

In Health Care, It Pays to be Green

Susan Carol Christoffersen¹ & Elizabeth Harman Granitz²

¹ Philadelphia University, Philadelphia, Pennsylvania, USA

² Long Island University, Post Campus, Brookville, New York, USA

Correspondence: Susan Carol Christoffersen, Philadelphia University, Philadelphia Pennsylvania, USA.

E-mail: christoffersens@philau.edu

Received: February 19, 2016

Accepted: April 2, 2016

Online Published: April 27, 2016

doi:10.5539/jms.v6n2p103

URL: <http://dx.doi.org/10.5539/jms.v6n2p103>

Abstract

Firms have a responsibility to their shareholders to maximize their financial performance however they are increasingly scrutinized for environmental practices as well. These two objectives are often thought to be in conflict; it can be costly to be a good steward of the environment however it may be more costly in the long run to ignore societal pressures and environmental impacts. While various studies provide ambiguous and sometimes contradictory results, we conduct a rigorous analysis of the health care sector using Trucost's Environmental Impact Score and financial data. The study uses regression analysis to identify the extent to which the benefit to the firm of reducing its environmental impact is financially beneficial. In the health care sector, an increase in the environmental impact score of 1 unit is correlated with an increase of 4% of their earnings per share. Improving the environmental bottom line improves the financial bottom line.

Keywords: environment, financial, health care

1. Introduction

This paper examines if it is possible to manage a firm in a more environmentally sound manner and outperform firms who operate in a less environmentally sound manner. There is much speculation regarding the costs of being environmentally responsible, that any effort not directed to the bottom line is costly, and unlikely to be embraced by the stakeholders, particularly investors who may have a short term horizon. Companies must perform in the short term financially but hope to operate in the long term when costs of environmental irresponsibility are more likely to arise. We examine Fortune 500 firms in the health care sector to investigate the impact of environmentally sound management on earnings per share.

2. Literature Review

A number of studies have examined whether environmentally sound management can strengthen the bottom line utilizing a variety of measures of both environmental behavior and firm performance. Some use the Dow Jones Sustainability Index (DJSI) as firms included in the index have to adopt a number of sustainability practices as ratified by the index. Lopez et al. (2007) matched 55 firms that initially joined the DJSI with comparable firms not in the index. They found that initially the implementation of the sustainability had a negative impact on the performance indicators. Their results also show that over time these differences diminish.

Ameer & Othman (2012) selected the top 100 firms from a universe of 3,000 firms, ranked on the company's record on sustainability. The firms were then matched with others of similar size (within 10% of total sales) and in the same industry who were not ranked as sustainable and these made up the control group. The study used return on assets, profit before taxation and cash flow from operations as measures of financial performance. Based on these measures the study found that overall the more sustainable firms had better and increasing financial performance from 2006-2010. Despite these positive findings, one may still ask whether the sustainably ranked firms benefited from sustainable practices or overall enlightened management.

Some ambiguity arises from the measure used to determine the level of corporate environmental performance (CEP). Often this measure includes the firm's policy approach without a measure of the success of the policy. For example, in order for a company to be in the DJSI, they must follow sustainability practices that relate to innovation, governance, shareholders, leadership, and society. According to those who constructed the index, (Knoepfel, 2001) input sources for the DJSI consist of "responses to the corporate sustainability questionnaire,

submitted documentation, policies and reports and publicly available information.”

In a meta-analysis based of 71 studies, Dixon-Fowler, Slater, Johnson, Ellstrand and Romi (2013) examine the relationship between (CEP) and corporate financial performance (CFP). Many studies find a positive relationship between CEP and CFP and Dixon-Fowler et al. (2013) attempt to identify the underlying causes of this relationship. They compare firms that pursue proactive strategies to firms that pursue reactive strategies. A proactive firm is one that engages in environmental measures beyond what is required by governmental regulations such as process redesign. A reactive firm implements environmental controls to meet the required regulations such as end of the pipe controls. “Firms appear to benefit similarly, in terms of financial performance, from pursuing either proactive or reactive initiatives.” (Dixon-Fowler et al., 2013)

The result that firms benefit similarly whether they are proactive or reactionary in implementing their environmental strategy seems unusual. If there is any real benefit to being green then it seems that the firm that implements a change sooner will have greater benefits. The only time this might not be the case is if there is a regulatory requirement for an end of the pipe control. End of pipe controls are emission reduction technologies that are applied at the end of the process such as the catalytic converter on your car or an electrostatic scrubber that removes particulates from the emissions before being released into the environment.

