Abstract:

The paper is an inquiry into the circumstances under which the voluntary provision of public goods might be sensible from a firm’s point of view. To shed light on the question, the paper draws on industrial organization theory, price theory, and the theory of the firm, and on case-based clinical research.

In a world where environmental externalities are the only departure from the assumptions of perfect competition, firms that volunteer to internalize costs cannot survive. In a world in which externalities coexist with other departures from the competitive paradigm (impacted information or oligopoly competition, for example), the latitude for managerial discretion is much greater. In particular, firms may find it in their shareholders’ interests to provide environmental public goods to a greater degree than that required by law. A number of firms, especially in Europe and North America, assert that they are pursuing such “beyond-compliance” strategies. The decision whether to pursue such strategies should depend, inter alia, on the structure of the firm’s industry, its competitive position with that structure, and its internal organizational capabilities.

The paper presents a typology of such strategies. It discusses the ways in which a firm’s chances of success in pursuing any one of them are influenced by the firm’s market position and organizational capabilities and by the basic structure of the industry in which it competes.

Most environmental economics is appropriately rooted in welfare economics, and seeks, from a normative perspective, to inform debates about public policy. This paper is intended to complement this mainstream work by helping to develop a richer understanding of private environmental policy, rooted in industrial organization and the theory of the firm.
This paper is an informal inquiry into the circumstances under which the voluntary provision of public goods might be sensible from a private firm’s point of view. Most environmental economics seeks to develop normative prescriptions for public policy with respect to the environment, and is therefore based in welfare economics. This paper is intended to complement that mainstream work by helping to develop a richer understanding of private environmental policy, drawing on industrial organization and the theory of the firm.

Economists have played a less central role in debates about the environment and business than they have in those about environment and public policy. They have focused on normative public policy matters like the choice of regulatory instruments and the appropriate methods for the valuation of nonmarketed benefits. At the same time, they have left discussions of business and the environment largely to professional students of management, who have tended to use methodologies and attitudes drawn from business ethics and the “social responsibility of business” literature in order to derive normative recommendations for firms. This approach has not proven very fruitful because its practitioners have not always taken the time to understand the economic context in which corporate decisions about the environment get made. If divorced from this economic context, discussions of business and the environment too often get derailed into sterile arguments about whether it pays to be green, as though the answer had to be categorical. It makes more sense, from either an academic perspective or from the point of view of a business executive, to ask about
the circumstances under which it pays to be green rather than searching for an unconditional answer.

As is well known, environmental problems can be seen as examples of unregulated externalities. Environmental resources like clean air or common-property fisheries, in the absence of regulation, are unpriced or at least underpriced, creating incentives for economic agents to use more of those resources than is socially efficient. Similarly, one could think of environmental assets as public goods: consumption is nonrival and nonexclusive, and private entities lack the incentive to invest in the production or maintenance of such goods. In either case, the simplest story is that government intervention is required to create the missing markets, or at least to supply alternative incentives to reduce pollution or preserve resources.

In a world where environmental externalities were the only departure from the assumptions of perfect competition, firms that volunteered to internalize these costs could not survive. If a firm’s markets for inputs and outputs were perfectly competitive, and if there were no government interventions in the markets, there would be no way to internalize costs voluntarily without losing one’s customers or selling output at a loss, and any manager who tried to do so would lose money and hence lose her job. Further, if those markets were perfect, there would be no room for asymmetric information or principal-agent problems within the firm: all of the relevant information about the managers’ performance would be revealed in market outcomes.

But where externalities coexist with other departures from the competitive paradigm—oligopoly competition and asymmetric information—the scope for managerial discretion is much greater. The simultaneous existence of different kinds of market failure can reinforce the tendencies of economic agents to overconsume underpriced environmental resources, but it can also counteract those tendencies. Further, government intervention itself, whether motivated by a desire to internalize externalities or by some other goal, is itself a departure from the assumptions of perfect competition and hence further complicates the firm’s decision problem. In fact a number of firms, especially in Europe and North America, assert that they are pursuing “beyond-compliance” environmental strategies, providing environmental public goods to a greater degree than that required by law.

One reason that some firms might pursue such strategies is that it makes sense as a way of increasing the expected shareholder value of those particular firms.

