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AN EMPIRICAL EXAMINATION OF THE RELATIONSHIP BETWEEN POLLUTION PREVENTION AND FIRM PERFORMANCE

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An Empirical Examination of the Relationship Between Pollution Prevention and Firm Performance

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ABSTRACT

Anecdotal evidence can be marshalled to support either the view that pollution abatement is a cost burden on firms and is detrimental to competitiveness or that reducing emissions increases efficiency and saves money, giving firms a cost advantage. In an effort to resolve this seeming paradox, this paper examines empirically the relationship between emissions reduction and firm performance for a sample of S&P 500 firms using data drawn from the Investor Responsibility Research Center's (IRRC) Corporate Environmental Profile and Compustat. Results indicate that efforts to prevent pollution and reduce emissions drop to the "bottom-line" (ROS, ROA, ROE) within 1-2 years of initiation and that those firms with the highest emission levels stand the most to gain.

In 1975, 3M Company pioneered a new path to control pollution. Rather than merely collecting and treating waste after it was created (as required by law), they also sought to prevent the creation of waste in the first place. The program, "Pollution Prevention Pays (3P)" served as a model for scores of other companies over the next 20 years. For the first time, line workers and employees were involved (rather than just pollution control engineers and lawyers) in the identification of waste reduction opportunities and projects. Between 1975 and 1990, 3M reduced total pollution by over 530,000 tons (a 50% reduction in total emissions) and, according to company sources, saved over $500 million through lower raw material, compliance, disposal, and liability costs. In 1990, 3M embarked on 3P+-- this program sought to reduce remaining emissions 90% by the year 2000 with the ultimate goal being zero pollution (3M, 1992). Based upon the 3M example, many companies and analysts have adopted a "win-win" view of the relationship between business and the environment. Proponents of this view include Vice President Gore (1992), Michael Porter (Porter and van der Linde, 1994), and many others (e.g. Smart, 1992; Willig, 1994).

Coincident to the above experience, however, are some sharply contrasting facts: Expenditures for pollution control in the U.S. now represent more than 2% of GNP, approaching $200 billion per year (EPA, 1990). It is estimated that compliance with the new Clean Air Act alone will cost the U.S. oil industry $37 billion over the next decade. Texaco, for example, plans to invest $1.5 billion per year over the next five years on environmental compliance and emission reduction for a total investment of over $7 billion-- three times the book value of the company and twice its current asset base. Indeed, environmental costs now account for as much as 20% of corporate capital expenditures in pollution-intensive industries such as petrochemicals (Buzzelli, 1994). These data suggest a real trade-off between environmental and economic goals. Proponents of this view include McKinsey's environmental management practice group. They write: "The idea that environmental initiatives will systematically increase profitability has tremendous appeal. Unfortunately, this popular idea is also unrealistic... Talk is cheap, environmental efforts are not." (Walley and Whitehead, 1994, p. 46-47).

These competing streams of experience seem paradoxical. They raise fundamental questions about the economic and strategic implications of corporate "greening." Does reducing pollution and emissions really produce bottom-line results or just add investment burden and cost? Despite a plethora of anecdotal evidence, we were unable to find any systematic, empirical examination of this question. This paper therefore seeks to answer the question "does it pay to be green?" Specifically, we examine the relationship between emissions reduction and business performance in S&P 500 firms using two data bases: Environmental performance and emissions reduction measures were derived from the Investor Responsibility Research Center's (IRRC) Corporate Environmental Profile. Operating and financial performance measures as well as selected control variables were operationalized from Compustat.

THEORY AND HYPOTHESES

Pollution abatement can be achieved through two primary means: 1. Control; emissions and effluents are trapped, stored, treated, and disposed using pollution control equipment; or 2. Prevention; emissions and effluents are reduced, changed, or prevented altogether through better housekeeping, material substitution, recycling, or process innovation (Frosch and Gallopoulos, 1989; Cairncross, 1991; Willig, 1994). The latter approach reduces pollution in the manufacturing process itself, at the same time that it produces saleable goods whereas the former approach entails expensive, non-productive pollution control equipment.

