

Corporate Environmental Performance and Shareholder Value

White, Mark A.

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Abstract

The role corporations should play in achieving social objectives is a topic with a lengthy history of debate. Significant recent interest has focused on the impact corporate activities have upon the natural world and the environment. This paper examines the link between corporate environmental responsibility--measured by environmental reputation indices--and shareholder wealth. Investors in a portfolio of firms enjoying above-average reputations for corporate environmental responsibility earn risk-adjusted returns significantly greater than either the overall market or portfolios composed of less environmentally-responsible firms. These results are supported by preliminary evidence concerning the value of adopting the CERES Principles, a formal code of corporate environmental responsibility.

I. Introduction

Recent years have seen a marked shift in many businesses' attitudes towards the environment. In the face of changing consumer attitudes, increasingly stringent environmental regulations, threats of large-scale climate change and a perceived scarcity of natural resources, "business as usual" is taking on an emerald hue for many managers. Most visions of a sustainable future include a world in which corporations prosper by meeting the needs of a stable population and by minimizing their impact on the natural environment (Gladwin, Kennelly and Krause 1995; Shrivastava 1995a). "Pollution prevention," "design for the environment," "industrial ecology," and "total quality environmental management" are a few of the strategies currently promoted to help achieve this end. But does it really pay to be "green"? Corporations are, after all, at least nominally responsible to their shareholders, who presumably anticipate some return for the use of their capital. Unless corporate policies yield financial as well as environmental benefits, it is unlikely investors will commit the resources necessary to ensure the transition to a sustainable economy. It is therefore of critical importance to investigate the relationship between corporate environmental responsibility and shareholder value.

II. Background

Standard finance theory espouses maximization of shareholder wealth as the preeminent goal of the financial manager. According to this paradigm, socially desirable investments that do not directly benefit the firms' shareholders should not be undertaken (Friedman 1970; Malkiel and Quandt 1971). Firms persisting in these behaviors, perhaps by donating a portion of their profits to environmental organizations or by employing more environmentally sound but higher-cost production processes, should yield investment returns inferior to businesses pursuing less lofty aspirations. Stakeholder theory suggests just the opposite, arguing that managers must satisfy the competing demands of many stakeholders (Freeman 1984; Cornell and Shapiro 1987). Competitive advantage, and thus management's response to the needs of a particular stakeholder group, depends upon the importance of that stakeholder group to the firm's overall strategy.

An abundance of articles, books, speeches and seminars touting the advantages of responsible environmental behavior have appeared in the past few years. In brief, it is argued that green firms

will benefit from 1) opportunities from the sale of environmental services and "earth-friendly" products, 2) Reduced waste treatment and/or disposal costs, 3) Decreased litigation and future liability for environmental damages, 4) Improved credibility with the public, 5) More productive employees and/or improved employee working conditions, and 6) Benefits accruing from less antagonistic regulatory relationships (cf. Kleiner 1991; Cairncross 1992; Hawken 1993; Shrivastava 1995b).

Environmental Responsibility and Competitive Advantage

Traditionally, managements have presupposed there to be many costs and few benefits associated with environmentally responsible behavior. The generally antagonistic posture taken by many industrial companies towards environmental legislation during the 1970s and an overall reluctance to modify existing production technologies lend support to these observations. More recently, several authors have explored the notion that actions undertaken by a corporation or nation to reduce environmental impacts may actually confer competitive advantage vis-à-vis other firms or countries. Michael Porter is most closely identified with the belief that strict environmental regulations improve a nation's competitiveness by encouraging efficiency and innovation (Porter 1991). Recent empirical work by Sorsa (1994) and a thorough review by Jaffe et al. (1995) find that more stringent environmental standards do not appear to have lowered the United States' international competitiveness. Bezdek (1993) and Repetto (1995) argue that on balance, environmental regulation probably creates jobs, though Repetto is careful to note the real issue is not jobs, but what a country's citizens want their economy to produce. Bonifant, Arnold and Long (1995) report the results of case studies examining competitiveness issues in various manufacturing industries. They find increased flexibility in environmental regulations provides opportunities for firms to gain advantage over their competitors.

Hart (1995) proposes a theoretical framework for how a firm might gain competitive advantage based on its relationship to the natural environment. He identifies three interconnected strategies--pollution prevention, product stewardship and sustainable development--and develops propositions concerning the ways in which these strategies might be translated into the bottom line. Shrivastava (1995a, 1995b) and Gladwin, Kennelly and Krause (1995) argue quite persuasively for an "ecocentric" or "sustaincentric" ethic as the key to corporate competitive advantage in a future with a growing world population and decreasing natural resources.

