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THE REWARDS FOR ENVIRONMENTAL CONSCIENTIOUSNESS IN THE U.S. CAPITAL MARKETS

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Abstract

Do capital markets reward companies for their environmental policies, goals and activities or their efforts at reducing the release of toxic substances? This paper examines the relationship between *environmental conscientiousness* scores and stock returns. It appears that the US capital markets have only weakly rewarded environmentally conscientious companies. However, companies with the worst environmental conscientiousness scores have shown lower average performance.

INTRODUCTION

The long-term prosperity of a corporation may depend on its environmental performance and stock investors are expected to recognize this. Porter (1990) demonstrates that one source of competitive advantages for companies is their ability to offer products of superior value that justify a premium price. Companies' environmental performance is one such source of superior value (Porter and Linde, 1995). Environmental obligations of industrial firms, however, have measurable financial consequences. Making environmental policies and the reduction of pollution improves a company's environmental performance but such initiatives are expensive and cash flows of the company can suffer in the short-term. Thus environmental efforts of a company may impact its stock price. On the other hand, lack of environmental consciousness may result in accidents and law suits that involve potential penalties. Environmental regulations also impose financial burdens which can adversely affect company stock prices. The negative impact of incidents such as announcements of new regulations, environmental accidents, and law suits, has been examined in Little *et al*.(1995), Muoghalu *et al*. (1990), Laplante and Lanoie (1994), Rao (1996), and others. These studies found that law suits resulting from companies' violation of environmental regulations have caused significant stock price declines. By punishing non-complying companies through lower stock prices, the capital markets seem to provide incentive for companies to comply with environmental regulations and disclosures. Blacconiere and Patten (1993) found that consequent to the Bhopal disaster in 1984, Union Carbide and other chemical companies suffered significant negative reactions. Such reactions were less severe for companies with more extensive environmental disclosures.

Environmental regulations led to the creation of an environmental services industry. Quite a few environmental mutual funds invested in the environmental industry or related technologies (*Forbes*, 1994). Early in the 1990's, in the United States, environmental industries such as hauling, storing and treating wastes, and environmental consulting were thought to have business merit because of congressional actions to stiffen environmental regulations, even though the US economy was in a downturn (*Barron's*, 1995). This paper is not concerned with the stock performance of the environmental services industry, but instead concentrates on environmental activities in regular business corporations which are not necessarily part of the environmental industry. In this paper, we focus on companies' environmental conscientiousness (henceforth EC) and examine the impact of EC scores on stock prices. While environmental obligations refer to the adherence to environmental laws regarding toxic substance release, accidents, or pollution control, we adopt a broader concept of environmental conscientitiousness which, in addition to legal environmental obligations, includes the corporations' environmental policies and similar "progressive" activities. To our knowledge, we conduct the first event study of the impact of companies' EC scores

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on their share prices. An event study examines only the short-term stock market impact of an event. We, therefore, conduct further analysis of the long-term relationship between EC scores and stock returns.

Recently, independent institutions have scored companies by their environmental performance. Examples of such scoring in the US are the Council on Economic Priorities (henceforth, CEP) and the Investor's Responsibility Research Center (Washington DC). These services are similar to the company debt-credit rating system by Moody's or by Standard and Poor's (Shmidheiny, 1992). In Europe, *SustainAbility* (London) and *Hamburg Umwelt Institut* (Hamburg) are also scoring and reporting corporations' environmental activities (*Chemical Week*, 1994a). A company that receives a superior EC score has a goal of an environmental contribution to society, an appropriate environmental policy, and it offers incentives to its workers to join environmental activities or there is sufficient disclosure of the company's activities that affect the environment. In addition, such a company is making efforts to reduce pollution and is not responsible for environmental accidents involving toxic substances.

Environmental awareness among investors and fund managers appears to be on the rise. A British financial research company, *Eagle Star*, found that 72 percent of British unit trust holders rated the environmental stance of a fund manager as being important (Cairncross, 1991). In addition, the board members of companies have begun to give priority to environmental issues and are taking responsibility for corporate behavior (*The CPA Journal*, 1995). Companies are eager to show the financial analysts of security firms and fund managers how they are making efforts at reducing pollution or how they are working on environmental issues, setting goals or policies (*Chemical Week*, 1994b). As a consequence, we might expect environmentally responsible companies to have higher stock price appreciation in the capital markets if the market values environmental conscientiousness. This paper examines this later issue and consists of three parts.