Pollution prevention's major conceptual breakthrough is the realization that it can be much cheaper to prevent pollution before it occurs than it is to clean it up at the "end of the pipe" (Smart, 1992). This is analogous to the quality principle that preventing defects is superior to finding and fixing them after the fact (Imai, 1986). The philosophy of pollution prevention holds that pollution is a sign of inefficiency within manufacturing processes, and waste is a nonrecoverable cost (Shrivastava and Hart, 1992). By integrating pollution prevention into existing total quality management programs (TQM) through the use of employee involvement (Lawler, 1986; Cole, 1989) and "green" teams (Makower, 1993; Willig, 1994), significant reductions in emissions appear possible using continuous improvement methods focused on environmental objectives (Rooney, 1993). Thus, not only does pollution prevention appear to save the cost of installing and operating end-of-pipe pollution control devices, but it may actually increase productivity and efficiency-- less waste means better utilization of inputs resulting in lower raw material and waste disposal costs (Young, 1991; Schmidheiny, 1992). Furthermore, pollution prevention strategies offer the potential to cut emissions well below the levels required by law, reducing the firm's compliance and liability costs (Rooney, 1993).

However, there would appear to be some time lag between the initiation of emissions reduction efforts and the realization of "bottom-line" benefits. First, pollution prevention requires up-front investment in training, time, and equipment. Just as in TQM, pollution prevention appears to require the proper bounding of the system or process to be improved, the involvement of key stakeholders in the process, and the establishment of clear goals and targets for improvment (Ishikawa and Lu, 1985; Imai, 1986). Second, the savings from emissions reduction may take some time to be realized since renegotiation of supply and waste disposal contracts, and internal reorganization may be required (White et al, 1993; Wood, 1994). For example, cutting emissions by 50% may mean that dramatically less raw material is needed. Supply contract renegotiations may be required to reduce inventory in order to realize the cost savings. Similarly, drastically lower emissions and waste may also mean renegotiating waste disposal contracts or storage and treatment arrangements. Finally, to realize savings in compliance costs, it may be necessary to reassign or reduce internal personnel involved in legal compliance or pollution control activities (Hunt and Auster, 1990).

Evidence also suggests that in the early stages of pollution prevention, there is a great deal of "low hanging fruit"-- easy and inexpensive behavioral and material changes that result in large emission reductions relative to costs (Rooney, 1993; Hart, 1994a). As the firm's environmental performance improves, however, further reduction in emissions becomes progressively more difficult, often requiring more significant changes in processes or even entirely new production technology (Frosch and Gallopoulos, 1989). For example, a pulp plant might make significant reductions in emissions through better housekeeping, equipment maintainance, and incremental process improvement. Eventually, however, diminishing returns set in and no significant additional reductions are possible without entirely new technology such as de-ink pulping equipment for processing recycled fiber or chlorine-free bleaching equipment to eliminate organochloride emissions. Thus, as the firm moves closer to "zero pollution," emission reductions will become more technology- and capital-intensive (Walley and Whitehead, 1994).

Thus, the following hypotheses:

Hypothesis 1: Emissions reduction in time period t will enhance operating performance (ROS) in time period t + 1 through lower raw material, compliance, disposal, and liability costs.

Hypothesis 2: Emissions reduction in time period t will enhance operating performance (ROA) in time period t + 1 through more efficient use of assets.

Hypothesis 3: Emissions reduction in time period t will enhance financial performance (ROE) in time period t + 1 through corresponding improvements in ROS and ROA.

Hypothesis 4: Emissions reduction in time period t will show no relationship to operating or financial performance in that period since time is required for cost savings to be captured.

Hypothesis 5: Emissions reduction will enhance the operating and financial performance more for firms with higher emissions levels than those with lower emissions levels.

METHODS AND MEASURES

The sample of firms for this study was drawn from the Standard and Poor's 500 list of corporations. While this population is clearly biased toward the largest of firms, this was not deemed to be a problem for this study since there was ample evidence that environmental performance and emissions levels varied considerably among the largest firms (e.g. Rice, 1993).

Two screens were applied in selecting firms. First, only those firms involved in manufacturing, mining, or production of some kind (SIC Codes below 5000) were selected since the main research variable, emissions reduction, was most salient to these firms. Second, since the pollution intensity of industries varies widely, a minimum of four firms per industry (4 digit level) was required to insure stable and reliable industry means. After applying these two screens to the population, we ended up with 127 firms in the study sample.