Environmental Performance and Financial Performance

Historical evidence concerning the relationship between environmental performance and financial performance has been mixed. Cochran and Wood (1984), Ullman (1985) and Davidson and Worrell (1990) review over two dozen studies examining corporate social responsibility and firm performance and find the results inconclusive, evidently due to differences in datasets, methods, time periods and measures. Recent work has been more encouraging. Erfle and Fratantuono (1992) find a positive relationship between environmental performance as measured by reputation indices developed by the Council on Economic Priorities and financial performance measured in terms of accounting variables. Russo and Fouts (1993), Swinnerton and Shinkel (1993) and Diltz

(1993) report essentially the same results, the former study using accounting variables and the latter two using stock market returns. Using an impressive array of control variables, Wolf and Curcio (1994) conclude that financial performance (measured with accounting variables) and environmental performance are also positively related.

The U.S. Environmental Protection Agency (EPA) collects annual pollution data and releases it to the public in the Toxic Release Inventory (TRI). Using the TRI data, several researchers have reported recently that the financial performance of firms with lower toxic emissions is as good or better than that of firms with higher emissions (Hart and Ahuja 1994; Cohen, Fenn and Naimon 1995; Repetto, 1995). However, studies conducted using environmental mutual fund data show opposite results. Hamilton, Jo and Statman (1993) examined socially responsible mutual funds and found no statistically significant excess returns. White (1995) tested environmentally-oriented mutual funds in Germany and the United States, reporting a negative relationship between environmental concern and financial performance.

Shareholder Value and Corporate Environmental Responsibility

If investors are not compensated for the use of their monies, they are unlikely to commit the resources necessary to achieve socially desirable results, and thus throw open to question the vast amount of effort currently devoted to enhancing corporate environmental responsibility. This study therefore seeks to answer two key questions:

- 1) What is the relationship between shareholder value and a firm's reputation for environmentally responsible behavior? and
- 2) How is shareholder value impacted by a firm's signaled intent to become more environmentally responsible?

Earlier work has not provided wholly satisfying answers to these questions for several reasons. First, most of the studies mentioned previously measure financial performance in terms of accounting variables--return on assets, return on equity, and the like. Not only do these measures ignore risk, but the relationship between accounting performance and shareholder value is sufficiently tenuous to warrant a more direct investigation using market-based data. Second, measuring environmental performance solely in terms of emissions or compliance with environmental regulations ignores the benefits of a "green" reputation--benefits captured in the form of increased sales of green products, decreased probability of consumer boycotts and possibly more motivated employees. Third, with the notable exception of Wolf and Curcio (1994), most researchers have used data from but one or two years and their results must necessarily be interpreted as tentative.

The present study uses four years of data from the Council on Economic Priorities to test the hypothesis that a superior reputation for environmental responsibility is associated with higher risk-adjusted shareholder returns. The results of a preliminary inquiry investigating whether it is possible for a firm to create its own reputation for environmental responsibility (by signing a set

of environmental principles) are also reported. Together, these analyses provide a partial answer to the question, "Does it pay to be `green'?"

III. Method

Data

Information collected and published by the Council on Economic Priorities (CEP) was used to proxy a firm's environmental reputation. CEP was founded in 1969 to inform and educate the American public on corporate responses to issues of social concern. Over the years it has published many reports highlighting the social records of numerous companies and industries. Researchers have used data from these reports to investigate various aspects of environmental and financial performance (e.g., Ingram and Frazier 1980; Stevens 1984; Wolf and Curcio 1994). In recent years, CEP has perhaps become best known for its publication of *Shopping for a Better World*, an annual guide rating the social performance of numerous consumer products firms. At least two studies have examined the relationship between environmental and financial performance using this dataset (Erffle and Fratantuono 1992; Diltz, 1993).

CEP rates a firm's environmental performance using a simple three–element scale. Companies receiving the highest rating ("green" companies in the present study), are characterized by "... substantial positive programs, such as the use and encouragement of recycling, alternative energy sources, waste reduction, green products and packaging, etc." and a relatively clean record of major environmental regulatory violations. "Brown" companies are firms rated lowest on the scale, indicating a poor public record of major accidents, significant violations and/or history of lobbying against sound environmental policies. The description "oatmeal" is used for companies receiving the middle rating--in CEP's words, "... nothing outstanding either positively or negatively. As far as CEP can ascertain, [the] company is in compliance with minimum legal standards, but has no significant proactive programs" (CEP 1991).