Dixon-Fowler et al. (2013) also compared large versus small firms, public versus private firms, and US versus international firms. In these comparisons they found that small firms benefit more than large. There was no appreciable difference in the CFP impact between public and private firms. They also found that international firms do not benefit to the extent that U.S firms do. Dixon-Fowler et al. (2013) also looked at some of the methodological issues and found that the choice of CEP measure doesn't create a significant difference in the relationship with CFP.

In this paper we use a measure of CEP that is outcome based, avoiding reporting bias that might arise in measures such as those used by DJSI. By using the *Environmental Impact Score* (EIS) produced by Trucost, we rely on a quantitative measure of environmental performance. The EIS is based on over 700 metrics including greenhouse gas emissions, water use, and solid waste disposal. Newsweek incorporated this EIS in their annual composite Green Ranking of the top 500 US companies.

On September 14, 2010 Trucost's unique methodology and assessment received a U.S. Patent for their “method and system for calculating an environmental score for a business unit”. Standard & Poor's selected Trucost and its comprehensive methodology to evaluate companies for their S&P US Carbon Efficient Index which tracks around 350 companies selected for their carbon efficiency. As a measure of actual environmental impact we find that Trucost's quantitative, standardized ranking is a valid measure based on the use of publically available environmental data whenever available, and a rigorous input-output model that tracks impact through the supply chain.

3. Hypotheses

Focusing the research on a single US industry using a metric that measures actual environmental impact for a specific time period eliminates many of the confounding variables that lead to some of ambiguous results observed in the literature. At a point in time one would expect that a firm with a higher EIS is more likely to be proactive, being an early adopter or developer of techniques or practices which reduce the firm's environmental impact.

Using regression analysis, we measure the extent to which Earnings per Share are a function of environmental impact, taking into account control variables for risk and reward.

Regression Equation:

$$EPS = f(\text{environmental impact} \mid \text{control variables for firm success and risk})$$

$$H_0: b_2 = 0$$

$$H_1: b_2 \neq 0 \text{ where } b_2 \text{ is the EIS coefficient}$$

If practicing sustainable environmental policies is good for the bottom line, we expect b_1 to be positive and significant, controlling for the risk, reward characteristics of the companies in the health care industry. The control variables help “estimate the ‘pure’ effect of some explanatory variable on the dependent variable” the additional explanatory variables allow us “to control as many other effects as possible” (Weber, 2008).

4. Data

The literature review discusses the Trucost ranking which we use for our environmental impact ranking.

Following is a discussion of the financial ratios and then the descriptive statistics for the data set are presented.

Earnings per Share (EPS) is one of the most widely used and important metrics used to indicate a company's profitability and financial strength. EPS is called the bottom line, denoting that, of all the items on the income statement, it is the most important. It captures both the revenues generated and the costs incurred during the reporting period (Weston & Scott, 2005).

Control Variables:

Return on Assets (ROA) tells an analyst how much profit a company generates for each \$1 of assets. It is a good indicator of the capital intensity of a company. For example, railroads and steel mills are capital intensive however financial services and software companies usually do not have large investments in assets. ROA measures the relationship between all of a firm's assets (shareholders equity and borrowed funds) to its earnings. It may be considered one of the strongest tests of return to stockholders.

Beta is a measure of volatility or systemic risk associated with a stock or group of stocks in comparison to the market as a whole. It may be thought of as the tendency of the returns on a stock to be affected by swings in the general market. A stock with a Beta equal to 1 will move with the market, less than 1 the price will not fluctuate as widely as the market and a stock with a Beta greater than 1 will be more volatile than the market as a whole. (Investopedia.com)

Of the US Fortune 500 firms, 49 firms are categorized as health care industry; these 49 firms are ranked by Trucost for their environmental impact. There are essentially three types of firms in the health care industry classification. Approximately one-fifth of the firms in the group are insurance and managed care firms or firms that provide management services. The top 6 Environmental Impact Scores belong to these companies. Compared to the other types of firms in the industry group this is mainly office work and relatively clean.