The independent variable, emissions reduction (EMRED), was derived from the Investor Responsibility Research Center's (IRRC) 1993 Corporate Environmental Profile. This data set provides a summary of the reported emissions of selected pollutants from domestic manufacturing facilities owned by each company and its subsidiaries. It includes a tabulation of an "Emissions Efficiency Index" which is the ratio of reported emissions in pounds to the company's revenues in thousands of dollars. To measure emissions reduction, we computed the change in the Emissions Efficiency Index from 1988 to 1989.[1]

The dependent variables, operating and financial performance were secured from the Compustat data base. Return on sales (ROS), return on

[1]This period (1988-89) was chosen as the most appropriate to measure emissions reduction for several reasons. First, 1988 marked the first year that firms in the U. S. were required by law to disclose their emission levels of some 300 pollutants under the "Toxic Release Inventory." Second, 1989 was the most recent year for which complete emissions data were available in the 1993 IRRC Corporate Environmental Profile.

assets (ROA), and return on equity (ROE) data for each firm were collected for the years 1989-92. Several control variables were also compiled for this period, both at the firm and industry levels. Firm-level controls included R&D intensity (RDSALES), advertising intensity (ADSALES), capital intensity (KAPSALES), and leverage (KAPSTRUCTURE).[2] Since the performance variables were unstandardized, it was necessary to include these control variables to blunt the effect of differences in firm commitments, resources, and strategies (Wernerfelt, 1984; Ghemawat, 1991).[3] Industry effects (Porter, 1980) were controlled by including the industry (4-digit level) average performance for each case as a predictor in all analyses (INDUSTRY). Including the controls in the analysis forced the emissions reduction measure to explain variance in performance above and beyond these powerful firm- and industry-level predictors.

Multiple regression analysis was used to test the hypotheses. Three separate models were run for ROS, ROA, and ROE as dependent variables. To test Hypotheses 1-4, an initial run was made with 1988-89 independent variables and 1989 dependent variables (time t). Additional runs were then made lagging the dependent variables one additional year each time, i.e. 1990 (time t + 1), 1991 (time t + 2), and 1992 (time t+3). To test Hypothesis 5, the sample was split on the industry means of the Emissions Efficiency Index for 1988, yielding high- and low-polluting firms within each industry. These firms were then aggregated into either a high- or low-polluting sub-sample. This procedure ensured that the most and least polluting firms (rather than industries) were captured. Separate regressions were then run on these two sub-samples.

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[2]While leverage (i.e. debt-to-equity ratio) is most likely to influence ROE rather than ROS or ROA, we included leverage controls in all the analyses for completeness.

[3]Firm size was initially included among the controls but was later dropped since it turned out not to be a significant factor.

RESULTS

The results of the full sample are presented in Tables 1 (ROS), 2 (ROA), and 3 (ROE). The results for the split sample are presented in Tables 4 (ROS), 5 (ROA), and 6 (ROE).[4] Tables 1-3 clearly show that reducing emissions has an effect on operating and financial performance net of the control variables of R&D intensity, capital intensity, advertising intensity, leverage, and industry-average performance.[5]

Insert Tables 1-3 About Here

The relationship between 1988-89 emissions reduction (EMRED) and both ROS and ROA turned significant in 1990, became even a bit stronger in 1991, then began to dwindle in 1992. Thus, Hypotheses 1 and 2 are confirmed: *Emissions reduction in time period t enhances operating performance in time period t + 1.* Furthermore, the effect continues for at least two more years, peaking in period t + 2.

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[4]Extensive sensitivity analysis was conducted to insure the robustness of these results. For example, both medians and means were used as well as adjusted and unadjusted ROA measures. The results were unaffected by these minor changes in variable definition.

[5]The relationships among the control variables and the three measures of firm performance are generally as would be expected: At the firm level, leverage (KAPSTRUCTURE) is significant only in relation to ROE, and is a positive factor in 1989 turning negative in 1991 with the onset of the recession in the U.S. Capital intensity (KAPSALES) is a significant predictor for both ROS and ROA, again turning negative in 1991 with the advent of the recession. Advertising intensity (ADSALES) is a consistently positive predictor of both ROA and ROE, while R&D intensity (RDSALES) is a drag on ROA until the recession when it becomes positively associated with both ROS and ROA. Finally, the industry control (INDUSTRY) shows a consistently negative sign with performance and displays a negative and significant relationship to ROS. This curious result can be explained as a sampling bias: Our study included only the largest (i.e. dominant) firms in each industry.

