



# The Green and the Gold

## How a Firm's Clean Quotient Affects Its Value

by David Austin

---

Can companies actually profit from operating clean and green? A review of the available statistical evidence suggests that the answer is yes. But the relationship of cause and effect between investment and profit needs more study.

---

Can business firms increase their profitability by reducing the polluting emissions that their activities produce—that is, can they “do well by doing good”? Anecdotal evidence suggests that the answer may be yes. Many firms have found that they can profit from their efforts to operate in an environmentally sound fashion, and so the debate is not merely of academic interest. However, because much of the case for making gold from green investments is anecdotal, it is not clear how widespread the phenomenon actually is, and under what circumstances firms are managing to improve their bottom lines by reducing or preventing pollution.

This article introduces what evidence can be found in empirical studies on the sources and scope of positive returns to firms from their investments in “green” business practices. The available studies reviewed here are statistical in nature, which is appropriate, since statistical evidence is necessary to assess the generality of increased market value through such investments. The studies are not, however, about cost-saving investments or process changes. Instead, they focus on the financial performance of green firms and how capital markets revalue firms when information about their environment-related performance has changed.

An assemblage of the statistical evidence not only gives a sense of the payoffs from improving environmental performance, but may also shed light on the controversial assertion that firms stand to gain from still stricter environmental regulations. A survey is

useful too in suggesting where more research is likely to be productive.

### The Market and Information

The environmental performances of U.S. firms affect their bottom lines now more than in the past. (In some cases this is true of foreign firms as well.) One reason is that government agencies require companies to report much more information about their environmental records than ever before. Thus, investors can better distinguish between firms—in how they perform environmentally and what risks they face. At the same time, this abundance of information puts firms' reputations more at stake. Both factors suggest that the market values of firms reflect the new environmental information. What is the evidence that this assumption is correct?

Securities people are clear that they do use this information. Half of the respondents to a recent National Wildlife Federation Global Survey of the financial services sector, for example, indicated that the financial markets have begun placing greater emphasis on environmental screens in their commercial credit decisions. Thus firms' environmental performance should affect their cost of capital, and so their market values. A recent collaborative study by researchers at the RAND Corporation and the Harvard School of Public Health likewise shows that firms named as potentially responsible parties at multiple “national priority” Superfund sites had capital costs

about three-tenths of a percent higher than they otherwise would have been. (Citation information for all of the studies mentioned in this article is available from the author.)

Other researchers have been able to show that capital markets reacted strongly to the Environmental Protection Agency's initial Toxics Release Inventory report, issued in 1989, even though the releases that the TRI lists are legal. Same-day losses in market value when the TRI came out averaged two- to three-tenths of a percent for a sample of over 400 firms on the list. A firm's loss increased with the number of toxic chemicals it handled, and losses were higher again by half for firms that also were potentially responsible parties at Superfund sites. The losses were not large, averaging between \$4 and \$6 million in the total market value of the companies—but they may have been enough to change firms' behavior: the firms with the biggest losses in value that day were the ones that reduced their TRI emissions the most over the next three years. Why did the market devalue these firms in the first place? Possibly because of expectations that the firms would face higher future liabilities, or higher regulatory compliance costs, or some loss of goodwill on the part of the public.

A related study compared the values of several hundred firms. After accounting for differences in advertising, research and development, sales, industry sector, and other factors relating to market value, it was found that two otherwise identical firms differing only in that the TRI emissions of one were 10 percent higher than the other's would differ in market value by some \$30 million on average. In industries with significant pollutant emissions, this difference was higher still.

Markets obviously react to environmental accidents. When the *Exxon Valdez* ran aground, Exxon's market value fell immediately in response to an expectation of fines, cleanup expenses, and a loss of revenue and goodwill stemming from consumer backlash. This experience might suggest that firms engaged in environmentally risky activities stand to profit from taking greater care. In fact, though, the payback will depend on the existing level of care, because costs rise at an increasing rate with firm effort. The real point of mentioning the *Exxon Valdez* is to reveal how the market revalued *other* oil companies in the wake of the accident. It turns out that their values also declined, according to their levels of dependency on oil from the

Trans-Alaska Pipeline. Companies that were only marginally dependent on Alaskan oil were barely affected.

Thus it appears from these studies that the capital markets are fairly efficient at processing information about exposures to environmental risk. Evidence suggests that markets in Europe, South America, and Asia make similar use of environmental performance data in those parts of the world.