Reputational ratings for a sample of 97 companies listed on either the New York Stock Exchange (NYSE) or the American Stock Exchange (AMEX) were obtained from the 1989, 1990, 1991 and 1992 editions of *Shopping for a Better World*, supplemented in one year by cep's companion publication, *The Better World Investment Guide* (Alperson et al. 1991).^[1] Table 1 lists the firms used in this study together with their environmental reputation ratings.

Table 1. Company Environmental Reputations

Name	Ticker	CUSIP	1989	1990	1991	1992
Abbott Laboratories	ABT	00282410	O	O	G	G
Albertson's Inc.	ABS	01310410			O	O
Allied–Signal Inc.	ALD	01951210			B	
American Brands Inc.	AMB	02470310	B			
American Cyanamid Co.	ACY	02532110	B	B	B	B

American Home Products Corp.	AHP	02660910	O	O	O	O
American Stores Co.	ASC	03009610			O	O
Amoco Corp.	AN	03190510	O	O	O	O
Anheuser-Busch Cos. Inc.	BUD	03522910	G	O	O	O
Archer-Daniels-Midland Co.	ADM	03948310		O	B	B
AT&T Corp.	T	03017710			G	
Atlantic Richfield Co.	ARC	04882510	O	B	B	B
Avon Products Inc.	AVP	05430310		G	O	O
Baxter International Inc.	BAX	07181310			O	
Borden Inc.	BN	09959910	B	O	O	O
Bristol-Myers Squibb Co.	BMY	11012210			O	O
British Petroleum Plc	BP	11088940	B	B	B	B
Brooklyn Union Gas Co.	BU	11425910			O	
Campbell Soup Co.	CPB	13442910	G	G	O	O
Carter Wallace Inc.	CAR	14628510			B	O
Chevron Corp.	CHV	16675110	B	B	B	B
Chiquita Brands Int'l Inc.	CQB	17003210				B
Church & Dwight Inc.	CHD	17134010			G	G
Clorox Co.	CLX	18905410	G	O	G	G
Coca-Cola Co.	KO	19121610	B	O	O	O
Colgate-Palmolive Co.	CL	19416210		O	G	G
Conagra Inc.	CAG	20588710		O		
CPC International Inc.	CPC	12614910		O	O	O
Dial Corp.	DL	25247010		O	O	
Dole Food Co.	DOL	25660510				B
Dow Chemical Co.	DOW	26054310	O	O	O	O
DuPont de Nemours (E.I.) & Co.	DD	26353410			B	
Eastman Kodak Co.	EK	27746110	O	O	O	O
Exxon Corp.	XON	30229010	B	B	B	B
First Brands Corp.	FBR	31935610			O	O
General Electric Co.	GE	36960410	B	B	B	B
General Mills Inc.	GIS	37033410	O	O	O	O
Georgia-Pacific Corp	GP	37329810	O	B	B	B
Getty Petroleum Corp.	GTY	37429010		B		
Gillette Company	G	37576610	G	G	G	O
Grand Metropolitan Plc	GRM	38609030				O
Great Atlantic & Pacific Tea Co.	GAP	39006410		O	O	O
GTE Corp.	GTE	36232010	B	O	O	O
Hartmarx Corp.	HMX	41711910			O	
Hawaiian Electric	HE	41987010			G	
Heinz (H.J.) Co.	HNZ	42307410	O	O	G	G
Hershey Foods Corp.	HSY	42786610	G	G	G	G