Interestingly, the relationship between EMRED and ROE did not become significant until 1991 and gained a bit in strength the following year. Thus, Hypothesis 3 is only partially confirmed: *Emissions reduction in time period t enhances financial performance in time period t + 2 rather than period t + 1.*

EMRED had no significant effect on any of the performance measures in 1989, confirming Hypothesis 4: *Emissions reduction in time period t shows no relationship to operating or financial performance in that period since time is required for the cost savings to be captured.*

Insert Table 4 About Here

Finally, results of the split sample analysis (Tables 4-6) show that EMRED had no significant effect on performance in any of the years for the low-polluting sub-sample, but had a positive and significant effect on performance for the high-polluting sub-sample. Thus, Hypothesis 5 is also confirmed: *Emissions reduction enhances the operating and financial performance more for firms with high emissions levels than for firms with low emissions levels.*

DISCUSSION

The results of this study suggest that it does indeed pay to be green. Efforts to prevent pollution and reduce emissions appear to drop to the bottom line within 1-2 years after initiation. Operating performance (ROS, ROA) is significantly benefitted in the following year, while it takes about 2 years before financial performance (ROE) is effected. These are general findings based upon a sample drawn from a broad range of industries; the results may be even more significant for particular industries where emissions and effluents are especially salient.

The surprising finding of a longer lag between emissions reduction and impact on ROE merits some discussion. There seem to be at least two factors which could explain this result. First, ROE reflects not only operating efficiency but also the capital structure of the firm. The impact of emissions reduction on ROE thus works through its effect on ROS and ROA with capital structure as a confounding factor. Hence, a relationship that is less immediate than the one between emissions reduction and ROS/ROA is not particularly surprising.

A second consideration in explained the lagged relationship between emissions reduction and ROE has to do with reputation and cost of capital. The environmental profile of a company is known to have an effect on its liability exposure, reputation, and market value (Barth and McNichols 1993). Poor environmental performance may thus effect the firm's cost of capital. This "cost of capital" effect is likely to effect ROE with a longer lag than the direct effect through ROS and ROA since it requires that a) the market becomes aware of the firm's environmental performance and reflects this in the cost of capital, and b) the firm raises capital at this new cost level. In this analysis we cannot distinguish between these two explanations, and leave this issue for subsequent research.

As expected, the biggest bottom-line benefits accrue to the "high polluters" where there are plenty of low-cost improvements to be made. It appears that the closer a firm gets to "zero pollution" the more expensive it gets, as further reductions mean rising capital and technology investments. Rising costs thus appear to offset cost reductions realized from elimination of the remaining emissions. Yet, the results also suggest that the marginal costs of reducing emissions do not exceed marginal benefits. Indeed, while up-front investment may increase, the data suggest that a strategy to reduce emissions does not negatively impact the bottom line, even among those firms that have already drastically reduced emission levels. It must be remembered, however, that this study was based upon emission reductions data from the 1988-89 time period, when pollution-intensive industries such as petrochemicals, forest products, and automobiles had not yet achieved dramatic levels of emission reduction (i.e. there was still a great deal of "low hanging fruit" to be picked). Future work should examine whether or not the above findings hold even after industry-average emission levels have been drastically reduced. For example, once the data become available, it would be instructive to replicate this study with 1992-93 emissions reduction data and 1993 and 1994 performance measures.

A narrow reading of these results would suggest that pollution prevention pays, but only for the slower, more inefficient firms. However, there is an alternative interpretation of this finding: The early moving (lower-polluting) firms may be moving on to other, more advanced strategies that build upon low emissions but that involve other sources of sustainable competitive advantage (Ghemawat, 1986). For example, firms with very low manufacturing emissions relative to competitors may be able to gain a first-mover advantage in emerging green product-markets. Indeed, attempts to differentiate products as environmentally responsible while continuing to produce comparatively high levels of waste and emissions in production is risky since outside observers (e.g. environmental groups) can easily expose this anomoly, destroying firm credibility and reputation (Hart, 1994b). It has been said that "if you green your operations, the products will follow." In the language of the resource-based view (e.g. Dierickx and Cool, 1989; Barney, 1991) a green product strategy may be "path dependent" upon pollution prevention and emissions reduction.

