CHAPTER THIRTEEN
COMPETITIVENESS & COMPLIANCE : THE PORTER HYPOTHESIS

INTRODUCTION

This chapter presents a selection of the best literature discussing compliance and competitiveness, including how firms can cut the cost of compliance—and even profit from it—and how regulators can design strategies to facilitate this.

The purpose of environmental regulation is to protect public health and to ensure that we use our natural resources—both "sources" and "sinks"—in a sustainable way. Environmental law does this by addressing externalities, including pollution, that firms impose on the public. Environmental law strives to make the polluter pay by using law to internalize the cost of pollution and other adverse social costs that are external to the market.

Historically, in the United States and most OECD countries, the polluters paid an aggregate cost of complying with environmental laws equal to 2 to 2.5% of GDP, with some highly polluting firms having to pay more to clean up their excess pollution, and other cleaner firms paying less.[1] The public benefits from making the polluter pay exceeds the cost paid by the polluter, in part, because environmental law does not yet require the polluter to pay for all of its pollution.[2]

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[1] Paul Portney, *Counting the Cost: The Growing Role of Economics in Environmental Decisionmaking*, ENV'T MAGAZINE (1998) at 3, *available at* http://www.weathervane.rff.org/refdocs/portney_enviro.pdf.

[2] OFFICE OF MANAGEMENT AND BUDGET, INFORMING REGULATORY DECISIONS: 2003 REPORT TO CONGRESS ON THE COSTS AND BENEFITS OF FEDERAL REGULATIONS AND UNFUNDED MANDATES ON STATE, LOCAL, AND TRIBAL ENTITIES (2003) at 7, *available at* http://www.whitehouse.gov/omb/inforeg/2003_cost-ben_final_rpt.pdf. *See also* ECOTEC, THE BENEFITS OF COMPLIANCE WITH THE ENVIRONMENTAL ACQUIS FOR THE CANDIDATE COUNTRIES, DGENV CONTRACT: ENVIRONMENTAL POLICY IN THE APPLICANT COUNTRIES AND THEIR PREPARATIONS FOR ACCESSION, FINAL REPORT, iii-iv (2001), *available at* http://www.europa.eu.int/comm/environment/enlarg/pdf/benefit_long.pdf (suggesting other benefits, including lower costs of production and maintenance due to availability of cleaner water that does not require pretreatment, and

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As environmental regulation progressed from the initial command-and-control model to embrace more flexible performance standards, firms and regulators began to appreciate that pollution not only imposed a cost on the public but also was a waste of the firms' resources. They also learned that pollution prevention and other improvements in environmental management could not only provide vital benefits to the public, but also actually save the firm itself money.[3] Waste was reduced at the source, before it became pollution, and the cost of compliance started to come down, and in some cases it actually provided a profit.

This is the holy grail of environmental regulation — win-win solutions — where firms might be forced to take strong medicine to clean up their pollution and protect the public, but where the medicine would save the firms money and make them, and the countries where they are located, healthier competitors in the long run. Professor Michael E. Porter and Class van der Linde developed the "Porter Hypothesis" to show how environmental compliance can achieve this.

Porter and van der Linde theorized that properly designed environmental regulations trigger innovations within the firm that partially or more than fully offset the costs of complying with those regulations. Such "innovation offsets" can not only improve product quality and value but also may lower the total cost by allowing companies to use a range of inputs more efficiently. Ultimately, according to Porter and van der Linde, this enhanced resource productivity makes companies—and countries—more competitive.

lower consumption of primary resources as a result of a more efficient use and higher levels of recycling). Estimates of the magnitude of public benefits from ecosystem services that environmental law protects are in the range of US $ 16 to 54 trillion per year, with an average of US $ 33 trillion per year. Ecosystem services include regulation of atmospheric chemical composition, global temperature, precipitation, and hydrological flows; storage and retention of water and nutrients; removal and decomposition of wastes; and provision of habit for various species. *See* R. Costanza, *et al.*, *The value of the World's Ecosystem Services and Natural Capital*, 387 NATURE, 253 (1997).

[3] An example is the case of distillers of coal tar in the United States. In 1991, many of these firms opposed the regulations requiring substantial reductions in benzene emissions because at the time, it was thought that the only means to achieve this goal was to cover the tar storage tanks with costly gas blankets. However, the regulations prompted Aristech Chemical Corporation to develop a method of removing benzene from tar in the first processing stage, eliminating the need for gas blankets and saving $ 3.3 million. *See* Michael Porter & Class van der Linde, *Green and Competitive: Ending the Stalemate*, HARVARD BUS. REVIEW (1995). *See also* STEPHEN O. ANDERSEN & DURWOOD ZAELKE, INDUSTRY GENIUS: PEOPLE AND INVENTIONS PROTECTING CLIMATE AND THE FRAGILE OZONE LAYER (2003).