Part I presents an event study of the effect of the announcement of EC scores published in *Fortune* magazine (*Fortune*, July, 1993) on stock prices of the companies reported. In Part II, we rank these companies in order of their environmental performance using CEP's EC scores and examine the relationship between EC scores and stock returns over a longer time period. For this purpose, a correlation study of EC scores and stock returns is applied. In Part III, the stock price performances of groups of companies with different environmental scores are compared with respect to a set of financial variables to further test the long term relationship between EC scores and stock performance.

AN EVENT STUDY OF ENVIRONMENTAL CONSCIENTIOUSNESS SCORE ANNOUNCEMENT AND STOCK MARKET REACTION

In this section we present an event study of the stock price reactions to the announcement of EC scores published in *Fortune* (1993). The study examines if the announcement of a better EC score positively impacts short-term stock returns. The *Fortune* article was published in the July 26 issue (1993) of the magazine and was the first such comprehensive EC score announcement. The article reported "10 Leaders", "10 Most Improved" and "10 Laggards" from 130 of America's largest manufacturing companies according to their environmental performance (See, Table 1 for a list of these companies and their ranking by the *Fortune* Magazine). *Fortune* assigned a score to each company in a scale of zero (worst) to ten (best) in 20 key environmental issues. The key variables included not only the reduction of toxic chemical releases or violations of environmental laws, but also environmental programs (whether the company has a written policy or goals) and ratings by credible environmental groups (such as the CEP). The period covered is from 1987 to the spring of 1993.

Using the S&P 500 Index as the benchmark, we estimated the capital market characteristic line for each stock. The characteristic line provides a prediction of a companies' stock returns. We use the historical daily price data from May 27, 1993 to August 13, 1993. The event day (day 0) is July 12 (Monday), the day the *Fortune* article was first available, and July 9 was the last stock trading day (day -1) before the event and July 13 was the first day (day 1) after the event. The effect of the event can be examined by the existence of excess return measured by the differences between predicted (from the capital market line) and actual stock returns (See, Appendix A). Usually, if there is a significant impact of the information contained in the event, a large part of the effects emerges during the event day (Muoghalu et. al., 1991). Our *a priori* expectation was that "The 10 Leaders" and "The 10 Most Improved" groups would show positive excess returns and "The 10 Laggards" would show negative excess return. The results from the event study are shown in Table 2. "The Leaders" and "The Most Improved" companies had positive prediction errors and the "The Laggards" had negative prediction errors on the event day. However, none appeared significant at statistically acceptable levels. The impact of excellent EC scores on stock prices was at best weakly positive and the impact of worse scores was weakly negative. It appears that although stock investors and

companies have begun to realize the importance of EC, the realization is not deep enough to significantly affect stock prices. Secondly, it is possible that information published in the *Fortune* article in 1993 was already anticipated by the market.

TABLE 1
Fortune Ranks of Environmental Performance*

The 10 Leaders	The 10 Most Improved	The 10 Laggards
AT & T	Ciba-Geigy	American Cyanamid
Apple Computer	Hewlett-Pack	Boeing
Church & Dwight	Johnson & Johnson	BP America
Clorox	S. C. Johnson & Son	Du Point
Digital Equipment	Minn. Mining & Mfg.	General Electric
Dow Chemical	Nalco Chemical	International Paper
H.B. Fuller	Polaroid	Louisiana-Pacific
IBM	Shell	Maxxam
Herman Miller	Sun & Co.	Monsanto
Xerox	Union Camp	USX

Source: *Fortune*, 1993. In each group, companies are listed in an alphabetical order. Among the 30 companies listed, four are foreign companies or a subsidiary of a foreign company (Ciba-Geigy, S.C. Johnson, Royal Dutch/Shell and BP). As their stock prices may not be impacted in the US markets, these companies were ommitted from further analysis.

TABLE 2
t-Values in Regressions of Excess Returns in Various Event Periods

		The Leaders	The Most Improved	The Laggards
period:	day -24 to 24	-1.29	+0.82	+0.58
	day -24 to 1	-0.33	-0.53	+0.16
	day -5 to -1	+0.37	-0.17	+1.66
	day 0	+0.68	+0.56	-1.31
	day 0 to 1	+0.45	+1.64	+0.61
	day 0 to 5	-1.42	+1.03	+1.88
	day 0 to 24	-1.48	+1.66	+0.66

None is significant at the 5% level in a two tail test.

