

An Analysis of Financial Performance Vis a Vis Environmental Performance of BT 500 Companies

Dr. Sangeeta Arora

Associate Professor,
Department of Commerce,
Guru Nanak Dev University,
Amritsar, Punjab, India

Sonia Kundra

Assistant Professor,
Department of Commerce,
Guru Nanak Dev University College,
Jalandhar, Punjab, India

Abstract

Purpose: There is always a conflicting relationship between the Corporate Environmental Performance and Corporate Financial Performance. Economists argue that going green is not profitable whereas environmentalists argue that businesses should take actions to protect and preserve the environment. Thus this study is carried out with the objective of analyzing the association between Environmental Performance and Financial Performance.

Design/ Methodology/ Approach: Corporate Environmental Performance and Corporate Financial Performance are the two variables are affected by each other and also affect each other. So studying their relationship with the help of Multiple Linear Regression Model will not serve the purpose. Hence it was decided that this relationship can be explored with the help of Simultaneous Equation Modeling.

Findings: It can be stated that within the Indian context, Environmental Performance have significant and positive relation with return on assets, company size, age of the company.

Research Limitations/ Implications: Till the companies follow the same benchmark for environmental performance measurement, such study may not lead to any reliable results. The subject needs to be explored further. However, the study will be evocative if there is statutory provision of Environmental Reporting like Financial Reporting.

Originality/Value: This paper is an exploratory attempt to find the relationship between the Corporate Environmental Performance and Corporate Financial Performance. No such study with the sample of as large as 500 companies have been conducted in Indian context.

Keywords: Corporate Environmental Performance, Corporate Financial Performance, Simultaneous Equation Model and Green Initiatives.

Introduction

The environment in which we are living is actually handed over to us by our previous generations and it our responsibility to preserve and safeguard it for our coming generations too. According to Hindu Philosophy, "Sky is like a father, earth is like a mother, space is like their children". Thus the Rig Veda proclaims that environment is to be valued like parents and loved like children. Preservation of

environment can also be expressed in the simple terms of an economic golden rule for the restorative economics: leave the word better than you find it, take not more than you need, try not to harm life of the environment, make amendments if you do (Sahay and Singh, 2004). A global challenge in 21st century is how to address climate change and reduce greenhouse gas emissions (UN, 2007). According to Verdien Corporation (2008), sustainability has become a major focus for businesses, as it was discovered that sustainable practices can strengthen reputation, improve employee morale, lead to cost savings and benefit the environment. Being green is no longer a cost of doing business; it is in fact a catalyst for constant innovation, new market opportunities and wealth creation (Walley and Whitehead, 1994). In fact the former Vice President of Harvard Business Review, 1994 argues that making environmental improvements is often the best way to increase company's efficiency and therefore profitability.

The turning point in growth of environmentalism came in 1984 with the Bhopal Gas Tragedy where thousands of people died and many sustained injuries due to leak of poisonous gas from factory of Union Carbide Limited. It was perhaps the first known instance when environment and industry got linked directly through a major environmental management issue. Subsequently the enactment of EPA, 1986 was one of the major environmental laws aimed at ensuring compliance based mechanisms for major polluted industries in India.

In Indian context of requiring environment related information from business house on regular basis was made mandatory by Central Government in 1991. The Ministry of Environment & Forest had proposed that, "Every company shall in the report of its Board of its Directors, disclose briefly the particulars of steps taken or proposed to be taken towards adoption of clean technologies for prevention of pollution, waste minimization, waste recycling and utilization, pollution control measures, investment on environmental protection and impact of these measures on waste reduction, water and other resource conservation.

But such information is still not required by the Government to be publically disclosed through Annual Report. Consequently till date any disclosures on environmental matter in in Annual Report of Indian Companies are voluntary in nature.

Due to this reason there was difficulty in measuring the impact of Corporate Environmental Performance on Corporate Financial Performance. The proxy variable for environmental performance was not available. Therefore the total scores of companies calculated on the basis of Content Analysis by analyzing the Sustainability reports, Annual Reports and Websites of companies ranked as Top 500 in the Rankings of Business Today Survey of year 2013 was used as proxy variable for the purpose.