Thus, a fuller examination of the question "does it pay to be green" will require empirical study of firm strategies that extend beyond lowering production emissions (Kleiner, 1991; Hart, 1994b) including product stewardship strategies based upon the principles of "design for environment" (Allenby and Fullerton, 1992), and an orientation toward sustainable technology development in emerging markets (MacNeil, 1989; Schmidheiny, 1992). More targeted sectoral analysis is also warranted to examine the specific relationships between emissions reduction and business performance at the industry level. For example, future work might compare models for the chemical industry (an "early-mover" industry) to the forest products industry (a "late-mover" industry). Also, comparing the relationships between environmental and business performance across industries with very different technologies and product life cycles (e.g. electronics versus pharmaceuticals) might be important and instructive.

Finally, future work will need to examine critically the "reverse causality" hypothesis: Do lower emissions lead to enhanced profitability or do more profitable companies tend to invest in pollution prevention and emissions reduction activities? This is an important question requiring serious examination. Since we had only one year of emission reduction measures available at the time of our study, we were unable to rule out the reverse causality hypothesis. However, future research will be able to incorporate longitudinal measures both for the environmental- as well as firm-performance measures. Our hunch is that a "virtuous circle" exists with regard to the relationship between pollution prevention and firm performance. That is, firms can realize cost savings and plow these savings back into further emission reduction projects for a number of years before the investment/savings balance turns negative. Eventually, however, major new investments in process technology and/or product design will be required to realize further gains. At this point, the firm must shift to a new strategic logic (e.g. product stewardship) for it to continue to "pay to be green."

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TABLE 1

IMPACT OF EMISSIONS REDUCTION ON FIRM PERFORMANCE

DEPENDENT VARIABLE: ROS

	1989	1990	1991	1992
INTERCEPT	0.0150	0.0080	0.1000***	-0.0124
INDUSTRY	-0.0065***	-0.0087***	-0.0054**	-0.0082***
KAPSTRUCTURE	-0.0000	0.0011	0.0017	-0.0039
KAPSALES	0.0375**	0.0229**	-0.1111***	0.0231
ADSALES	-0.0415	0.1060	0.1452	0.2625
RDSALES	-0.0184	-0.1527	0.5016*	0.0161
EMRED	-0.0014	0.0122*	0.0204**	0.0122*
AdjR2	0.4307	0.4889	0.4247	0.4693
F	12.979***	15.665***	12.318***	13.972***

$P \leq 0.05$* $P \leq 0.01$** $P \leq 0.001$***

TABLE 2

IMPACT OF EMISSIONS REDUCTION ON FIRM PERFORMANCE

DEPENDENT VARIABLE: ROA

	1989	1990	1991	1992
INTERCEPT	0.0439*	0.0184	0.0345	0.0094
INDUSTRY	0.0082	-0.0190	-0.0078	-0.0095
KAPSTRUCTURE	-0.0007	0.0004	-0.0006	-0.0053
KAPSALES	0.0012	0.0012	-0.0411*	-0.0067
ADSALES	0.4858**	0.8400***	0.7506***	0.8265***
RDSALES	-0.2524*	0.1425	0.5392**	0.3577*
EMRED	-0.0000	0.0143*	0.0168*	0.0138*
AdjR2	0.1113	0.1980	0.2903	0.2744
F	2.984*	4.785***	7.272***	6.547***

$P \leq 0.05$* $P \leq 0.01$** $P \leq 0.001$***

TABLE 3

IMPACT OF EMISSIONS REDUCTION ON FIRM PERFORMANCE

DEPENDENT VARIABLE: ROE

	1989	1990	1991	1992
INTERCEPT	0.1025*	0.0471	0.0648	-0.0329
INDUSTRY	-0.0159	0.0084	-0.0227	-0.0633**
KAPSTRUCTURE	0.0522***	0.0113	-0.0523***	-0.0961***
KAPSALES	-0.0043	0.0021	-0.0729	0.0273
ADSALES	1.2714***	2.3046***	2.2542***	3.0306***
RDSALES	0.1357	0.0470	0.7794	0.3685
EMRED	-0.006	0.0250	0.0501*	0.0643*
$AdjR^2$	0.3611	0.2443	0.2744	0.4282
F	9.950***	5.958***	6.798***	11.982***

$P \leq 0.05$* $P \leq 0.01$** $P \leq 0.001$***

TABLE 4

EMISSIONS EFFICIENCY SUBSETTING

DEPENDENT VARIABLE: ROS

HIGH-POLLUTING [n = 52]