THE LONG-TERM RELATIONSHIP BETWEEN EC SCORES AND SHARE PRICES - A CORRELATION ANALYSIS

The event study results relate stock price response to an event in a short time window. In this section, we examine the relationship between a company's environmental performance and its performance in the capital market in a longer term perspective, using a correlation study between EC scores and stock returns.

For EC scores, we use two different sources: "The Better World Investment Guide" (1991) by the Council on Economic Priorities (the CEP) and the CEP SCREEN Service (1995). CEP SCREEN publishes *Corporate Ratings Subscription* since the first quarter of 1994. 252 companies were assigned a score in the first quarter of 1995 (of which 229 were used).

The CEP selected 100 large companies and assigned scores for environmental progress. Environmental scores were assigned for 53 companies covering the period 1986-90 (of which 49 were used in this study). The BEST rank (rank 1) was obtained by companies which had positive programs for recycling, alternative energy sources, and waste reduction. A MIDDLE rank (henceforth CEP Guide rank 2) was assigned to a company which had a mixed record: some positive programs but had problems such as accidents, regulatory infractions, fines, complaints, etc. The WORST rank (henceforth CEP Guide rank 3) was given to a company that had a poor public record of regulatory violations and/or, there were major accidents and/or lobbying against sound environmental policies.

Companies were evaluated by CEP in 13 areas of environmental performance: i) toxic substance release records, ii) environmental policy or goals, iii) use of recycled materials for packaging, iv) office recycling, v) reduction in (pollution causing) raw materials, and waste reduction, vi) toxic substance reduction, vii) impact on community health, and compliance with right-to-know regulations, viii) energy conservation, ix) impact on natural resources, x) accidents, xi) Superfund sites, xii) compliance with environmental statutes, and xiii) environmental technologies. EC scores were assigned according to weighted average of these 13 evaluations. Actual scores of A, B, C, D and E were reassigned as CEP SCREEN ranks, 1 for A or B, 2 for C and 3 for D or E. This was suitable because grades included A/B, D/E which we arranged in a uniform manner as used in the CEP Guide ranks.

We assigned long-term ranks (I, II, III and IV) based on changes in those EC scores for the long-term behavior study since 49 companies had both CEP Guide ranks (1991) and CEP SCREEN ranks (1995).[1] The first column in Table 3 shows CEP Guide ranks. The number in parenthesis is the number of companies in each rank. The second column shows CEP SCREEN ranks for the same companies. For example, 7 out of 21 companies which ranked 1 in the CEP Guide, retained the rank 1 in the CEP SCREEN, 13 companies slipped to rank 2 and one company received rank 3. In the last column, long-term ranks I, II, III and IV are assigned according to how the ranks changed from the CEP Guide to CEP SCREEN.

We examined two cases: the long-term EC scores (using score points 4, 3, 2 and 1 for ranks I, II, III and IV respectively) and the CEP SCREEN ranks (using score points 3, 2 and 1 for ranks 1, 2 and 3 respectively). We test cross-sectional correlation coefficients for their significance by using a significance test described in Appendix B. We assigned a score point for each rank in order to calculate correlation coefficients. If environmentalism is rewarded by the capital markets, we would expect larger positive correlation coefficient between EC scores and the

TABLE 3
Long-Term Ranks for 49 Companies

CEP Guide Rank	CEP SCREEN Rank	Number of Companies Used	Long-Term Rank
Rank 1 (21)	Rank 1	7	Rank I
	Rank 2	13*	Rank III
	Rank 3	1	Rank III
Rank 2 (14)	Rank 1	9	Rank II
	Rank 2	4	Rank III
	Rank 3	0	Rank IV
Rank 3 (14)	Rank 1	3	Rank II
	Rank 2	2	Rank II
	Rank 3	10	Rank IV

*Including one company whose score was upgraded from 1994 first quarter to 1995 first quarter and one company whose score was downgraded from 1994 first quarter to 1995 first quarter.

10 year average total stock return consisting of stock price changes and dividends. In addition, beta adjusted returns (or Jensen's alpha)[2] were calculated in order to examine the EC effect more clearly. We also examined the relation between EC scores and other major company characteristics such as dividend yield and debt ratio.