Hormel George A. and Co.	HRL	44045210		O			
Huffy Corp.	HUF	44435610		G			
James River Corp. of Virginia	JR	47034910	O	B	B	B	
Johnson & Johnson	JNJ	47816010		G	G	G	
Kellogg Co.	K	48783610	G	G	G	G	
Kimberly-Clark Corp.	KMB	49436810	O	B	B	B	
Kroger Co.	KR	50104410			G	G	
McDonald's Corp.	MCD	58013510			O		
Mead Corp.	MEA	58283410	O	O	O	O	
Meyer Fred Inc.	FMY	59309810			G	G	
Minnesota Mining & Mfg. Co.	MMM	60405910	G	G	O	O	
Mobil Corp.	MOB	60705910	B	B	B	B	
Occidental Petroleum Corp.	OXY	67459910	B		B		
PepsiCo Inc.	PEP	71344810	O	O	O	O	
Pfizer Inc.	PFE	71708110	O	O	O	B	
Philip Morris Companies Inc.	MO	71815410	B	B			
Phillips Petroleum Co.	P	71850710	O	O	O	O	
Polaroid Corp.	PRD	73109510	O	O	O	O	
Procter & Gamble Co.	PG	74271810	G	O	O	O	
Quaker Oats Co.	OAT	74740210		G	G	G	
RJR Nabisco	RN	74960K10					B
Ralston Purina Group	RAL	75127730		O	O	O	
Reynolds Metals Co.	RLM	76176310	O	O	O	O	
Rhone Poulenc Rorer	RPR	76242T10			B	B	
Rockwell International Corp.	ROK	77434710			B		
Royal Dutch Petroleum Co.	RD	78025770	B	B	O	B	
Safety-Kleen Corp.	SK	78648410			O		
Safeway Inc.	SWY	78651420			O	O	
Sara Lee Corp.	SLE	80311110	G	G	O	O	
Schering-Plough Corp.	SGP	80660510	G	G	G	O	
Scott Paper Co.	SPP	80987710	O	B	B	B	
Seagram Co. Ltd.	VO	81185010			O	O	
SmithKline Beecham Plc.	SBH	83237830			O	O	
Smucker J. M. Co.	SJM	83269610	G	G	G	G	
Stop & Shop Cos.	SHP	86209910					O
Sun Co. Inc.	SUN	86676210	B	B	B	B	
Texaco Inc.	TX	88169410	B	B	B	B	
Unilever N.V.	UN	90478450					O
Upjohn Co.	UPJ	91530210	O	O	O	O	
USX--Marathon Group	MRO	90290582		B	B	B	
USX--U.S. Steel Group	X	90337T10	B	B	B	B	
Vons Companies Inc.	VON	92886910		O	G	G	

Wal-Mart Stores Inc.	WMT	93114210		G	
Warner-Lambert Co.	WLA	93448810	O	O	O
Wellman Inc.	WLM	94970210		G	
Westinghouse Electric Corp.	WX	96040210		B	
Weyerhaeuser Co.	WY	96216610		O	
Winn-Dixie Stores Inc.	WIN	97428010	O	O	O
WMX Technologies Inc.	WMX	92929Q10		O	
Wrigley (Wm. Jr.) Co.	WWY	98252610			O

Data from the Council on Economic Priorities.

G = "green," O = "oatmeal," B = "brown." See text for further discussion.

Monthly stock returns for all firms rated by CEP and publicly traded on either the NYSE or AMEX were used to investigate the relationship between shareholder value and a firm's reputation for environmentally responsible behavior. Stock returns were obtained from the Center for Research in Security Prices (CRSP). For each year, three portfolios--Green, Brown, and Oatmeal--were constructed from information supplied by CEP. Monthly returns on these portfolios were value-weighted using monthly equity capitalization figures also taken from the CRSP files. The CRSP value-weighted index was used to estimate the return on the market and the risk-free rate was proxied by monthly returns on three-month U.S. Treasury bills, as released in the *Federal Reserve Bulletin*.

A firm's intent to pursue more responsible environmental policies was measured by its formal adoption of the CERES née Valdez Principles, a corporate code of environmental conduct.^[2] In 1989, shortly after the *Exxon Valdez* oil spill, an organization composed of representatives from national environmental groups and the social investment community formed the coalition for environmentally responsible economies (ceres) and drafted what was then known as the valdez principles. Firms adopting these principles agreed to reduce waste, conserve energy, and in general work towards improving the environment. Due in part to the specter of legal liability for environmental mishaps, few major corporations initially agreed to sign the document (Barnard 1990; White 1992). The principles were recently amended to specifically address this and several other stumbling blocks, with the result that several large companies have now signed on. Unfortunately, only six of the 56 signatories in June 1995 were listed on either the NYSE, AMEX or the national association of securities dealers automated quotation system (NASDAQ). The remaining firms are either very small, privately held or both, and this dataset, although complete, is limited in scope. The six firms used in this analysis and their signing dates are shown in table 2.

Table 2. Signing Dates of CERES Signatories Listed on the NYSE, AMEX or NASDAQ

Name	Ticker	CUSIP	Signing Date
Ben and Jerry's Homemade	BJICA	08146510	14 May 1992
H. B. Fuller Co.	FULL	35969410	17 September 1993
Sun Inc.	SUN	86676210	10 February 1993
Timberland Co.	TBL	88710010	15 April 1993
General Motors Co.	GM	37044210	3 February 1994
Polaroid Corp.	PRD	73109510	25 July 1994

Daily stock returns for an event study on all CERES signatories listed on either the NYSE, AMEX or NASDAQ were taken from the CRSP daily files. As before, the return on the market was proxied by

the CRSP value-weighted index.