In order to do so, those strategies must increase expected revenues or lower expected costs. On the cost side, the strategies can be aimed at reducing the prices or quantities of inputs that the firm must purchase; alternatively, or in addition, they can be aimed at reducing the probability or magnitude of losses arising from regulation or litigation. On the revenue side, the company may be interested in reducing the probability or magnitude of revenue losses (due to boycotts, or, more likely, simply to changes in consumer tastes), or it may be interested in capturing a price premium.
for its outputs. In either case, given that we are operating in world where oligopoly power and government intervention are both salient, strategic interactions with competitors or with regulators are likely to be of interest.

Whether it makes sense from the shareholders’ perspective for a firm to provide public goods beyond legal requirements should depend, among other things, on the structure of the firm’s industry, on its competitive position within that structure, and on its internal organizational capabilities. Much of this paper presents a typology of the strategies by which firms may be able to reconcile the apparently competing goals of increased provision of public goods and increased provision of shareholder value, and assesses the ways in which a firm’s chances of success in pursuing any of them will be influenced by the firm’s market position and organizational capabilities and by the basic structure of the industry in which it competes. Parts one, two, and three of this paper consider three different circumstances under which “beyond compliance” environmental behavior could lead to increases in expected shareholder value: where the possibility for strategic interaction exists, where opportunities exist to differentiate products, and where principal-agent slack within the firm gives rise to the possibility of cost reduction within the firm.

A second explanation for the existence of “beyond compliance” strategies is that they are appropriate policies for the management of business risk.

Here again, the degree to which this makes sense from a normative business point of view, assuming an objective of shareholder wealth maximization, will depend on the structure of the industry, the position of the firm within it, and the firm’s organizational capabilities. Like “beyond compliance” environmental behavior, risk management within firms needs to be justified in terms of some imperfect competition or information asymmetry; otherwise shareholders should prefer their manager-agents to be risk neutral. If information asymmetries or other imperfections in markets make the costs of externally raised capital higher than those of internally generated funds, then it may be optimal from the shareholders’ point of view for managers to hedge risks. The relations between market imperfections and the management of business risk arising from environmental concern are considered in part four of this paper.

A final set of explanations for the existence of “beyond compliance” strategies is that they serve some objective besides shareholder value creation and risk management. They may, for example, serve managers’ interests at the expense of shareholders. That is, they may represent a diversion of shareholder value into managerial perquisites, which may take the form of reduced effort at work, reduced risk of psychological stress or job loss, or enhanced community status. Because these agency problems are integrally connected with the cost reduction and risk management motives of corporate environmental behavior, they are discussed in the sections of the paper on those topics. Similarly, “beyond compliance” environmental behavior may be motivated by the desire to adhere to personal or social codes of ethics, or to a desire to manage corporate assets in the interests of many stakeholders rather than the literal shareholders of the firm. Strategies that pursue such objectives,
however, must ordinarily be justified to constituencies both within the firm and outside it as contributing either to expected shareholder wealth maximization or to the sensible management of business risk, again providing a rationale for considering them in the parts of the paper that cover those topics.

The following sections of the paper discuss three sets of circumstances under which it might “pay to be green.” The first applies theories of industrial organization and the political economy of rent-seeking to understand strategic interaction and government intervention; the second analyzes product differentiation along environmental lines; and the third uses agency theory to analyze the debate over the existence of the environmental “free lunch.” The paper’s fourth section discusses corporate environmental policy as a risk management strategy. A final section draws conclusions.

1. Environmentalism for profit: Strategic interaction and government intervention

Under some circumstances, firms in imperfectly competitive markets, by exploiting cost asymmetries among themselves and their rivals, can increase both their provision of environmental public goods and their returns to shareholders. Suppose that a firm enjoys a cost advantage over its rivals in the production of some public good: for example, perhaps it can reduce pollution more cheaply than other firms in its industry. (Cost asymmetries in public good provision can arise from the same roots as private cost asymmetries: proprietary technology, economies of scale, locational advantages, access to superior natural resource stocks, and so on.) In this case the firm’s executives might wish to bring about a situation in which all of the industry’s firms have to produce the public good. Two ways to do this suggest themselves. One is the creation of a private mechanism to force collective action. The other is to use government to force the same result, a strategy that has obvious ties to the literature on rent-seeking.