Previous Research

Exploring the relationship between corporate social responsibility and profitability has been a lively confrontation since Friedman (1962) challenged that a corporate social responsibility of a business is to make profit. The relationship between Corporate Environmental Performance and Corporate Financial Performance may depend upon alignment of environment management function to other business functions and alignment of environment management function to external stakeholders (Grekova et.al, 2010). Several authors and researchers empirically tried either to prove it wrong or support it. A large number of review and theory based papers (Mc Williams & Siegel, 2001) have proposed conceptual presence of relationship between Corporate Environmental Performance and Corporate Financial Performance. The results are both positive (Cohen et al., 1995; Hamilton, 1995, Hart and Ahuja, 1996, Klassen & Mc Laughlin, 1996; Russo & Fouts, 1997; Judge & Douglas, 1998, Sharma and Vrendenburg, 1998; Alvarez- Gil et.al ,2008; King and Lenox,2001; Konar & Cohen (2001); Melnyk et.al,2003; Al- Tuwaijri et.al,2004, Montabon et.al,2007, Wahba,2008) and negative (Cordeiro & Sarkis, 1997; Wagner et.al,2002; Wagner, 2005; Canon & Garces,2006). Some of the results even showed mixed results (Edwards, 1998, Khanna & Damon 1999, Giley et.al, 2002; Watson et.al, 2004; Benito and Benito, 2005; Menguc & Ozanne, 2005; Aragon-Correa et.al, 2007). Thus the debate of relationship between corporate environmental performance and corporate financial performance is still ongoing. Some are of the view that complying with environmental regulation is costly and thus might hurt a firm's bottom line. On the other hand, a firm that is efficient at pollution control might also be efficient at production (Cohen et.al, 1997). It is also important to state that any relationship found does not necessarily imply the degree of causation. For example if a correlation between good environmental performance and high earnings do not mean the environmental performance has led to high earnings rather it could be the other way round i.e. if a firm is financially sound only then it can afford to invest in environmental initiatives. Existing research could not answer whether it pays to be green or whether it pays to operate in green industries (King and Lenox, 2001).

Objective And Hypothesis Testing

The study is carried out with the objective of analyzing the association between Environmental Performance and Financial Performance. For the purpose, few other variables were also studied. The null hypotheses are as under:

H1: There is no association between the financial performance and environmental performance amongst companies in India.

H2: There is no association between the age of a company and environmental performance amongst companies in India.

H3: There is no association between the size of a company and environmental performance amongst companies in India.

H4: There is no association between the industry concentration and environmental performance amongst companies in India.

Database And Methodology

As already discussed in literature review, there are number of theories based on the relationship of corporate financial performance and corporate environmental performance. Some researchers are of the view that they have positive relationship which indicates increase in Environmental Performance leads to higher profits and vice versa. While others argue that increased expenditure on environmental initiatives lead to reduction in profits, thereby leaving the debate ongoing. So in this study, it is proposed to study that what is the association between the Financial Performance and Environmental Performance. There are numerous studies on this relationship as discussed in the review, few of which take financial performance as dependent variable and few of them environmental performance as the dependent variable in the multiple linear regression model. But the problem, as discussed earlier is that these two variables are affected by each other and also affects each other. So studying their relationship with the help of Multiple Linear Regression Model will not serve the purpose. Hence it was decided that this relationship can be explored with the help of Simultaneous Equation Modeling. It is a technique which establishes the relationship between two such variables which are dependent on each other. Some exogenous variables are used which are also known as independent variables i.e. those variables which are not affected by any other variable in the model. Then some endogenous variables are used which affects and in turn gets affected by the dependent variable. Instrumental variables are also used in this model which is those variables which don't affect the dependent variable directly rather they affect the endogenous variable which in turn affects the dependent variable. Thus instrumental variables are those which affect dependent variable only through variable. It will contribute to existing literature in a way that it will study the two way relationship between financial performance and Environmental Performance. No study, till date has been conducted in India with such proposed model. The basic reason, may be, behind this scenario is there is no regulatory, government, non-government or any other agency or organization which rates or measures the environmental performance of companies in India. The only exception to this is Centre for Science and Environment which has its

own leaf rating program. But it only rates only the specific sectors and from that sectors too, only selected companies for which it has its own criteria. Consequently, with such sample the study could not be conducted because the results can't be generalized. Hence it was decided to measure the Environmental Performance by a separate methodology which is discussed in the following section.