Measures

Financial performance was determined using Jensen's alpha, a widely-used method of measuring portfolio performance (Jensen 1968). The Jensen measure provides an estimate of a particular portfolio's risk-adjusted performance, inviting comparisons with other portfolios and the market index. The Jensen measure is based on a portfolio's *ex post* characteristic line and subject to all the strengths and weaknesses associated with the Capital Asset Pricing Model, which provides its theoretical underpinnings. [3] To estimate the line, monthly *risk premiums* were determined for each of the three portfolios and the market index for the 48-month period from January 1989 to December 1992. Next, the monthly risk premiums on the respective portfolios were regressed against the monthly risk premiums on the market index, as shown in equation (1).

$$(k_{i,t} - k_{F,t}) = \alpha_i + \beta_i(k_{M,t} - k_{F,t}) + \varepsilon_{i,t}$$

where

- $K_{i,t}$ = return on portfolio i in period t
- $K_{F,t}$ = return on the risk-free asset in period t
- $K_{M,t}$ = return on the market index in period t
- α_i = intercept coefficient (Jensen measure for portfolio i)
- β_i = slope coefficient for portfolio i
- $\varepsilon_{i,t}$ = error term

The slope coefficient (β) is an estimate of the portfolio's systematic, or market risk. The intercept coefficient $(k_{i,t} - k_{F,t}) = \alpha_i + \beta_i(k_{M,t} - k_{F,t}) + \varepsilon_{i,t}$, also known as the **Jensen measure**, captures the portfolio's risk-adjusted performance relative to the market. A significantly positive alpha coefficient indicates superior performance (i.e., "beating the market") while a significantly negative coefficient signals inferior performance. If the market is efficient, the capital asset pricing model predicts $\alpha = 0$.

The impact of a firm's formal commitment to environmentally-responsible behavior on shareholder wealth was ascertained using event study methods (Brown and Warner 1985; see also

Peterson 1989; Henderson 1990). This analysis determines the extent to which a particular event is associated with abnormal or excess returns. Patten (1990) has used this method to examine the market reaction of firms signing the Sullivan Principles, a corporate code of conduct decrying South Africa's policy of apartheid.

The market model was estimated for each security in the sample over a 255 trading day period ending six trading days before the event date. [4] Event dates were defined as the day each firm signed the CERES Principles and were obtained directly from CERES. The intercept (α_i) and slope (β_i) parameters were determined from the ordinary least squares regression equation

$$R_{i,t} = \hat{\alpha}_i + \hat{\beta}_i R_{M,t} + \epsilon_{i,t}$$

where

- $R_{i,t}$ = return on security i for day t during the estimation period
- $R_{M,t}$ = return on the market index for day t during the estimation period

Abnormal returns ($AR_{i,t}$) were computed for each security in the sample for each day during the event period -5 to $+5$. the abnormal return on security i for day t equals

$$AR_{i,t} = R_{i,t} - (\hat{\alpha}_i + \hat{\beta}_i R_{M,t})$$

Abnormal returns were standardized by the standard error of the forecast (Patell 1976). Patell's method allows the variation in the market during the estimation period to differ from the event period and adjusts for the number of observations in the estimation interval. The standard error of the forecast (SEF_t) equals

$$SEF_t = \sqrt{\frac{\sum_{t=1}^k (AR_{i,t})^2}{k}} \cdot \sqrt{1 + \frac{1}{k} + \frac{(R_{M,t} - \bar{R}_M)^2}{\sum_{t=1}^k (R_{M,t} - \bar{R}_M)^2}}$$

where $R_{M,t}$ and \bar{R}_M are the return and mean return on the market during the k -day estimation period. Standardized abnormal returns ($SAR_{i,t}$) for each security during each day of the event period were defined as

$$SAR_{i,t} = \frac{AR_{i,t}}{SEF_t}$$

signing the ceres principles was likely to affect the different firms in the sample in different ways. Automobile giant General Motors, for instance, was probably affected differently than socially-conscious Ben and Jerry's Homemade Ice Cream. to correct for this, Boehmer, Musumeci and Poulsen's (1991) standardized cross-sectional extension of the standard Patell test was used to determine the significance of the abnormal returns during the event period. the Boehmer, Musumeci and Poulson (hereafter BMP) test statistic is defined as:

$$\text{BMP } z\text{-statistic} = \frac{\frac{1}{N} \sum_{i=1}^N \text{SAR}_{i,t}}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^N \left(\text{SAR}_{i,t} - \frac{\sum_{i=1}^N \text{SAR}_{i,t}}{N} \right)^2}}$$