Government is the obvious institution through which to solve collective action problems because it maintains a monopoly on the legitimate use of force and thus has a clear enforcement mechanism. This ancient insight is at the root of most writing on the economics of externalities and public goods, which is normative and oriented toward public policy. On the other hand, governments’ difficulties in designing and implementing Pareto-enhancing environmental regulations are well understood. The absence of a commitment mechanism, and the ability—and hence the temptation—to engineer Pareto-reducing wealth transfers are at the root of the most important of these difficulties.

1 Mancur Olson’s The Logic of Collective Action (Cambridge: Harvard University Press, 1965) is the seminal modern work in this field, but the positive analysis of government behavior obviously goes back much further, to Madison, Hobbes, and Machiavelli.

Our focus here, however, is on private actors’ ability to solve collective action problems without resorting to explicit government intervention. Here the basic insights come not only from the economics of externalities and public goods but also from the literature on oligopoly behavior. Applications of noncooperative game theory in this literature show that collusion is more likely to succeed if the number of firms is small, the game is repeated, detection of “cheating” or “defection” is relatively easy, and communication among firms is inexpensive. Historical studies of collusive behavior in the late nineteenth and early twentieth centuries show a clear link between the technological characteristics of industries (especially the presence of economies of scale and hence the ability to deter entrants even after prices rise) and the success or failure of trusts, cartelizing arrangements, and other forms of explicit or implicit collusion.

Within business schools, students of corporate strategy have been quick to apply insights from this economic literature to the formulation of contemporary business practice. Since Michael Porter’s explicit recasting of corporate strategy as an application of the theory of industrial organization, strategy scholars have paid close attention to the industrial organization literature. Like the IO theorists, students of strategy now make frequent use of game theory. Neither the IO economists nor the mainstream corporate strategists, however, have spent much time analyzing the application of their models to firms’ environmental policies.

These scholars would find fertile empirical territory if they were to apply their theories to private environmental policy issues. Several industry groups have recently undertaken initiatives, aimed at regulating the environmental behavior of the firms in the industry, that exemplify the kinds of behavior analyzed by the industrial organization theorists and students of corporate strategy. One example is the Chemical Manufacturers Association’s Responsible care program. This private regulatory initiative requires members of the Association to adhere to codes of management practice intended to reduce the probability and impact of accidental releases of contaminants, improve relations between companies and the towns in which they manufacture chemicals, and so on. In this case, mechanisms for detection of noncompliance and for enforcement of standards are available because the companies in the Association routinely sell intermediate products to one another (although a formal agreement not to buy from noncompliers would violate American antitrust law). Economies of scale undoubtedly exist in the activities that Responsible Care requires, including recordkeeping, reporting, and the maintenance of

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5 See, for example, David Besanko, David Dranove, and Mark Shanley, The Economics of Strategy (New York: John Wiley & Sons, Inc., 1996).
specialized environmental staff. From the perspective of the large chemical companies that initiated it, the Responsible Care program has been very successful.\(^6\)

Besides the development of private institutions to bring about collective action, an alternative way to reconcile increased provision of environmental quality and increased provision of shareholder value is to persuade government regulators to constrain competitors’ behavior. Here the relevant literature is that on rent-seeking behavior.

The term “rent-seeking” was coined by Anne O. Krueger in 1974, and is closely associated with the work of James Buchanan, Robert Tollison, and Gordon Tullock.\(^7\) Milgrom and Roberts summarize the basic insight of this literature as follows: “Governmental decisions to grant monopolies, determine rates for utilities, or establish tariffs or other trade barriers can create rents or quasi-rents for firms. Firms attempt to capture these rents for themselves, rather than having them go elsewhere. They do so both by participating legitimately in political and regulatory processes and, sometimes, by paying bribes.”\(^8\)

Since environmental regulation, like tariffs or other kinds of government intervention in markets, can create rents and quasi-rents, one might expect firms to seek these rents as they do others. Applications of the positive theories of regulatory behavior and of the theories of rent-seeking have appeared both in the economics literature and the literature on corporate strategy.\(^9\)