The following variables are proposed to be studied for the aforesaid objective:

Environmental Performance: For measuring the dependent variable i.e. environmental performance of a company, environmental scores have been calculated. For this purpose an index of green initiatives has been framed by scanning the literature, initiatives undertaken by various companies mentioned in their Annual Reports, Sustainability Reports, Environmental Policies or Directors' Report and Global Reporting Initiatives. The index contained 42 environmental initiatives which were categorized into seven main categories viz initiatives relating to Environment Policy and Management; Operations related Initiatives; Product and Suppliers related Initiatives; Human Resources related Initiatives; Selling Process related Initiatives; Awards and Recognitions of Green Initiatives and lastly Miscellaneous Green Initiatives. Environmental Score Based Analysis unweighted scoring has been done on the basis of 0 and 1. The score '1' was assigned if a particular green initiative is disclosed by a company and '0' if not disclosed. Final score has been scaled to 100 for each company to ensure better analysis and interpretation.

Financial Performance: Financial performance of a company is endogenous variable of the study, which will be measured by proxy variable Return on Assets:

Return on Assets: Return on Assets is most commonly used measure by market analysts for firm performance as it states the efficiency of assets in producing income. It has been previously used as a barometer of financial performance by various studies, (Hart and Ahuja, 1996, Cohen et al., 1997, Russo and Fouts, 1997, King and Lenox, 2001, Benito and Benito, 2003, Bonafos, 2004, Susi, 2005). It is calculated by dividing the after tax income of a respective company with its total assets. The data for after tax income and total assets has been taken from database Prowess for the year ending 31st March, 2013.

The exogenous variables used in Simultaneous Equation Model are:

1.Age: The variable age is included in the regression model as a control variable for the perceived stability of the company. Liu and Anbumozhi (2009) and Joshi et al., (2011) also controlled for age of the company for environmental performance. It is calculated since the year of incorporation

to the year 2013. The dummy of this variable is obtained in the manner, if age of the company is greater than median value then '1', and if age is less than median value, then '0'.

2.Size: According to Chen and Metcalf (1980) differences in firm size play an important role due to economies to scale concept. Thus, firm size is probably the most commonly used proxy for firm visibility, which is generally measured by natural log of total assets. While size is widely known as a representative of firm visibility, it also represents firm capacity to be involved in social and environmental programs and to report such activities.

3. Industry Sector: It is believed that the industry with higher pollution and stricter regulation tend to disclose more environmental information. Since previous researches showed significant differences with regard to industry differences (Russo and Fouts, 1997, Benito and Benito, 2003, Salama, 2005, Susi, 2005), thus it was also included as a control variable. According to a report of Centre for Science and Environment the following 17 sectors are rated as most highly polluting industries:

1. Aluminum smelting
2. Basic drugs and pharmaceuticals manufacturing
3. Caustic soda
4. Cement
5. Copper smelting
6. Dyes and dye intermediate
7. Fermentation (distillery)
8. Fertilizer
9. Integrated iron and steel
10. Leather processing including tanneries
11. Oil refinery
12. Pesticide formulation and manufacturing
13. Pulp and paper
14. Petrochemical
15. Sugar
16. Thermal power
17. Zinc smelting.

The companies belonging to above sectors are assigned dummy variable '1' as they belong to highly polluted sector and remaining companies were assigned dummy variable '0' as they belong to low polluted sector.