There are two key design principles for the "Porter Hypothesis." First, it requires regulations that focus on outcomes, for example, by specifying performance standards, as opposed to regulations that impose technology standards or otherwise limit flexibility.[4] Second, it requires strict regulations that are complied with. Under these conditions, Porter and van der Linde show that firms re-examine their processes and technologies, and often find greater efficiencies and cleaner processes.

The first Porter design principle, flexibility, requires performance based regulations that set the goals the firms must meet, without specifying the means: firms are allowed to use whatever strategies they see fit to achieve the goals, providing incentive to innovate as they search for the most efficient and effective strategies.[5] An example of a successful flexible regulation is the Sulfur Dioxide regulation on electric generating facilities in the United States. The US government formerly regulated the emission at a cost of $ 7 billion a year by mandating specific technology—the installation of scrubbers on smoke stacks.[6] However, in 1990, the law was changed to a performance standard—an emission cap and trade system, allowing firms maximum flexibility, including the flexibility to innovate in their choice of technological solutions. As a consequence of this new flexible regulation and resulting innovation, the cost of compliance came down dramatically and about a fourth of firms were able to comply with the standard at a profit.[7]

The second element of the Porter hypothesis requires strict standards that are complied with.[8] Stringent regulations are necessary for

[4] For a discussion of reasons inflexible standards severely limit innovation, *see* ENVIRONMENTAL LAW INSTITUTE, INNOVATION, COST AND ENVIRONMENTAL REGULATION: PERSPECTIVES ON BUSINESS, POLICY AND LEGAL FACTORS AFFECTING THE COST OF COMPLIANCE (1999) (hereinafter "ELI").

[5] Some studies suggest that when an environmental manager in a firm is afforded a higher level of discretion, the firm interprets environmental issues as opportunities rather than threats, and achieves higher compliance and improved environmental performance. *See* Sanjay Sharma, *Managerial Interpretations and Organizational Context as Predictors of Corporate Choice of Environmental Strategy*, 43 ACAD. MGMT. J. 681, 691 (2000). For a fuller discussion of theories explaining such behaviors, *see* Chapter Two: Compliance Theories.

[6] ELI, *supra* note 4.

[7] *Id.*

[8] Without strict compliance with emission trading schemes, not only will firms not realize the Porter innovation off-sets, but the market itself will collapse. Traders need the confidence in the market before they participate, and only strict enforcement can provide this. The US Sulfur Dioxide regulation utilizes continuous real-time telemetry to ensure nearly 100% compliance. *See* EPA's Acid Rain Program 2003 Progress Report, *available at* http://www.epa.gov/airmarkets/cmprpt/arp03/summary.html, stating:

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innovation and innovation offsets because lax regulations can be dealt with incrementally and often with "end-of-pipe" or secondary treatment solutions, discouraging any innovation. Stringent regulations, on the other hand, focus greater company attention on discharges and emissions, and compliance with such regulations requires more fundamental solutions, like reconfiguring products and processes.

Porter and van der Linde have identified eleven design factors for innovation-friendly regulations: [9]

1. focus on outcomes, not technologies;
2. enact strict rather than lax regulation;
3. regulate as close to the end user as practical, while encouraging upstream solutions;
4. employ phase-in periods;
5. use market incentives;
6. harmonize or converge regulations in associated fields;
7. develop regulation in sync with other countries or slightly ahead of them;
8. make the regulatory process more stable and predictable;
9. require industry participation in setting standards from the beginning;
10. develop strong technical capabilities among regulators; and
11. minimize the time and resources consumed in the regulatory process itself.

The Porter design principles have been well received by many scholars, policy makers, and industry leaders, and an increasing body of empirical

> As in years past, the electric power industry achieved nearly 100 percent compliance with Acid Rain Program requirements — only 1 unit had emissions exceeding the SO_2 allowances that it held and no units were out of compliance with the NO_X program. This exceptionally high level of compliance was, in part, achieved as a result of the Acid Rain Program's continued provision of accurate and complete SO_2 and NO_X emissions data. This process was augmented by a substantial auditing effort and accountability through rigorous, yet streamlined, reporting systems.

See also Stranlund, Chavez & Field, *Enforcing Emissions Trading Programs: Theory, Practice, and Performance*, 30 POLICY STUDIES J., 343 (2002) ("it is clear that the efficiency gains realized by emissions trading programs will depend on rates of compliance…").

[9] *See* Porter & van der Linde, *supra* note 3 at 124.

evidence confirms their success. For instance, in 2002, Daniel Esty and Michael Porter analyzed various countries' environmental regulations and their competitiveness and economic status in the world. In their study, they found that,

> there is no evidence that higher environmental quality compromises economic progress. Environmental performance is positively and highly correlated to GDP per capita. The…preliminary evidence suggest[s] that countries with stricter environmental regulations than would be expected at their level of GDP per capita enjoy faster economic growth.[10]

Indeed, Esty and Porter found that countries that have the most aggressive environmental policy regimes are the ones most competitive and economically successful.[11]

Moreover, Lawrence Pratt's 2000 study analyzed the relationship between environmental performance and competitiveness and concluded that,

> [s]uperior environmental performance will be rewarded in the long run in most industries and in national development…. Both theory and an emerging body of empirical evidence on the topic show that under most circumstances, improved environmental performance should improve a number of aspects of firm competitiveness, especially in developing countries.[12]

[10] Daniel C. Esty & Michael Porter, *Measuring National Environmental Regulation and Performance, in* THE GLOBAL COMPETITIVENESS REPORT 2001-2002 (M.E. Porter, J.K. Sachs, P.K. Cornelius, J.W. McArthur, & K. Schwab eds., 2002). *See also* Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115 (2004) (describing how information can translate into resource productivity).