An example of this sort of strategy is the one pursued by E.I. Du Pont de Nemours and Company (DuPont) in managing its exit from the business of manufacturing chlorofluorocarbons. DuPont invented many of the CFCs and held a dominant market position worldwide. As scientific evidence linking CFCs to the

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\(^8\) Paul Milgrom and John Roberts, *Economics, Organization and Management* (Englewood Cliffs, New Jersey: Prentice Hall, 1992), p. 271. A seller’s rent is the difference between the amount she receives form a business relationship and the minimum amount that she would need to receive in order to be indifferent between entering the relationship and not entering it. Her quasi-rent is the difference between the amount she receives and the amount that she would need to receive in order to be indifferent between exiting the relationship and not exiting it once she has made whatever relationship-specific investments were required. If no assets are relationship-specific then rents equal quasi-rents. Quasi-rents are always equal to or greater than rents. See, for example, David Besanko, David Dranove, and Mark Shanley, *The Economics of Strategy* (New York: John Wiley & Sons, Inc., 1996), pp. 114-116.

depletion of stratospheric ozone strengthened, DuPont invested heavily in the ability to make substitutes for the compounds, but these substitutes were several times more expensive than the original CFCs. By announcing an exit from the CFC business ahead of the regulatory requirements and signaling to regulators that substitutes were available, DuPont facilitated a worldwide regulatory phaseout of CFCs and their replacement with compounds that were protected by patents and know-how and were far more profitable for DuPont than the CFCs.\textsuperscript{10}

Business scholars tend to ambivalence about rent-seeking behavior, which occupies a less prominent place in the strategy literature than might be expected given its apparent importance in the economy. On one hand, contributors to the business literature tend to assume, as a normative proposition, that firms should try to maximize shareholder value. On the other hand, the contributors know that at least some rent-seeking activities are wasteful from a social standpoint, and they maybe uncomfortable with the idea that they are just teaching their students to be more effective seekers of rent. David Baron, the author of the leading textbook in the field of political strategy for firms, expresses the dilemma in this way:

In the long run, a firm has influence over issues addressed in government institutions to the extent that its interests are aligned with those of citizens. In the short run, however, firms, as well as such other interests as labor unions and activist groups, have both the ability and the means to affect the outcomes of an issue. There is thus the possibility of undue influence, which raises the issue of limits, either governmental or self-imposed, on the political activity of firms as well as other interest groups. Some political action, including but not restricted to that proscribed by law, clearly is irresponsible and other action clearly is responsible. Many actions, however, are in the gray area between what is clearly responsible and what is clearly not.\textsuperscript{11}

A strategy of the sort pursued by DuPont could, of course, be motivated by shareholder value maximization, by risk management considerations, by ethical objectives, or by some combination of these. For example, executives may wish to reduce the probability of government regulation that will, if imposed, increase their firm’s costs, reduce its flexibility in responding to later changes in market conditions, or both. It may occur to these executives that voluntarily undertaking some of the activities that the regulators are thinking of mandating may mollify the regulators and reduce the chances of a successful regulatory initiative. But this cure may seem worse than the disease if unregulated competitors can continue to operate under the old rules and therefore maintain lower costs. Hence the executives are likely to look for a solution to the public good problem in which they have a cost advantage, and to encourage regulators and other interested parties to define the problem in such a way


that the technologies in which the firm has a cost advantage are the socially preferable solution.

The application of theories of collusion or theories of rent-seeking to environmental problems presents some interesting problems in welfare economics which are not fully understood. Both “collusion” and “rent-seeking” have pejorative connotations involving inefficiency and wasted resources. Certainly the business activities discussed here—the Responsible Care initiative, and the DuPont phaseout—could have been improved upon from a social welfare standpoint by a government regulator with the information and the political wherewithal to wield the appropriate tax instrument. Given that the actual regulators in these cases had neither the political wherewithal nor the information about social costs required for an optimal solution, it is unclear whether the unilateral private activities represented a welfare gain. This may be an interesting avenue for future research.