The Instrumental variables used in Simultaneous Equation Model are:

1. Price Earnings Ratio: Price Earnings Ratio may also be used as a market based measure for measuring Financial Performance (Spicer, 1978, Chen and Metcalf, 1980, Al-Tuwaijri, 2003). A high Price Earnings Ratio suggests that investors are expecting higher earnings growth in the future compared to companies with a lower Price Earnings Ratio. Price Earnings Ratio as provided by database Prowess is used in this study.
2. Capital Intensity: Capital intensity is the amount of fixed or real capital present in relation to other factors of production. For a company, higher capital intensity means that it needs more assets than those with lower ratios to generate sales in equal amounts. Higher capital intensity ratios may be due to a company's lower use of assets. It could also be due to having a more capital-intensive business which is less intensive in terms of labor, such as if a company uses machines. For companies in similar industries that follow similar production processes and business models, the ones with less capital intensity are better as these uses less assets to generate more revenue (Jenniferc, 2014). It is calculated as the ratio of total assets to sales. (Hart and Ahuja, 1996, Russo and Fouts, 1997, King and Lenox, 2001)
3. Foreign Operations: It is argued that firms with foreign operations will have better environmental performance as the rules regarding preservation of environment are quite stringent in developed nations. So log of foreign operation earnings is taken in this study as a proxy variable for foreign operations.
4. Research and Development Intensity: It is calculated by dividing the research and development expenses by total assets of a firm. It is proposed in literature that if a firm spends on research and development then it is likely to be more environmental friendly as research and development will lead to green initiatives in firms' operations. Moreover, it is taken as instrumental variable as research and development expenses affects the profitability of a firm.
5. Advertising Intensity: It is calculated by dividing the advertising expenses by total assets of a firm. It is obvious that if a firm spends on advertising, then it affects the profitability of a firm, so it is taken as instrumental variable in the simultaneous equation model.
6. Growth in Sales: Growth in sales was calculated as average annual increase in sales for the year 2012 and year 2013. This was taken as an instrumental variable because growth in sales directly affects the financial performance of a firm.

7. Debt Equity Ratio: Debt equity ratio or leverage of a firm also affects the financial performance of a firm as proper use of debt can reduce the cost of a firm.
8. Asset age: The age of a firm's assets could also have conflicting effects on its profits, since newer equipment could be more productive but also more expensive than existing equipment. So asset age is calculated by dividing the total assets of a firm by its gross assets.

As discussed earlier in Research Methodology section of this thesis, the association between Corporate Environmental Performance and Corporate Financial Performance will be empirically tested with the help of Simultaneous Equation model. Thus, after measuring the variables planned to be included in the study, the proposed model is:

$$\text{ENVIRONMENTAL PERFORMANCE} = a + b11\text{ROA} + b12\text{AGE} + b13\text{SIZE} + b14\text{INDUSTRY CONCENTRATION}$$

$$\text{FINANCIAL PERFORMANCE (ROA)} = a + b21\text{ENVSC} + b22\text{PRICE EARNING RATIO} + b23\text{CAPITAL INTENSITY} + b24\text{FOREIGN OPERATIONS' INCOME} + b25\text{RESEARCH AND DEVELOPMENT INTENSITY} + b26\text{ADVERTISING INTENSITY} + b27\text{GROWTH IN SLAES} + b28\text{DEBT EQUITY RATIO} + b29\text{ASSETAGE}$$

Where

a= constant

E= Error term

b11 to b14 are regression Coefficients of environmental performance equation.

b21 to b29 are regression Coefficients of financial performance equation.

Empirical Results And Discussion

The Simultaneous Equation Model was applied using the Stata software. The Stata14 was used in this study. The results of the model are shown in Table 1. As it is evident from the table r square value is 0.0953 which implies 9% of the variance in environmental performance variable is explained by Return on Assets (Financial Performance) and independent variables age, size and industry concentration. The value is small due to the fact that environmental performance is dependent on many other factors like air spills, pollution emissions, etc. which are not measureable in Indian Context as these are not required by any regulatory agency. No doubt, Pollution Control Board collects such data but they don't make such data public. Therefore this is the limitation of this model as it does not consider such variables. As it is evident from the table that ROA is significant as 5% level of significance and age and size are significant as 1% level of significance whereas industry concentration was not found to be significant.