RESULTS OF THE CORRELATION STUDIES

Table 4 shows correlation coefficients between long-term ranks and stock returns and their level of statistical significance. In Table 5, the CEP SCREEN is used in the same manner. Each row of the tables shows a correlation coefficient between the ranks and a capital market indicator such as the10 year average of total stock returns, beta adjusted returns, dividend yield, etc. Their significance can be obtained through the test-statistics shown in the third column of the tables in parenthesis. The following are the major results from the correlation study:

i) Table 4 shows that the correlation coefficient between long-term ranks and 10 year average of total stock returns is +0.35, and the correlation coefficient between long-term ranks and risk-adjusted returns is +0.45. Thus, there is a positive relationship between higher long-term EC scores and higher stock returns over the long run. The test-statistic for the correlation coefficient between long-term ranks and 10 year average of total stock returns is +2.53 and this is significant at the 5% level.

ii) Adjusting returns for risks improved the correlation coefficient and its significance level. The test-statistic for the correlation coefficient between long-term ranks and 10 year average of beta adjusted stock returns is +3.08 which is significant at the 1% level.

iii) Dividend yield has a significantly negative relation with EC scores. Dividend growth has a significantly positive relation with EC scores but earnings growth does not appear to have a relation with EC scores. Debt/asset ratio, company size and beta have no significant relations with the EC scores. Volatility in stock prices appears to have a significant relationship with EC scores.

iv) The correlation coefficients in Table 5 show that there is almost no relationship between the CEP SCREEN ranking and total stock returns. The reason may be that the sample includes smaller and growing companies whose stock prices are more significantly affected by factors besides the EC score.

TABLE 4
Correlation Analysis Between Long-Term Environmental Ranks and Stock Returns

Capital Market's Characteristics (i)	Correlation Coefficient $r_{\text{Long-Term Ranks, i}}$	Significance (test-statistics)
Total Stock Return Avg.	+0.35	(+2.53)*
Beta Adj. Return Avg.	+0.41	(+3.08)**
Dividends Yield Avg.	-0.41	(-3.09)**
Dividends Growth (91-95/86-90)	+0.45	(+3.47)**
Earnings Growth (91-95/86-90)	+0.08	(+0.56)
Debt/Asset Ratio (94)	+0.16	(+1.12)
Company Size (Jan. 96)	-0.18	(-1.27)
Volatility (86-95)	+0.15	(+1.06)
Beta	-0.01	(-0.08)

*Significant at the 5% level
**Significant at the 1% level
Avg.: 95-86 average
# of companies: 49

TABLE 5
Correlation Analysis Between CEP SCREEN Environmental Ranks and Stock Returns

Capital Market's Characteristics (i)	Correlation Coefficient $r_{\text{New Ranks, i}}$	Significance (t-statistics)
Total Stock Return Avg.	+0.12	(+1.86)
Beta Adj. Return Avg.	+0.17	(+2.61)*
Dividends Yield Avg.	-0.20	(-3.07)**
Dividends Growth (93-95/90-92)	-0.08	(-1.20)
Earnings Growth (93-95/90-92)	-0.09	(-1.31)
Debt/Asset Ratio (94)	-0.08	(-1.24)
Company Size (Jan. 96)	-0.08	(-1.22)
Volatility (90-95)	+0.21	(+3.24)**
Beta	-0.06	(-0.96)

*Significant at the 5% level
**Significant at the 1% level
Avg.: 95-86 average
# of companies: 49

RETURN DIFFERENCES BETWEEN EC RANKS

In the previous sections we examine the relationship between companies EC scores and their stock prices. In this section we test to see if the difference in stock returns can be explained by the difference in the environmental ranks of the companies. To determine if companies with superior environmental ranks also had superior returns, we compute the 10 year average (1986-95) return of all companies in each rank and then compare these returns across ranks. We test for the difference of means between group populations using the Welch significance test (See, Appendix C). We expect that the average of stock returns of higher ranked companies should be greater than that of the lower ranked companies.

Differences in stock returns between the ranks are summarized in Table 6. The second column shows the difference between the 10 year average total stock return for companies with different ranks. The third column shows the difference in returns of the companies with a particular rank and the 10 year averages of beta adjusted returns. Each column in the table has a pair of figures, the first shows the actual difference in the returns between the ranks and the second with parentheses shows the significance test statistic. The following discusses the major results from Table 6.

i) Evidently, higher environmentally ranked company stocks performed better than lower ranked stocks. For example, between 1986 and 1995, the 7 companies ranked 1 had total returns which were +0.24% greater than the average return of the 13 companies ranked II (though insignificant) and rank I companies outperformed rank IV companies by 8.8% on a beta adjusted basis and this difference is statistically significant at the 1% level.

ii) It is notable that using beta adjusted returns as shown in the third column produces a more significant relationship between environmental performance and stock market performance.

iii) Table 6 exhibits a general tendency that the worst ranked (IV) company stocks have the lowest stock performance.

iv) Finally, we measure capital market reward for being environmentally conscientious by regressing the average of 10 year beta adjusted returns of the 49 companies on the company's environmental rank. The dependent variable is the 10-year average of beta adjusted returns (or Jensen's alpha) for each company, and the explanatory variable is the company's environmental score. The following regression results obtain:

$$x_j - \beta_j x_{BM} = -2.70 + 2.66 S_j$$
$$(3.08^*)$$

*t-value, showing significance at the 1% level.