2. Environmentalism for profit: Environmental product differentiation

From a microeconomic perspective, product differentiation just involves the creation of a new market, protected by barriers to entry or barriers to mobility, in which an individual producer faces finite elasticity of demand. Some of the earliest work on the subject studied spatial competition in a “linear city,” in which firms compete by choosing locations so as to lower transportation costs of consumers spread evenly over a line segment. Although quite simple, the approach has wide applicability because “transportation costs” can represent departures from the customers’ preferences with respect to any number of product characteristics. The author of the linear city model was Harold Hotelling, who was even more famous for his work in the apparently unrelated field of natural resource economics. 12

The economic literature of product differentiation focuses on the identification of the conditions that will lead to lesser or greater differentiation, and on the social welfare consequences of differentiation and advertising. 13 The theoretical approach has remained firmly rooted in industrial organization. For example, Caves and Porter applied Bain’s theory of entry barriers to product differentiation. They, like most theoreticians of product differentiation, did not apply their framework explicitly to environmental concerns.14

The study of product differentiation within marketing departments at business schools is tied both to this economic literature and to the psychology-based literature on consumer behavior. The marketing literature on product differentiation emphasizes the normative implications for business managers. For example, Philip Kotler, in his

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influential textbook, defines seven criteria that managers should use to analyze potential “differentiators” of their products:

A difference is worth pursuing to the extent that it satisfies the following criteria:

Important: The difference delivers a highly valued benefit to a sufficient number of buyers.

Distinctive: The difference either isn’t offered by others or is offered in a more distinctive way by the company.

Superior: The difference is superior to other ways of obtaining the same benefit.

Communicable: The difference is communicable and visible to buyers.

Preemptive: The difference cannot be copied easily by competitors.

Affordable: The buyer can afford to pay for the difference.

Profitable: The company will find it profitable to introduce the difference.15

The marketing literature is implicitly rooted in the models of segmented markets and information asymmetries because these are the circumstances under which interesting marketing questions arise. Perhaps because marketing scholars focus their efforts on industries in which differentiation is more likely to be a viable strategy for firms, the marketing literature tends to be more optimistic about the degree to which differentiation strategies can succeed. For example, Tirole ends his economic survey with the observation that “there are limits to differentiation. Fixed prices, discrete concentration of demand in the product space, and cost and demand gains from the agglomeration of firms all may foster product homogeneity.”16 By contrast, Harvard Business School marketing guru Ted Levitt begins an influential article with the sentences “There is no such thing as a commodity. All goods and services are differentiable.”17

Casual observation suggests that product differentiation is difficult for many firms even if their job is the relatively straightforward one of selling a bundle of attributes that customers prefer for private reasons (e.g., “tastes great” and “less filling” are both characteristics that enhance private consumption benefits). The task is even more difficult when the company is trying to capture a price premium because its product is preferable from a public goods standpoint, for the familiar collective action reasons discussed above.

Like the economic literature on product differentiation, the mainstream marketing literature has paid little explicit attention to the incorporation of public


goods into the analytic framework. Some marketing scholars have analyzed of the opportunities for marketing public goods, but explicit applications of the theories of product differentiation to behavior in markets where environmental characteristics are thought to be important are relatively few. A paper by Forest Reinhardt applies the economics of product differentiation in a straightforward way and identifies three necessary conditions for successful environmental product differentiation—willingness to pay, credible information, and protection against imitators. These three conditions turn out to relate closely to Kotler’s criteria for differentiators. Reinhardt concludes that differentiation of products along environmental lines is more likely to succeed if the public goods are bundled with private consumption benefits, and if the environmental positioning is related to and supportive of other aspects of the firm’s strategy. A paper by Yvon Chouinard and Michael Brown of Patagonia, Inc., supports these contentions and offers an interesting glimpse behind the scenes at a company with unusual success in environmental product differentiation.

3. Environmentalism for profit: Principal-agent slack and the “free lunch” debate

It seems to many economists too obvious to mention that adding new constraints cannot increase the maximand of a constrained optimization problem, and hence that there is no “free lunch” involving the simultaneous achievement of improved environmental performance and lower private costs. Meanwhile, however, the idea that companies can simultaneously reduce their costs and improve their environmental performance is a famous one in environmental circles, and this view has received some support from economists. For example, Michael Porter and Claas van der Linde argue that “the world does not fit the Panglossian belief that firms always make optimal choices. This will hold true only in a static optimization framework where information is perfect and profitable opportunities for innovation have already been discovered.”