### The Market and Regulation

Another reason for surmising that a firm's environmental performance may increasingly affect its profit margin is that regulations are more stringent than they used to be. This stringency has raised the cost of toxic inputs to production. So reducing the use of toxics lowers costs more than it used to. Poor environmental performers will need to devote more of their future capital to compliance than good performers will. And they will run an increasing risk of lawsuits, fines, or loss of goodwill. Other things equal then, firms that perform better environmentally will perform better financially than other firms, or at least no worse. (The same should be true of firms that avoid environmental lawsuits and fines.) What evidence is there to support this hypothesis?

One study, using data from the Investor Responsibility Research Center, compared the financial performance of two portfolios of firms in the Standard & Poor 500. The two portfolios were balanced with respect to industry sectors, with the difference being that one featured firms scoring above their industry's median on various measures of environmental performance while the other contained only below-median firms. For each of nine measures, the "green" portfolio performed at least as well as the "brown" one, and slightly better on some of the measures. Of course, the green firms might have been healthier financially to begin with.

The study provided tentative support for the hypothesis that lagging environmentally can carry a market penalty. Firms whose TRI releases were above their industry median experienced several years of subpar returns on assets. Moreover, similar results from cross-sectional studies suggest at least a slight negative relationship between a firm's book value and the amount of its most environmentally significant emissions, such as the total biochemical oxygen demand discharged by paper and pulp firms.

Interestingly, however, the portfolio study also

revealed the capacity of some firms to go from brown to green, given sufficient incentives. Firms that were above the overall median for TRI releases in the initial list experienced subpar returns over the next few years, but by the third year had 60 percent higher returns on assets, on average, than the cleaner, below-median TRI firms. In other words, the higher emitters seem to have done a good job of reducing emissions, and may have discovered cost savings along the way.

Which kinds of firms have successfully reduced their TRI emissions? Identifying them might suggest where, or at least with whom, the most cost-effective environmental investments lie. According to another group of studies, within any particular industry firms with high TRI emissions tend to be those involved with Superfund sites or those with high sales volumes or those with aging asset structures. Meanwhile, the firms that have been most successful at *lowering* their toxic emissions have tended to be large emitters, but in industries that are below-average toxic releasers; large, high-revenue, publicly owned firms, especially in concentrated industries; and especially firms with less-constrained cash flows. In other words, they are high-profile toxic releasers with the opportunity, the means, and the incentive to reduce their pollution quotients. In particular, they are firms whose shareholders can and will pressure them to clean up their acts when they lag behind the environmental performance standards of other firms in their industry.

### The Role of Regulation

Quite apart from these studies, some people—including Michael Porter of the Harvard Business School—have concluded on the basis of suggestive anecdotal evidence, that strict environmental regulations can benefit U.S. firms financially and so should be ratcheted up further. Since companies stand to profit by complying with tougher reporting requirements and more stringent environmental standards, the reasoning goes, why not raise the stakes?

The “profit through regulation” argument, though, turns on whether regulators can *as a rule* help firms identify profitable green investment opportunities. Proponents say that regulators can spot profit opportunities that firms might miss, while economists tend to be skeptical. Economic models, several produced at RFF, are clear that only under special circumstances would widespread profit opportunities arise from

tightened environmental regulation. The available data seem to back this up: reported expenditures on mandated pollution abatement and control outweigh any resulting cost savings by about fifty to one. (The “portfolio” study cited earlier compares overall returns for firms with better- versus worse-than-average environmental performance. Here, only firms’ direct pollution abatement costs and savings are compared, without consideration of environmental performance. The results are not directly comparable.)

Economic models and indirect statistical studies suggest that claims of nonenvironmental benefits of environmental regulations—competitiveness or financial performance primarily—should be scrutinized carefully, and should not, at this point, be accepted as strong arguments in favor of further regulations. These benefits may indeed occur in some instances. The evidence needed, however, to substantiate their existence has not yet surfaced. The kind of study that might succeed in producing such evidence might be an “event study” that examines the effects of announcements of new or proposed environmental regulations on the market valuation of the affected firms. This study would estimate the regulatory effects on firm profits that the capital markets expect to occur.

### Cause and Effect Next

So what do these studies tell us, and where do we go from here? In sum, they suggest that markets are reasonably efficient at pricing business environmental practices in terms of market risks. The body of research described here also suggests that firms are not penalized by the market for their green investments. What’s more, the studies to date suggest that out of concern for their reputations, or pressure from their shareholders, firms may improve their environmental performances when they are not as good as those of their competitors.

Where we see environmentally sound firms performing well on financial measures, though, we still do not know which is cause and which is effect. This question is amenable to further study to see if the direction of causality between green performance and gold performance can be established.

David Austin is a fellow in RFF’s Quality of the Environment Division, email [austin@rff.org](mailto:austin@rff.org). This article is based on remarks delivered at the RFF Council Meeting this past April.