Table 1: Results of Simultaneous Equation Model

Instrumental variables (2SLS) regression						
		Number of obs =		317		
		Wald chi2 (4) =		49.85		
		Prob > chi2 =		0.0000		
		R-squared =		0.0953		
		Root MSE =		20.122		
Envsc	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
Roa	.8871058	.3539751	2.51	0.012	.1933273	1.580884
Age	8.814833	2.317798	3.80	0.000	4.272033	13.35763
Size	11.50387	2.121677	5.42	0.000	7.345463	15.66228
Indus	-.0698916	2.487653	-0.03	0.978	-4.945601	4.805818
_cons	-18.50871	11.08921	-1.67	0.095	-40.24316	3.225734
Instrumented: roa						
Instruments: age size Indus forex pe capint growth in sales deratio advintensity rdintensity assetage						

After the application of model, there are some post estimation tests of Simultaneous Equation Model, which are tests of endogeneity and test of over identifying restrictions. The results of these tests are shown in Table 2 and Table 3 respectively. As it is evident from the Table 2 that the null

hypothesis of endogeneity tests is that variables are exogenous. P value of Durbin and Wu- Hausman Tests are less than 0.05 which implies null hypothesis is rejected and the variables used in the model are endogenous. Thus the model passes the test of endogeneity.

Table 2: Tests of Endogeneity

. estat endog	
Tests of endogeneity	
Ho: variables are exogenous	
Durbin (score) chi 2(1)	= 3.2828 (p = 0.031)
Wu-Hausman F (1,311)	= 3.25437 (p = 0.029)

The results of tests of over identifying restrictions are shown in Table 3. The null hypothesis of the test is that model is valid and correctly specified. The p value Sargan and

Basmann Tests are more than 0.5, thereby accepting the null hypothesis that the model is correctly specified and valid.

Table 3: Tests of Over Identifying Restrictions

. estat overid	
Tests of overidentifying restrictions:	
Sargan (score) chi2 (7)	= 15.3977 (p = 0.700)
Basmann chi2 (7)	= 15.5712 (p = 0.722)

Discussions

Our results are consistent with the previous literature, which has revealed positive association between Corporate Environmental Performance and Corporate Financial Performance (Spicer, 1978; Hart and Ahuja, 1996; Klassen and McLaughlin, 1996; Cohen et.al., 1997; Russo and Fouts, 1997; Edwards, 1998; Sharma and Vrendenburg, 1998; Melnyk et.al, 2003; Salama, 2004; Bonafos, 2004). As regards the financial performance parameters, Return on Assets is found significant at 5 % level of significance. These results are confirming to previous literature, regarding Return on Assets (Hart and Ahuja, 1996, Cohen et al., 1997, Russo and Fouts, 1997, Bonafos, 2004). In context to other variables, like company size and age it is found significant and positive which indicates bigger companies tend to indulge in more environment friendly initiatives. This is consistent with results of (Halme and Huse, 1997, Wilmshurst and Frost, 2000, Romlah et. al., 2002, and Cormier and Magnan, 2003). With regard to industry concentration, which seemed to be important variable in environmental performance during the literature review was found to be insignificant. In case of Indian companies, these results are also consistent with the results of Gupta and Goldar (2003) and Sahay and Singh (2004). Infact, Darnall (2005) also found no differences between the dirty and clean sectors in environment performance in case of studies outside India.

To sum up, it can be stated that within the Indian context, Environmental Performance have significant and positive relation with return on assets, company size, age of the company. Industry concentration has no significant association with Corporate Environmental Performance.

Conclusion

Indian companies are almost equivalent to the companies in developed world in case of making available financial data. Some data bases like that of Center for Monitoring Indian Economy provide a good indicator of Economy and the financials of listed companies but there is no environmental database available in public domain. Center of Science and Environment as discussed in the Research Methodology section, studied the environmental performance of companies in paper & pulp, automobile and Caustic – Chlorine Sector for green rating of the companies. They devised their own parameters for green rating which was based on collection of environmental data, sight visit and interviews. The parameters chosen are diverse indifferent sectors. Till the companies follow the same benchmark for environmental performance measurement, such study may not lead to any reliable results. The subject needs to be explored further. However, the study will be evocative if there is statutory provision of Environmental Reporting like Financial Reporting.