As discussed in the introduction to this paper, the existence of a “free lunch” depends on market imperfections and on agency problems within the firm. In a world of perfect competition, firms that fail to identify and exploit any available cost savings will lose their customers and go out of business. If competition is imperfect, and if information does not flow freely within the firm, then it may be possible for cost

It is certainly the case that many firms are behaving as though “free lunches” existed. Minnesota Mining and Manufacturing (3M) began an initiative called “Pollution Prevention Pays” in 1975; Dow Chemical’s “Waste Reduction Always Pays” (WRAP) program and others have followed. The objective of each is to identify and implement reductions of environmental impact that also save money. 3M, Dow, and other companies assert that they have reaped large cost savings as a result of such initiatives, amounting to tens of millions of dollars per year.\footnote{These initiatives are described in Stephan Schmidheiny, *Changing Course* (Cambridge: MIT Press, 1992), and in Livio DeSimone and Frank Popoff, *Eco-efficiency: the Business Link to Sustainable Development* (Cambridge: MIT Press, 1997).}

Economists and management scholars have been relatively active in applying the theory of the firm to explain the possibility of free lunches. The work of Michael Porter, cited above, has been especially influential despite (or because of?) its informality. Theodore Panayotou and Clifford Zinnes have modeled managerial behavior using concepts from the theory of the firm in order to draw conclusions for designers of public policy.\footnote{Theodore Panayotou and Clifford Zinnes, “Free-Lunch Economics for Industrial Ecologists,” in Robert Socolow et al., eds., *Industrial Ecology and Global Change* (Cambridge: Cambridge University Press 1994).}

It follows from the theory of the firm that, in order for environmental free lunches to exit, two conditions must be satisfied. First, some market imperfection and information asymmetry must be protecting managers from the need to minimize costs. Second, environmental concern must either change the costs or benefits of some of the firm’s activities or alter the information structure of the game. Adherents of the “free lunch” view have emphasized the second of these possibilities: for example, that regulatory requirements that information on pollution levels be disclosed to the public also have the effect of revealing the information to shareholders and senior executives, who then force reductions in the pollution levels. Some anecdotal information supports this idea.\footnote{See, for example, Edward Prewitt and Richard H.K. Vietor, “Allied-Signal: Managing the Hazardous Waste Liability Risk,” Harvard Business School case 9 793 044 (Boston: HBS, 1992), reprinted in Forest Reinhardt and Richard Vietor, *Business Management and the Natural Environment: Cases and Text* (Cincinnati: South-Western Publishing, 1996).}

In some cases, however, it appears that some “free lunches” are in fact routine responses to changes in the costs and benefits of pollution control as manifested in government regulations. Suppose, for example, that new regulations raise the cost of...
treating water pollution. A business whose operations generate water pollution may now find it profitable to reduce the amount of pollution it creates, for example by using different inputs. This change will reduce the business’s costs relative to what they would have been had it not made the change. But the costs might still rise relative to their level before the regulation was passed in the first place. This could be seen either as evidence of a “free lunch” or as a less inspiring story about a company responding rationally to an external cost shock.

4. The management of environmental business risk

The preceding discussion has analyzed the circumstances under which the provision of public goods might increase the expected value of a firm’s shareholders’ equity (or, equivalently, the expected value of the net present value of the firm’s cash flows). Even if they do not bring about such an increase, investments in environmental quality beyond compliance can make sense as components of risk management strategies for firms.