	1989	1990	1991	1992
INTERCEPT	0.0271	0.0538	0.0571	0.0686
INDUSTRY	-0.0034***	-0.0046***	-0.0038**	-0.0048***
KAPSTRUCTURE	-0.0194	-0.0168	-0.0140	-0.0094
KAPSALES	0.0285	-0.0082	-0.0483	-0.0610
ADSALES	0.0732	0.1200	0.1048	0.0459
RDSALES	0.1377	0.0006	0.5533*	0.2732
EMRED	0.0013	0.0123*	0.0168*	0.0193*
AdjR2	0.4899	0.4625	0.5406	0.5427
F	7.723***	7.024***	9.237***	8.912***

LOW-POLLUTING [n = 75]

	1989	1990	1991	1992
INTERCEPT	0.0139	-0.0042	0.1168***	-0.0241
INDUSTRY	-0.0025**	-0.0035**	-0.0020	-0.0041**
KAPSTRUCTURE	-0.0001	0.0009	0.0010	-0.0021
KAPSALES	0.0482**	0.0332*	-0.1190***	0.0395
ADSALES	0.1159	0.3343	0.4269	0.3820
RDSALES	-0.1328	-0.2097	0.0887	-0.0741
EMRED	-0.0168	0.0051	0.0042	0.0004
AdjR2	0.3582	0.4411	0.4395	0.4480
F	5.838***	7.444***	7.403***	7.357***

TABLE 5

EMISSIONS EFFICIENCY SUBSETTING

DEPENDENT VARIABLE: ROA

HIGH-POLLUTING [n = 52]

	1989	1990	1991	1992
INTERCEPT	0.0686*	0.0949**	0.0824*	0.0781
INDUSTRY	-0.1872**	-0.2611***	-0.1763*	-0.1751*
KAPSTRUCTURE	-0.0190	-0.0196	-0.0126	-0.0107
KAPSALES	-0.0113	-0.0387	-0.0659	-0.0655
ADSALES	0.0899	0.1592	0.1812	0.0385
RDSALES	0.0971	-0.1237	0.4455	0.3475
EMRED	0.0036	0.0121*	0.0153*	0.0178*
AdjR2	0.3324	0.4082	0.4743	0.3840
F	4.485**	5.828***	7.316***	5.155***

LOW-POLLUTING [n = 75]

	1989	1990	1991	1992
INTERCEPT	0.0708**	0.0428	0.0682*	0.0357
INDUSTRY	-0.1439*	-0.2473**	-0.2350*	-0.2304**
KAPSTRUCTURE	-0.0004	0.0008	0.0014	-0.0021
KAPSALES	-0.0030	-0.0082	-0.0543**	-0.0094
ADSALES	0.2669	0.3965	0.3453	0.5837*
RDSALES	-0.2225	-0.3814	-0.1248	-0.2970
EMRED	-0.0249	0.0111	0.0143	0.0062
AdjR2	0.2210	0.3546	0.3375	0.4514
F	3.459**	5.488***	5.161***	7.445***

TABLE 6

EMISSIONS EFFICIENCY SUBSETTING

DEPENDENT VARIABLE: ROE

HIGH-POLLUTING [n = 52]

	1989	1990	1991	1992
INTERCEPT	0.1321	0.1808	0.1910	0.1304
INDUSTRY	0.0023	0.0053	0.0178	0.0524
KAPSTRUCTURE	0.0227	0.0369	0.0080	-0.1073
KAPSALES	-0.0595	-0.1518	-0.2479*	-0.2882
ADSALES	1.5143	2.4175*	2.0920*	3.7537
RDSALES	0.7141	0.7169	1.7640**	2.1782
EMRED	0.006	0.0257	0.0501**	0.1249*
AdjR2	0.0864	0.2434	0.3453	0.1982
F	1.662	3.252*	4.691**	2.648*

LOW-POLLUTING [n = 75]

	1989	1990	1991	1992
INTERCEPT	0.1324**	0.0229	0.0292	0.0955
INDUSTRY	-0.0409	-0.0005	0.0081	-0.0073
KAPSTRUCTURE	0.0514***	0.0103	-0.0558**	-0.1023***
KAPSALES	0.0169	0.0232	-0.0485	0.0047
ADSALES	1.281**	2.1849***	2.3373*	2.6070***
RDSALES	-0.7051	-0.3785	0.3885	-0.3712
EMRED	-0.0681*	0.0260	0.0606	0.0063
AdjR2	0.5149	0.2283	0.2231	0.6411
F	10.2***	3.416**	3.345**	14.991***