Adjusted $R^2=0.168$, $n=49$ *companies*

x_j : 10 year average of stock returns for company *j*
x_{BM} : 10 year average of S&P 500 Index returns
β_j : beta of company *j*
S_j : environmental rank of company *j*
(for ranks I, II, III and IV, $S= 4, 3, 2$ and 1, respectively)

The regression results show a significant, positive effect of EC scores on stock prices and a 2.66% increase in returns for upgrading of EC scores by one rank.

TABLE 6
Stock Return Differences Between EC Ranks

Comparison of Average Returns	Total Return	(t-value)	Beta Adjusted Return	(t-value)
Rank I vs. Rank II	+0.24%	(+0.05)	+1.02%	(+0.47)
Rank I vs. Rank III	+2.01%	(+0.56)	+1.95%	(+0.95)
Rank I vs. Rank IV	+11.11%	(+3.19)**	+8.18%	(+3.53)**
Rank II vs. Rank III	+1.78%	(+0.44)	+0.93%	(+0.42)
Rank II vs. Rank IV	+10.88%	(+2.77) *	+7.16%	(+2.88) *
Rank III vs. Rank IV	+9.10%	(+2.96) *	+6.23%	(+2.63) *

*Significant at 5% level, **Significant at 1% level

SUMMARY OF RESULTS AND CONCLUSIONS

The objective of this paper was to examine the relation between environmental conscientiousness scores and stock returns in the US capital market. The results can be summarized as follows:

(1) The release of information on a company's environmental conscientiousness has an insignificant but a positive impact on stock prices. In the short term, environmental performance does not appear to be a very important issue to stock investors but improvement of EC scores seems to give the stocks small positive gains.

(2) In the long term, there is a positive relation between environmental conscientiousness and stock returns, though it is not strong. There is, however, a strong tendency that companies with poorer environmental conscientiousness scores have lower stock returns.

(3) It appears that the environmental conscientiousness of companies is not strongly related to their financial conditions. There is no strong association between environmental conscientiousness scores and company size, debt/asset ratio, and earnings growth. However, dividends yield and volatility of stock returns may have some relationship with companies' EC scores.

(4) Rewards for an upgrading of the environmental conscientiousness score by one rank could result in a 2.66% increase in the 10 year average of risk adjusted returns.

The above results on environmental conscientiousness scores suggests that the rewards given by the capital markets for being environmentally conscientious, although currently limited, can become significant.

APPENDIX A
The Event Study and Significance Tests for Prediction Errors

The capital market line is estimated using time series regression for stock return:

$$x_{tj} = \alpha_j + \beta_j x_{BMt} + e_{tj}$$

x_{tj} : stock capital returns of company j on day t
x_{BMt} : benchmark returns on day t
αj, βj : coefficients
e_{tj} : regression errors of company j on day t
t : $-n_b$ (the oldest day used), $-(n_b-1)$, ..., -2, -1 (the day before the event)

We define normal returns as predicted returns, NR_{tj} for company j at time t, using the coefficients α_j and β_j obtained above:

$$NR_{tj} = \alpha_j + \beta_j x_{BMt}$$
t: 0 (the event day), $1, 2, ..., n_f-1, n_f$ (the most recent day)

The impact of the event is examined by the existence of excess returns measured by the prediction errors (PE_{tj}) which is the difference between the actual returns and the predicted normal returns:

$$PE_{tj} = x_{tj} - NR_{tj} = x_{tj} - (\alpha_j + \beta_j x_{BMt}) \quad \text{where } t= 0, 1, 2, ..., n_f-1, n_f.$$

If the event had a significant impact on stock returns, it can be measured by the prediction errors in a period that should be significantly different from zero, as examined by the t-test for significance. The null hypothesis of a zero prediction error can be rejected when test-statistic T_{tj} and its t-value satisfy the following:

$$|T_{tj}| > t_{nb-2}(\alpha/2)$$

T_{tj}: test statistic for company j on day t ($t = 0, 1, ..., n_f$)

$$T_{tj} = PE_{tj} / s^{PE}_{j}$$

$$s^{PE}_{j} = \left[\sum_{t=-nb}^{-1} (e_{tj} - \sum_{t=-nb}^{-1} e_{tj} / n_b)^{-2} / (n_b - 2) \right]^{1/2}$$

$t_{nb-2}(\alpha/2)$: t-distribution value at rejection region α (a two tail test). The degree of freedom is $n_b - 2$.