As discussed in the introduction to this paper, risk management within firms, like environmental performance beyond compliance, can only be explained in terms of some imperfect competition or information asymmetry. If there are no such imperfections or asymmetries, then shareholders prefer their manager-agents to be risk neutral and can compel them to behave in a risk neutral manner. On the other hand, if information asymmetries or other imperfections in markets make the costs of externally raised capital higher than those of internally generated funds, then it may be optimal from the shareholders’ point of view for managers to hedge risks. Besides costs that arise from informational asymmetries, the costs of external finance include the contingent costs of bankruptcy and financial distress.27 A second reason that shareholders might want their manager-agents actively to manage risk at the firm level is that the shareholders, though themselves interested in the stock’s expected value, recognize that the managers will be unable fully to hedge against losses by the firm. If the managers are not allowed to hedge the returns of the firm, they may demand additional compensation for bearing this risk. Shareholders might prefer to let them manage the risks actively, depending on the costs of the hedge relative to the additional compensation that the managers would otherwise require.28

It could also be the case, of course, that the interests of the managers and the shareholders are opposed, with the diversified shareholder preferring a risk neutral stance on the part of managers but unable, because of information asymmetries, to bring this about. Although some of the risk management that occurs within firms may fall into this category, executives routinely engage in risk management activities that are easy for shareholders to monitor and that would be easy for shareholders to curtail should they so desire; to take the simplest example, most corporations buy insurance policies against liability, business interruption, and other contingencies.29

Environmental concern can affect business risk in a number of ways. Risks of liability or damaged reputation, such as those arising from an environmental accident or other dramatic insult, may be the most immediately evident. Environmental mishaps at a firm’s own facility or at a facility of a supplier can also interrupt the flow of business and reduce revenues, and accidents, regulation, and resource scarcity can raise the costs of inputs. Managers who have decided to invest in risk management in the environmental arena can make investments that will reduce the probability of an adverse event, reduce the total costs of the event should one occur, or shift the responsibility for these costs from the firm to some other party. In the case of marine oil spills, for example, double-hulled oil tankers would fall into the first category, rapid response crews for spills into the second, the purchase of insurance policies into the third.

Given the existence of asymmetric information and principal-agent slack, the possibility arises that managers may invest in greater or lesser amounts of risk management than their principals would want. They might underinvest in environmental risk management goods because they do not expect such investments to earn private returns and because they are evaluated according to the private returns that they deliver. They might overinvest in such risk management, on the other hand, because to do so reduces friction with regulators or environmental activists, enhances their status in the community, or provides other benefits. From this perspective, one might even view adherence to ethical codes as another argument in the managers’ utility function.

Applications of the theory of the firm to these incentive design problems are still relatively rare. Landis Gabel and Bernard Sinclair-Desgagné recently explored the optimal contract structure for principals who desire their agents to divide their efforts between profit generation and the reduction of environmental risk, as this depends on the information available to them. They concluded that shareholders should make more use of monetary incentives for environmental risk management if they become “more eager to promote environmental risk-reducing activities relative to activities that enhance profit,” and as their ability to monitor environmental risk reduction improves.30

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Asymmetric information makes it difficult for outsiders to tell whether a particular environmental strategy represents sensible risk management or a manifestation of agency problems. The assessment of the benefits of risk management within firms is related to, although distinct from, the kinds of benefits assessment conducted by environmental economists form a social welfare perspective. In the firm’s case the object of interest is not a social cost but a private cost. On the other hand, to derive estimates of that private cost it would seem sensible to apply many of the tools that economists have developed to support normative public policy analysis, including contingent valuation and hedonic pricing models. There seems to be a clear opportunity for environmental economists to contribute to this aspect of the business policy debate.

5. Conclusions

A number of suggestions emerge from this brief review of the relationships between microeconomics and the environmental strategies of firms. For executives and teachers in business schools, the main lesson is that environmental strategy, like other aspects of corporate strategy, needs to be based in the economic fundamentals of the business: the structure of the industry in which the business operates, its position within that structure, and its organizational capabilities. There is no one-size-fits-all environmental policy. This may not strike economists as particularly surprising but it is sometimes overlooked in business schools and consulting firms.

For economists, the primary lesson seems to be that significant opportunities exist to contribute to normative debates about business behavior, using with some modifications the tools developed for normative debates about public policy. For example, work on the assessment of unmarketed environmental benefits can be brought to bear on the firm’s problem of assessing the returns it obtains on environmental investments. Given the importance of firms both as allocators of resources and as shapers of the public debate about environmental priorities, it is surprising that the economic community has not made more effort to help them define the circumstances under which they can increase shareholder value and effectively manage risk in industries where environmental concern is important.31

31 I am grateful to J.P. Gownder, who provided research assistance and commented on earlier drafts. Remaining errors are mine.