The largest group of firm, approximately three-fifths of the sample is manufacturing firms who produce pharmaceuticals, medical instruments, implants and other devices used in health care delivery or directly by patients. A number of these firms are also involved in the research and development of their products. The manufacturing firms as a group has the lowest Environmental Impact Scores in the health care category as might be expected given that they are involved in producing goods that use chemicals, plastics, metals and other resources. In producing goods to improve people's health, they do not necessarily improve the environment's health.

Between the insurers and the manufacturers are the firms who support the industry either through distribution or support services like technology tools and consulting. The distribution firms sell and deliver either pharmaceuticals or medical supplies of all types to hospitals and other health providers or directly to the patient. These firms generally fall between the insurance companies and the manufacturers in terms of their EIS.

The descriptive statistics for the population studied follow.

Table 1. Descriptive statistics for health care industry firms

Variable	Minimum	Max	Mean	Median	Standard Deviation
EPS	0.37	7.88	3.22	3.42	1.62
ROA	0.028	0.37	0.11	0.094	0.073
EIS	46.9	86.9	66.05	61.9	9.77
Beta	0.29	2.25	0.874	0.8	0.418

While the EIS for all the 500 firms examined ranged from 88.5 to a low of 0.2. For the firms in the health care industry their EIS's are not that divergent, ranging from 46.9 to 86.9 with a standard deviation of 9.77, even though there are several different types of firms within this industry.

5. Results

Initially we investigate the relationship between EPS and EIS of the firm by running a regression analysis, with ROA and Beta as control variables. The EPS model had a slightly increasing variance for larger values and the function was not quite linear. In order to correct for this we regressed the independent variables on the natural log of EPS. The regression results are shown below.

$$\ln EPS = -1.39691 * + 3.478859 ROA^{***} + 0.038743 EIS^{***} - 0.62896 Beta^{***} \quad (1)$$

***significant at the 99% level, **significant at the 98% level, *significant at the 95% level

The EIS variable is positive and significant. An adjusted $R^2 = 0.391$ is quite respectable for cross-section data and the coefficients are all significant at the 99% level for ROA (as expected for the control variable) and EIS and Beta. The constant is significant at the 95% level. With this specification, the variables all have the expected signs and the residuals are normally distributed.

The differences in the EIS based on the type of firm made us worry that these results were influenced by the fact that the insurance companies had higher EIS in general. To test this we used a dummy (*ins*) for the insurance firms. The regression results for this formulation are below.

$$\ln EPS = -0.87088 + 0.29045 \text{ ins} + 3.314244 \text{ ROA}^{***} + 0.030854 \text{ EIS}^{**} + -0.66107 \text{ Beta}^{***} \quad (2)$$

***significant at the 99% level, **significant at the 98% level, *significant at the 95% level

The insurance dummy is not significant. The other coefficients are still all significant and the size of the coefficients didn't change much from the earlier specification. In addition, the adjusted $R^2 = 0.388$ meaning the addition of the dummy variable failed to add to the explanation of the natural log of EPS. Therefore the results are robust and not dependent on the type of firm in the health care industry.

6. Analysis

It is useful to get a feel for the effect on EPS of an improvement in the EIS of the average firm. The average Trucost EIS of the health care industry is 66.1. A 1 unit increase in the EIS to 67.1 will result in a 3.95% increase in the EPS of the firm. With the average EPS at 3.22% improving the EIS 1 unit will cause the EPS to increase to 3.35%. More vividly a 5 unit increase in EIS from 66.1 to 71.1 will result in a 20.6% increase in EPS from 3.22% to 3.88%.

7. Discussion

These results support the hypothesis that the firm's environmental management has a positive impact on the earnings per share. Furthermore,

This rough ordering of the EIS by type of firm did create some concern about the results so we ran an additional regression that added a dummy variable for the insurance companies. The insurance dummy was not significant and the coefficients and significance levels of the other explanatory variables were not affected by the insurance dummy.

While as a group the manufacturing firms have a larger impact on the environment than the other firms involved in health care, many of them are working hard to reduce their environmental impact and are seeing the results of these efforts in direct cost savings such as waste reduction and a corresponding improvement in their bottom line.