[11] Daniel C. Esty & Michael Porter, *Ranking National Environmental Regulation and Performance: A Leading Indicator of Future Competitiveness?, in* THE GLOBAL COMPETITIVENESS REPORT 2001-2002 (M.E. Porter, J.K. Sachs, P.K. Cornelius, J.W. McArthur, & K. Schwab eds., 2002); *see also* P. Lanoie, M. Patry & R. Lajeunesse, *Environmental Regulation and Productivity: New Findings on the Porter Hypothesis*, CAHIER DE RECHERCHE (2001) (finding that environmental regulations do not have contemporaneous impacts on firm's productivity).

[12] Lawrence Pratt, *Rethinking the Private Sector-Environment Relationship in Latin America,* Background Paper for the Seminar on the "New Vision for Sustainability: Private Sector and the Environment" IDB/IIC Annual Meeting of the Board of Governors New Orleans, Louisiana, 3-4 (March 25, 2000), *available at* http://www.iadb.org/mif/v2/files/Pratt-eng.pdf.

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Even if a country has a well designed environmental regulation with both elements of the Porter design principles—flexibility and strictness—the country still must ensure compliance to enjoy the "innovation offsets" described by the Porter Hypothesis.

The Porter design principles apply of course to parliamentarians who need to consider them when drafting laws. They also apply to agencies that, under most environmental laws, still have considerable discretion when implementing the laws passed by parliaments. The design principles can be applied to the remedy stage of enforcement proceedings as well, at least in common law countries where judges have considerable discretion to impose a "Porter Remedy" that forces violators to re-evaluate their technologies and processes.

This chapter begins with Porter and van der Linde's seminal article setting out the foundation for their hypothesis, explaining how innovation offsets occur, describing how to design environmental regulations to encourage innovation, and addressing criticisms that their hypothesis has received.[13] The chapter also includes an empirical study testing the Porter Hypothesis in India. M.N. Murty and S. Kumar studied the relationship between environmental water pollution regulation and manufacturing industry's efficiency in India, and found that the technical efficiency of firms increases with the firms' degree of compliance with the environmental regulations.[14]

The chapter concludes with two articles that discuss the implications for developing countries. Lawrence Pratt and Carolina Mauri emphasize the need for sound enforcement and compliance initiatives to better equip developing countries as the world continues to discover the strong and

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Pratt suggests that "[s]uccessful incorporation of environmental factors into [Latin America's] competitive fabric will align its productive sectors with more valuable market opportunities, make its business climate more attractive to foreign investors, offer new and exciting commercial potential and protect the resources the region needs to survive in the future." *Id.* at 3.

[13] Michael E. Porter & Class van der Linde, *Toward a New Conception of the Environment-competitiveness Relationship*, 9(4) J. ECON. PERSPECTIVES, (1995). For other criticism, *see* A.B. Jaffe, S.R. Peterson, P.R. Portney, & R.N. Stavins, *Environmental Regulation and International Competitiveness: What Does the Evidence Tell Us?*, 93 J. ECON. LITERATURE, 12,658-12,663 (1996); *see also* Michael Porter & Class van der Linde, *supra* note 3.

[14] M. Murty & S. Kumar, *Win-Win Opportunities and Environmental Regulation: Testing of Porter Hypothesis for Indian Manufacturing Industries*, 67 J. ENVTL MGMT 139 (2003).

positive relationship between good environmental performance and countries' competitiveness.[15] A final article by Glen Dowell, Stuart Hart, and Bernard Yeung analyzes multinational enterprises' behaviors and finds that adopting a single stringent corporate environmental standard enhances firm value more than defaulting to the less stringent or poorly enforced standards of some developing countries.[16] The study also concludes that developing countries may attract foreign investment in the short-run by lowering environmental standards, but that the type of companies they attract by doing so will be weaker, more pollution-intensive, and unable to invest in state-of-the-art plants and equipment.

[15] Lawrence Pratt & Carolina Mauri,*Environmental Enforcement and Compliance and Its Role in Enhancing Competitiveness in Developing Countries*, 7
th INECE International Conference Proceedings (Forthcoming 2005).
[16] Glen Dowell, Stuart Hart, Bernard Yeung, *Do Corporate Global Environmental Standards Create or Destroy Market Value?* 46 (8) MGMT SCI. 1059 (2000).