Cumulative abnormal returns were computed for various event windows corresponding to **pre-signing** : (-5, -1), **signing** (0, +1) and **post-signing** (+1, +5). An eleven-day test period was chosen to avoid minimize the impact of confounding events and other news announcements. moreover, if the market is efficient, new information is impounded nearly instantaneously into stock prices. The cumulative abnormal return for firm i over period t_1 to period t_2 (CAR_{i,t_1,t_2}) is

$$\text{CAR}_{i,t_1,t_2} = \sum_{t=t_1}^{t_2} \text{AR}_{i,t}$$

Mikkelson and Partch's (1988) adjustment for serial correlation of the abnormal returns within event windows was used to standardize the cumulative abnormal returns. The standardized cumulative abnormal return (SCAR_{i,t_1,t_2}) is defined as

$$\text{SCAR}_{i,t_1,t_2} = \frac{\text{CAR}_{i,t_1,t_2}}{\text{SD}_{\text{CAR}_{i,t_1,t_2}}}$$

and

$$\text{SD}_{\text{CAR}_{i,t_1,t_2}} = \sqrt{\frac{\sum_{t=1}^k \text{AR}_{i,t}^2}{k-2} \left[L + \frac{L}{k} + \frac{\left(\sum_{t=t_1}^{t_2} R_{M,t} - L\bar{R}_M \right)^2}{\sum_{t=1}^k (R_{M,t} - L\bar{R}_M)^2} \right]}$$

and L equals the length of the event window in days, i.e., $L = t_2 + t_1 + 1$. The null hypothesis $H_0 : \text{SCAR}_{t_1,t_2} = 0$ is tested with the z -statistic

$$z_t = \frac{\sum_{i=1}^N \text{SCAR}_{i,t_1,t_2}}{\sqrt{N} \cdot \text{SD}_{\text{SCAR}_t}}$$

where

$$\text{SD}_{\text{SCAR}_t} = \sqrt{\frac{\sum_{i=1}^N \left(\text{SCAR}_{i,t_1,t_2} - \frac{\sum_{i=1}^N \text{SCAR}_{i,t_1,t_2}}{N} \right)^2}{N-1}}$$

Cowan's (1992) nonparametric generalized sign test was used to confirm the results of the parametric tests.

IV. Results

Table 3 shows the results of investing in portfolios composed of "green," "brown," and "oatmeal" firms over the period January 1989 to December 1992.

Table 3: The Impact of Environmental Reputation on Investment Performance (January 1989–December 1992; n=48 months)

$$(k_{i,t} - k_{F,t}) = \alpha_i + \beta_i(k_{M,t} - k_{F,t}) + \varepsilon_{i,t}$$

	α_i	β_i	r^2	F
"Green" Portfolio	0.0091** (.0038)	1.0749** (.0962)	0.73	124.86
"Oatmeal" Portfolio	0.0047 (.0039)	0.7885** (.0893)	0.63	78.00
"Brown" Portfolio	0.0053 (.0032)	0.7418** (.0808)	0.65	84.20

Standard errors shown in parentheses.

* Significant at the .05 level

** Significant at the .01 level

As expected, the beta coefficients are highly significant for all portfolios, indicating that risk is an important determinant of portfolio return. The alpha coefficients are of greater interest, and Table 1 shows one could have earned superior investment returns over this period by purchasing the common stock of firms rated "green" by the Council on Economic Priorities. These results indicate (rather strongly; $r^2 = 0.73$, $F = 124.86$) that it does, indeed, "pay to be green."

Having established the value of a green reputation and corporate environmental responsibility to shareholders, it is worthwhile examining the impact of a firm's decision to signal this intent to the investment community. Like the South Africa-related Sullivan Principles, the CERES Principles are a key focus of shareholder activist groups (IRRC 1995). Table 4 indicates an immediate and significant ($t = 3.06$) increase in shareholder wealth the day after firms pledged themselves to pursue the responsible corporate behaviors outlined in the CERES Principles.

Table 4. Shareholder Response to Signing of the CERES Principles

Day	Average Abnormal Return	Median Abnormal Return	BMP z-statistic	Positive:Negative	Generalized Sign Test t-statistic
-5	1.37%	0.60%	1.10	4:2	0.96
-4	0.43%	0.37%	0.28	4:2	0.96
-3	2.06%	1.53%	1.71	4:2	0.96
-2	-1.40%	-0.82%	-1.50	2:4	-0.67
-1	0.10%	0.13%	0.15	4:2	0.96
0	-0.14%	0.11%	-0.30	3:3	0.14
1	1.05%	0.94%	3.09**	5:1	1.78
2	-0.15%	-0.16%	-0.08	3:3	0.14
3	0.02%	1.02%	0.34	4:2	0.96