The null hypothesis of a zero cummulative prediction error for a rank group from time t_0 to t_T can be rejected when the test-statistic $Z_{t1\ to\ t2}$ and its z-value satisfy the following:

$$|Z_{t0\ to\ tT}| > z(\alpha/2)$$

$Z_{t0\ to\ tT}$: test statistic for a rank during time t_0 to t_T

$$Z_{t0\ to\ tT} = \sum_{j=1}^{m} \sum_{t=t0}^{tT} T_{tj} / (t_T - t_0 + 1)^{1/2} / m^{1/2}$$

$z(\alpha/2)$: normal-distribution value at rejection region α (a two tail test)
m: number of companies in a particular rank.

APPENDIX B
Calculations of Correlation Coefficients and Their Significance Tests

The cross-sectional correlation coefficient between *A* and *B* (r_{AB}) is defined by the following:

$r_{AB} = Cov_{AB} / (\sigma_A \times \sigma_B)$.

A and *B* are EC scores and stock returns, respectively.

The null hypothesis of $r_{AB} = 0$ can be rejected when the test-statistic T_{AB} and its t-value satisfy: $|T_{AB}| > t_{m-2}(\alpha/2)$ where $T_{AB} = r_{AB} / (1 - r_{AB}^2)^{½} \times (m - 2)^{½}$ and $t_{m-2}(\alpha/2)$ is the t-distribution value at rejection region α (a two tail test) for $m-2$ degrees of freedom.

APPENDIX C
The Calculation of Stock Return Differences and the Welch Significance Test

For example , the difference between the rank I stock return average and the rank II stock return average are defined and calculated by $x^I_{AV} - x^{II}_{AV}$ where:

$$x^R_{AV} = \sum_{j=1}^{mR} x^R_j / m^R$$

Environmental Rank R: R = ranks I, II, III and IV
company *j* belonging to the rank R: $j = 1, 2, ..., m-1, m^R$
stock returns of company *j* belonging to the rank *R:* x^R_j
average of rank R stock returns: x^R_{AV}

Using the Welch Significance Test, the null hypothesis of "$x^I_{AV} - x^{II}_{AV} = 0$" can be rejected when test-statistic $TW^{I,II}$ and its t-value satisfy the following:

$|TW^{I,II}| > t_{df}(\alpha/2)$

$TW^{I,II}$: test statistic for defference between rank I and rank II

$$TW^{I,II} = (x^I_{AV} - x^{II}_{AV}) / [(s^I)^2 / m^I + (s^{II})^2 / m^{II}]^{1/2}$$

$$s^R = \left[\sum_{j=1}^{mR} (x^R_j - x^R_{AV})^2 / (m^R - 1) \right]^{1/2}$$

$t_{df}(\alpha/2)$: t-distribution value at rejection region α (a two tail test)

The degree of freedom:

$$df = 1 / [c^2 / (m^I - 1) + (1 - c)^2 / (m^{II} - 1)]$$

where $c = [(s^I)^2 / m^I] / [(s^I)^2 / m^I + (s^{II})^2 / m^{II}]$

ENDNOTES

1. One company has CEP SCREEN scores for only the first quarter of 1994 and 49 companies have both the 1994 and 1995 first quarter scores. (One company was omitted because it was a foreign company). Three companies were not assigned environmental scores by the CEP SCREEN.

2. The beta adjusted return (or the Jensen's alpha) is given by $x_{tj} - \beta_j x_{BMt}$ as shown below. For this purpose, the market characteristics line (defined in the same manner as in Appendix A) is estimated by time series regression for five year of weekly data (1991-95) of stock returns:

   $$x_{tj} = \alpha_j + \beta_j x_{BMt} + e_{tj}$$

   where t=time, j=company j, x_{tj}=stock returns of company j in year t, x_{BMt}= benchmark (S&P500) index returns in year t.

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