8. Conclusion

The benefit to the firm of reducing its environmental impact is significant for the health sector. The 49 firms who were selected for their financial performance were then evaluated by Trucost and scored based on their environmental impact. Trucost specializes in quantitative measures of environmental performance; the Environmental Impact Score they created examines information on over 700 metrics including: greenhouse gas emissions, water use, and solid waste disposal. When these health care firms improve their environmental impact score by 1%, we expect their earnings per share to increase by a 3%. The environmental bottom line improves the financial bottom line.

References

- Ameer, R., & Othman, R. (2012). Sustainability Practices and Corporate Financial Performance: A Study Based on the Top Global Corporations. *Journal of Business Ethics*, *108*, 61-79. <http://dx.doi.org/10.1007/s10551-011-1063-y>
- Dawkins, C., & Fraas, J. W. (2011). Coming Clean: The Impact of Environmental Performance and Visibility on Corporate Climate Change Disclosure. *Journal of Business Ethics*, *100*, 303-322. <http://dx.doi.org/10.1177/0007650315613120>
- Dixon-Fowler, H. R., Slater, D. J., Johnson, J. L., Ellstrand, A. E., & Romi, A. M. (2013). Beyond "Does it Pay to be Green?" A Meta-Analysis of Moderators of the CEP-CFP Relationship. *Journal of Business Ethics*, *112*, 353-366. <http://dx.doi.org/10.1007/s10551-012-1268-8>
- Evans, C. (2003). Sustainability: The Bottom Line. *Accountancy*, *131*(1313), 16.
- Greene, S. (2009). S&P launches low-carbon index. FT.com (Mar 8, 2009).

- Hawken, P. (1993). *The Ecology of Commerce*. New York: Harper Collins.
- Knoepfel, I. (2001). Dow Jones Sustainability Group Index: A Global Benchmark for Corporate Sustainability. *Corporate Environmental Strategy*, 8(1), 6-15. [http://dx.doi.org/10.1016/S1066-7938\(00\)00089-0](http://dx.doi.org/10.1016/S1066-7938(00)00089-0)
- Lopez, M. V., 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>
- McWilliams, A., & Siegel, D. (2000). Corporate Social Responsibility and Financial Performance: Correlation or Misspecification? *Strategic Management Journal*, 21(5), 603-609. [http://dx.doi.org/10.1002/\(SICI\)1097-0266\(200005\)21:5<603::AID-SMJ101>3.0.CO;2-3](http://dx.doi.org/10.1002/(SICI)1097-0266(200005)21:5<603::AID-SMJ101>3.0.CO;2-3)
- Newsweek Full Methodology. (2011). How we calculated this year's Green Rankings. Retrieved from <http://www.thedailybeast.com/newsweek/2011/10/16/newsweek-green-rankings-2011-full-methodology.html>
- Salam, M. (2011). Creating Sustainable Supply chain through Green Procurement. *International Journal of Business Insights & Transformation*, 3(S3), 83-89.
- Schumpeter. (2011). Why firms go green. *The Economist*, Nov 12 2011.
- Shankel, G. (2011). More U.S. Firms Going Green, Yet Effort Must Grow. Fabricators & Manufacturers Association, International, US Building Digest, pp. 1-7.
- Trucost. Retrieved from <http://www.trucost.com/methodology>
- US Fed News Service, Including US State News [Washington, D.C]: 15 Sep 2010. US Patent Issued to Trucost on Sept. 14 for 'Method and System for Calculating an Environmental Score for a Business Unit.' *British, New Zealander Inventors*.
- Weber, R. J. (2008). Regression Analysis: An Overview, Kellogg School of Management. Retrieved from http://www.kellogg.northwestern.edu/faculty/weber/emp/_Session_2/Regression.htm
- Wenzel, L., & Thiewes, H. (1999). Corporate Social Responsibility: Does It Pay? *Journal of Accounting and Finance Research*, 7(4), 48-58.
- Weston, B., & Scott, B. (2005). *Essentials of Managerial Finance*. Oak Brook: Dryden Press.
- World Commission on Environment and Development. (1987). *Our Common Future*. Oxford: Oxford University Press.
- Yarett, I. (2011). The World's Green Giants. *Newsweek*, 158(17), 50-56.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/3.0/>).