4	-0.37%	-0.31%	-1.51	2:4	-0.67
5	-0.48%	-1.12%	-0.72	1:5	-1.49

* Significant at the .05 level

** Significant at the .01 level

On average, shareholders in these six firms experienced a 1.05 percent increase in the value of their holdings the day after the event. The sign test provides confirming evidence that this result was not due to just one firm's response; 5 out of the 6 firms experienced a positive abnormal returns the day of signing (Table 5). This wealth effect was not persistent across time, however, at the firm level. This finding is in direct contrast to White (1995), who reported strongly negative risk-adjusted returns for environmentally-oriented mutual funds in the United States and Germany over a time period roughly comparable to that used in the present study. If the mutual funds studied by white invested in the same "green" firms used in this study, as seems likely, then the poor performance of green mutual funds lies more with fund managers than with the component investments themselves. Moreover, negative screens to exclude firms perceived as "brown" from one's investment set would seem of little value, as both "brown" and "oatmeal" portfolios earned returns commensurate with their level of risk.

Recommendations for Managers

It is interesting to consider the mechanisms by which a favorable environmental reputation might create value for a firm's shareholders. Since adoption of the CERES Principles appears to increase shareholder value, their texts provides initial guidance for these musings. Principles Two and Four focus on the *efficient and sustainable use* of natural resources and energy--strategies which would seem to reduce costs in the long run. principle three, emphasizing pollution prevention, waste reduction and recycling, may also yield cost advantages as firms cut down on double payments--once for the raw materials themselves and again to dispose of byproducts generated during production processes.

Informing the public (Principle Eight) also seems important. A firm's reputation is often judged by the effectiveness (or ineffectiveness) of its communication with third parties. The recent increase in corporate environmental reporting practices is testimony to the importance of this process (UNEP 1994; Ditz, Ranganathan and Banks 1995). Of course, a firm must be careful to avoid "greenwashing" while promoting its environmental responsibility claims or this strategy may backfire (Rehak 1993).

Public Policy Implications

The chief implication of this study for public policy is that markets can and do work to further environmental aims; corporations are part of the solution as well as part of the problem (Shrivastava 1995a). If the results presented in this paper are generalizable and sustainable, there is every reason to believe the marketplace will effect improvements in environmental quality without resorting to the "one size fits all" command-and-control approach. Recent legislation enacted in the United States is already moving in this direction. Under the 1990 Clean Air Act, for

instance, electric utilities are allowed to buy and sell emissions permits, thereby achieving an overall decrease in sulfur dioxide emissions (a key component in acid rain) in the most efficient and cost-effective manner.

Government intervention will still be necessary to address issues of market failure and to ensure the internalization of appropriate costs. But market-based solutions are likely to be the most effective. Ecological economics scholar Robert Costanza recommends three policy instruments (a natural capital depletion tax, the precautionary polluter pays principle and a system of ecological tariffs) to ensure markets help, rather than hinder, the quest for sustainability (Costanza 1994). He notes, "The market incentive-based instruments suggested to implement the policies are intended to do the job with relatively high efficiency and effectiveness. They are not the only possible mechanisms to achieve these goals, but there is considerable evidence that they would work rather well" (Costanza 1994, p. 393).

Suggestions for Future Research

Part of this study--the investment performance section--is subject to the reverse causality criticism. It cannot be determined from the results presented in Table 3 whether increased levels of corporate environmental responsibility *cause* higher risk-adjusted returns or whether more profitable corporations are simply able to devote more of their resources to environmentally responsible behavior. Teasing apart this "chicken and egg" relationship remains a challenging task for future research, although preliminary results from the event study run on CERES signatories suggests it is a commitment to environmental responsibility which is driving the increase in shareholder wealth.

An enhanced commitment to environmental responsibility is unlikely to benefit all firms equally well. In general, banks and other financial institutions have a much smaller impact on the natural environment than chemical or paper companies.^[5] Early work using CEP data on the paper and steel industries supports the hypothesis of differential effects in different industries; this would seem to be an area for fruitful investigation. In fact, Wolf and Curcio (1994) suggest a positive relationship between environmental performance and financial performance is likely to be strongest for firms with the greatest name recognition. The source of the CEP dataset used in this study--*Shopping for a Better World*--emphasizes consumer goods firms (who are likely to be very concerned about reputational factors). It would be enlightening to repeat the analyses in this paper with a larger sample of firms from more diverse industries.

The event study results pose an interesting question: Can a firm enrich its shareholders by simply adopting the CERES principles? The sample size is of course much too small to provide a definitive answer, but from a practical standpoint, the answer is probably no. CERES doesn't allow just any concern to sign the Principles. A rather lengthy period of negotiations generally occurs before a firm is accepted into the CERES fold. In addition, Principle Ten requires an annual self-evaluation and report on progress made towards implementing the Principles. The level of activity required to join and maintain a company's membership in this community is indicative of a sincere commitment to corporate environmental responsibility.

