, $ROCE = \text{Adjusted Net Profit} / \text{Capital Employed} \times 100$ Where, Capital Employed = Net Fixed Assets + Net Working Capital
P/B Value	The price-to-book ratio (P/B Ratio) also known as the price-equity ratio is used to compare a company's net assets available to common shareholders relative to the sale price of its stock. It is calculated by dividing the current closing price of the stock by the latest quarter's book value per share. $P/B \text{ Ratio} = \text{Stock price} / (\text{Total assets} - \text{Intangible assets \& liabilities})$
Market capitalization	Market capitalization is a measure of the size of a business corporation. It is equal to the price of one share, times the number of shares of stock. In general, it shows the public opinion of a company's value and aggregate value of a company or stock.

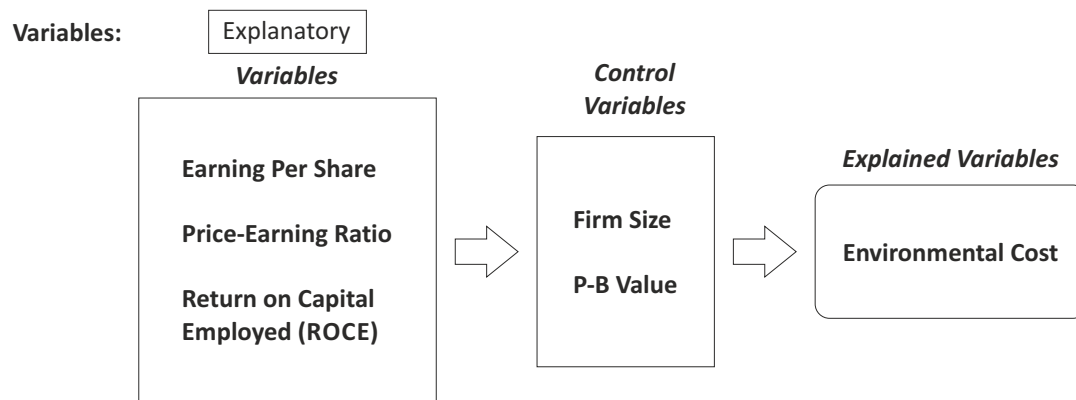


Figure: Theoretical Model

Model Specification

To study the impact of EC on financial performance, multiple regression (OLS) analysis has been applied. The mathematical model can be expressed as:

$$ENVCost = f(EPs, ROCE, PERatio, MarketCap, PBRatio)$$

The econometric model can be expressed as:

$$ENVCost = a + a_1 EPs + a_2 ROCE + a_3 PERatio + a_4 MarketCap + a_5 PBRatio + ut$$

Where,

ENV Cost, EPS, ROCE, PE Ratio, Market Cap, PB Ratio and ut stand for Environmental Cost, Earning per share, Return on capital employed, Market capitalization, Price to book value ratio and error term respectively.

The model is presented below. Regression model has been checked against all assumptions. VIF, Durbin Watson test and White test have been used for assessing the level of multicollinearity, serial correlation and heteroscedasticity respectively.

Limitations of the work

Due to nature of the topic, this study is subject to certain limitations. The key limitations are as follows:

- Environmental cost has been directly taken from the annual reports of the sample companies; as there are no generally accepted accounting standards, regulations, rules, etc., quantification process may differ across the companies.
- Environmental accounting is a long term process and therefore, to draw a conclusion with supporting data of only five years may not be advisable.
- Only five companies have been selected for the study; results may be more robust if all the companies of NIFTY are included under study.

Discussion and Findings

R^2 shows the explanatory power of the model. The table reveals that this model can explain 77.5 % variation in the environmental cost. This may be possible because of the presence of market capitalization in the model. Large sized firms can contribute more towards environmental cost. Overall regression model is significant at 0.01 level of significance. Now, coming to the individual hypothesis, we find that environmental cost does not have any significant association/impact on any of the explanatory variables i.e. EPS, ROCE and P/E ratio, as presented in the table. The relationship between environmental cost and EPS, ROCE, P/E ratio is negative but insignificant at 0.05 significance level. Thus, all three null hypotheses cannot be rejected based on this data set. This may be possible because in India, the level of awareness about environmental issues is not high among stakeholders. In the future, the result may change if the awareness and sensitivity about environmental issues increases among stakeholders. The outcome of Durbin Watson test and colinearity statistics is satisfactory.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EPS	-0.146842	0.070148	-2.093330	0.0500
MARKET_CAP	0.000328	5.26E-05	6.237803	0.0000
PBV_RATIO	-4.471957	1.703184	-2.625646	0.0166
PE_RATIO	-0.219954	0.271923	-0.808885	0.4286
ROCE	-0.199453	0.163915	-1.216804	0.2386
C	15.62974	5.053069	3.093117	0.0060
R-squared	0.774804	Mean dependent variable		13.80280
Adjusted R-squared	0.715541	S.D. dependent variable		12.09237
S.E. of regression	6.449426	Akaike info criterion		6.771423
Sum squared resid	790.3069	Schwarz criterion		7.063953
Log likelihood	-78.64278	Hannan-Quinn criterion		6.852558
F-statistic	13.07416	Durbin-Watson statistic		2.230595
Prob (F-statistic)	0.000013			

Conclusion

In current times, when assessment of the environmental impact of business is globally emphasized, developing countries like India are facing the dilemma of striking a balance between economic growth and ecology. Scholars are more or less in agreement that economic development cannot be achieved at the cost of environment. So a sustainable way would be a balanced approach, which is being favoured across the globe. Through this study, authors have made an endeavour to validate whether there is any association between environmental cost and financial performance of a company. EPS, P/E ratio and ROCE have been used as measures of financial performance. Based upon the sample data, it is concluded that there is no significant relationship between environmental expenditure of the company and its financial performance, using regression analysis. Besides, it has also been found that companies with higher market capitalization are spending more on environmental issues. The finding is

contrary to (Roberts, 1992) but consistent with (Patten, 1991), (Moneva & Cuellar, 2009) and (Makori & Jagongo, 2013). The findings are contrary to the theory that environmental expenditure should positively impact performance of a company. This may be possible because of low level of awareness about environmental issues among stakeholders and also because this practice is still in the infancy stage and no standard has been developed. One other reason which we should keep in mind is that environment accounting is a long term process and therefore, to draw a conclusion with supporting data of only five years may not be advisable. It is suggested that managers should make efforts to enhance the level of awareness about environmental concerns, relevance and implications among stakeholders so that the potential benefits which could theoretically arise because of the environmental cost incurred by the company, can be reaped. And, in long run it may come true.

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