References

- Al-Tuwaijri, Christensen S. and Hughes, K. (2004), "The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach", *Accounting, Organizations and Society*, Vol. 29 No's 5-6, pp. 447-71.
- Benito Javier Gonzalez, Benito Oscar Gonzalez (2005). "Environmental Proactivity and Business Performance: An Empirical Analysis". Available online at http://campus.usal.es/~econapli/docma/JGonzalez_Omega.pdf. Accessed on 19th December, 2015.
- Carmona-Moreno, E., Ce'spedes-Lorente, J. and de Burgos-Jime'nez, J. (2004), "Environmental strategies in Spanish hotels: contextual factors and performance", *The Service Industries Journal*, Vol. 24 No. 3, pp. 101-30.
- Center for Monitoring Indian Economy, Prowess Release 2, 2013
- Chakrabarti, S., and Mitra, N., (2005) Economic and environmental impacts of pollution control regulation on small industries: a case of study, *Ecological Economics*, 54, pp. 53-66.
- Chen Kung H. and Metcalf Richard W. (1980). "The Relationship Between Pollution Control Record and Financial Indicators Revisited." *The Accounting Review*. Vol. LV.(1) Pp.168-177.
- Christmann P. (1999), "Effects of best practices on environmental management and cost advantage: The role of complimentary Assets." *Academy of Management Journal*. Vol. 43(4). Pp.663-680.
- Darnall, N. and Sides, S. (2008), "Assessing the performance of voluntary environmental programs: does certification matter?" *The Policy Studies Journal*, Vol. 36 No. 1, pp. 95-117.
- Green K., Morton B. and New S. (1996), "Purchasing and Environmental Management: Interactions, Policies and Opportunities". *Business Strategy and the Environment*. Vol.5. Pp.188-197.
- Hart, S. (1997), "Beyond greening: strategies for a sustainable world", *Harvard Business Review*, Vol. 75 No. 1, pp. 66-76.
- Hart, S. and Ahuja, G. (1996), "Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance", *Business Strategy and the Environment*, Vol. 5 No. 1, pp. 30-7.
- Katsuhiko K., Eriko N., (N.D.), "Environmental Accounting Practices of listed companies in Japan", Graduate School of Business Working paper.
- Khanna M. and Damon Lisa A. (1997). "EPA'S Voluntary 33/50 Program: Impact on Toxic Releases and Economic Performance of Firms." *Journal of Environmental Economics and Management*. 37. Pp. 1-25.
- Mark H., Huan Gao, Juliana M. & Zysman J. (2011) "Shaping the Green Growth Economy A Review Of the Public Debate and the Prospects for Green Growth." *The Berkeley Roundtable on the International Economy*.
- Muang KO, Clark Jan G., KO D. (2011). "Investigating the Impact of 'Green' Information Technology Innovators on Firm Performance." *Journal of Information Technology*. (XXII) Pp.1042-1319.
- Rasi R.Z. Raja Mohd, Abdekhodae A., Nagarajah R. Environmental Initiatives: An Exploration of Small and Medium Enterprise (SME's) Responses toward Green Technologies. (2010). The 2nd International Conference on Logistics and Transport (ICLT 2010) Queenstown, New Zealand, 16-18 December 2010
- Parke, I. R., & Eilbirt, H. (1975) Social responsibility: The underlying factors. *Business Horizons*, 18(4), 5-10.
- Roberts, R.W., (1992) Determinants of corporate social responsibility disclosure: An application of stakeholder theory, *Accounting, Organizations and Society*, 17(6), pp. 595 – 612.
- Sharma, S., (2000) Managerial interpretations and organizational context as predictors of corporate choice of environmental strategy, *Academy of Management Journal*, 43, pp. 681-697.
- Singh H., Singh B.P. (2011). "Green and Sustainable Management – A Deciding Factor for Tomorrow's Business." *International Journal of Research in Commerce and Management*, 2 (4), pp. 110-114.
- Zikmund W., Babin B., Carr J., Griffin H. (2010). *Business Research Methods*, Eighth Edition. South-Western, Cengage Learning.