Finally, there is need for additional inquiry on the elements of a "green" reputation, and how to prioritize these various components. Where should managements direct their attention first?

Pollution prevention? Energy conservation? Improved communication about risk? Further research into this area holds promise for increasing our understanding of the relationships between environmental performance, environmental reputation and financial performance. This study has presented evidence that it pays to be "green." The next step is to find out why.

Notes

[1]The various editions are released in January of each year based on information collected through August of the previous year.

[2]A copy of the CERES Principles is attached as Appendix A. A complete list of signatories may be obtained from the Coalition for Environmentally Responsible Economies, 711 Atlantic Avenue, Boston, MA 02111.

[3]See Black (1993) for an interesting discussion of the benefits of using theory vs. data to estimate expected returns. Black comes down rather strongly on the side of theory (the approach taken in this paper).

[4]There are roughly 255 trading days in a calendar year.

[5]Banks can have a surprisingly large environmental impact. Munich-based Bayerische Landesbank, recently prepared an report which identified air travel as an area in which its operations had the biggest negative effects (Bayerische Landesbank, 1994).

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APPENDIX: The CERES Principles

Introduction

By adopting these Principles, we publicly affirm our belief that corporations have a responsibility for the environment, and must conduct all aspects of their business as responsible stewards of the environment by operating in a manner that protects the Earth. We believe corporations must not compromise the ability of future generations to sustain themselves.

We will update our practices constantly in light of advances in technology and new understandings in health and environmental science. In collaboration with CERES, we will promote a dynamic process to ensure that the Principles are interpreted in a way that accommodates changing technologies and environmental realities. We intend to make consistent, measurable progress in implementing these Principles and to apply them to all aspects of our operations throughout the world.

1. Protection of the Biosphere

We will reduce and make continual progress toward eliminating the release of any substance that may cause environmental damage to the air, water, or the earth or its inhabitants. We will safeguard all habitats affected by our operations and will protect open spaces and wilderness, while preserving biodiversity.

2. Sustainable Use of Natural Resources

We will make sustainable use of renewable natural resources, such as water, soils and forests. We will conserve nonrenewable natural resources through efficient use and careful planning.

3. Reduction and Disposal of Wastes

We will reduce and where possible eliminate waste through source reduction and recycling. All waste will be handled and disposed of through safe and responsible methods.

4. Energy Conservation

We will conserve energy and improve the energy efficiency of our internal operations and of the goods and services we sell. We will make every effort to use environmentally safe and sustainable energy sources.

5. Risk Reduction

We will strive to minimize the environmental, health and safety risks to our employees and the communities in which we operate through safe technologies, facilities and operating procedures, and by being prepared for emergencies.

6. Safe Products and Services

We will reduce and where possible eliminate the use, manufacture or sale of products and services that cause environmental damage or health or safety hazards. We will inform our customers of the environmental impacts of our products or services and try to correct unsafe use.

7. Environmental Restoration

We will promptly and responsibly correct conditions we have caused that endanger health, safety or the environment. To the extent feasible, we will redress injuries we have caused to persons or damage we have caused to the environment and will restore the environment.

8. Informing the Public

We will inform in a timely manner everyone who may be affected by conditions caused by our company that might endanger health, safety or the environment. We will regularly seek advice and counsel through dialogue with persons in communities near our facilities. We will not take any action against employees for reporting dangerous incidents or conditions to management or to appropriate authorities.

9. Management Commitment

We will implement these Principles and sustain a process that ensures that the Board of Directors and Chief Executive Officer are fully informed about pertinent environmental issues and are fully responsible for environmental policy. In selecting our Board of Directors, we will consider demonstrated environmental commitment as a factor.

10. Audits and Reports

We will conduct an annual self-evaluation of our progress in implementing these Principles. We will support the timely creation of generally accepted environmental audit procedures. We will annually complete the CERES Report, which will be made available to the public.

Disclaimer

These principles establish an environmental ethic with criteria by which investors and others can assess the environmental performance of companies. Companies that endorse these Principles pledge to go voluntarily beyond the requirements of the law. The terms may and might In principles one and eight are not meant to encompass every imaginable consequence, no matter how remote. Rather, these principles obligate endorsers to behave as prudent persons who are not governed by conflicting interests and who possess a strong commitment to environmental excellence and to human health and safety. ***These principles are not intended to create new legal liabilities, expand existing rights or obligations, waive legal defenses, or otherwise affect the legal position of any endorsing company, and are not intended to be used against an endorser in any legal proceeding for any purpose.***