MANDATING ENVIRONMENTAL LIABILITY INSURANCE

BENJAMIN J. RICHARDSON*

I. INTRODUCTION

For a number of years scholars and policy makers have discussed the merits and dangers of imposing liability for environmental damage on banks lending to hazardous industries.[1] Moves to make banks vicariously liable for the environmental behavior of their borrowers began in the United States in the search for deep pockets to fund the enormous costs associated with environmental cleanups demanded by government authorities. While lender liability may encourage more environmentally sensitive lending, it has been shown that various economic inefficiencies may occur when banks are exposed to expansive liabilities in relation to the developments they fund.[2] Among other institutions in the financial services sector, harnessing insurance markets may provide a better means for promoting sustainable development and funding environmental damage costs.

In a range of jurisdictions insurers have become increasingly concerned about pollution liability risks.[3] Insurance markets in theory can enable effective allocation of environmental damage costs and provide incentives to deter environmentally irresponsible behavior. Some commentators also believe that the contribution of insurance to these policy goals can be enhanced when environmental liability in-

* Faculty of Law, University of Manchester

1. *See, e.g.,* ENVIRONMENTAL LIABILITY FOR BANKS (Joseph J. Norton et al., eds., 1995); Richard Hooley, *Lender Liability for Environmental Damage*, 60 CAMBRIDGE L.J. 405 (2001); David Sarokin & Jay Schulkin, *Environmental Concerns and the Business of Banking*, J. COM. BANK LENDINGeb. 1991, at 6.

2. *See, e.g.,* James H. Boyd & Daniel E. Ingberman, *The Search for Deep Pockets: Is 'Extended Liability' Expensive Liability?*, 13 J.L. ECON. & ORG. 232, 255-56 (1997).

3. *See* POLLUTION LAW AND INSURANCE – A COMPARISON OF THE LEGAL REGIMES OF EUROPEAN STATES AND THE USA (Anthony Fitzsimmons ed., 1997) (outlining the legal positions of numerous countries in regard to pollution liability); David Cohen, *Historic Cover for Environmental Liability in the United Kingdom*, INT'L INS. L. REV., Feb. 1996, at 46.

surance is compelled by the state.[4] Indeed, in practice, to strengthen their protection against liability claims, banks have increasingly demanded liability insurance as a condition of financing, creating in effect a mandatory insurance situation for borrowers engaged in environmentally problematic activities.[5] Banks are also increasingly diversifying their business into insurance services, further stimulating this trend.[6]

This Article evaluates the role of insurance markets in managing environmental risks, and focuses on the question of whether environmental liability insurance should be compulsory. A wide range of environmental problems are addressed by insurance markets, including industrial accidents, contaminated land problems, climate change-induced damage and other natural disasters. Focusing on industrial pollution liabilities, the Article aims to show how insurance can facilitate environmental care and compensation, and some advantages that may accrue from mandating insurance in relation to certain environmental risks.

II. MANAGING ENVIRONMENTAL RISK THROUGH INSURANCE

A. *The Economic and Environmental Roles of Insurance*

Insurance functions to spread the economic consequences of individual events across many parties, and, thereby, reduce the potentially catastrophic effects of unforeseen events on individuals by having those consequences absorbed by a third-party (the insurer). Insurance is in principle utility maximizing, as it enables risk-averse parties to transfer their risks for a relatively small fee, and by so protecting parties from exposure to costly liability allows them to pursue socially beneficial ventures.[7] Where losses occur, society is said to

4. *See, e.g.,* Peter Jost, *Limited Liability and the Requirement to Purchase Insurance*, 16 INT'L REV. L. & ECON. 259, 270 (1996); Eberhard Feess & Ulrich Hege, *Environmental Harm and Financial Responsibility*, 25 GENEVA PAPERS ON RISK & INSURANCE – ISSUES & PRAC. 220 (2000).

5. *See* Eugene R. Anderson & Jordan Stanzler, *Insurance Coverage for Environmental Cleanup*, 72 J. COM. BANK LENDING, at 17 (June 1990); Eugene R. Anderson & Jordan Stanzler, *Maybe You're Not Really Naked: Existing Insurance Policies May Protect You Against Environmental Liability*, A.B.A. BANKING J., Aug. 1991, at 24.

6. *See* Gunter Dufey, *The Changing Role of Financial Intermediation in Europe*, INT'L J. BUS., Spring 1998, at 52.

7. Economic efficiency is enhanced if risks are allocated to those parties who are best able to bear them. Louis Kaplow & Steven Shavell, *Fairness Versus Welfare*, 114 HARV. L. REV. 961, 981 (2001) (arguing "well being is generally increased by the availability of insurance").

benefit through the indemnification for unexpected loss and the restoration of resources for productive purposes.[8] By determining *ex ante* the party that will intervene if an accident occurs, insurance also promises reduced transaction costs for all involved.[9] Besides these economic functions, insurance may have environmental policy benefits.[10] Insurance can be construed as an instrument for reflexive style regulation, providing a framework for communicating to economic actors the nature and cost of environmental risks, and offering incentives for firms to behave more carefully.[11] Through the setting of premiums and coverage conditions, insurance markets may induce improved safety measures and offer effective protection against the financial consequences of such accidents, which is particularly important where the responsible party is impecunious.[12]

Generically, there are two basic types of insurance. One type serves to compensate damage caused by the insured to other people and property. Known as third-party liability insurance, it can also serve to protect the injurer from excessive claims that could financially cripple their business. Under liability insurance the insurer becomes responsible for not only guaranteeing compensation for damage, but also ensuring that sufficient incentives remain for parties to take due care given that insureds are not subject to the full extent of legal liabilities. Alternatively, there exists first-party or personal insurance, which aims to compensate for example the costs incurred by the insured in remedying (historic or future) pollution on their own site, including externally generated harms.

Typically, an insurance arrangement arises when a firm proposes their risk to an insurer, who evaluates the risk and stipulates condi-

---

8. *See* KENNETH S. ABRAHAM, ENVIRONMENTAL LIABILITY INSURANCE LAW 15-17 (1991) (arguing that economic incentives drive the use of insurance by business).

9. *See* Goran Skogh, *Mandatory Insurance: Transaction Costs Analysis of Insurance*, *in* 2 ENCYCLOPEDIA OF LAW AND ECONOMICS, 521, 529 (Boudewijn Bouckaert & Gerrit De Geest eds., 2000).

10. *See* Anna Amarandos & Diana Strauss, *Environmental Insurance as a Risk Management Tool*, 15 NAT. RESOURCES & ENVT. 88 (2000); Stephan Schmidheiny, *Eco-efficiency and Sustainable Development,* RISK MGMT. July 1996, at 51(focusing on the relationship between insurance markets and sustainable development).

11. On reflexive law techniques, see STATE, LAW, AND ECONOMY AS AUTOPOIETIC SYSTEMS: REGULATION AND AUTONOMY IN A NEW PERSPECTIVE (Gunther Teubner & Alberto Febbrajo eds., 1992); Eric W. Orts, *Reflexive Environmental Law*, 89 NW. U. L. REV. 1227, 1268 (1995) (stating that "the reflexive aim is not to constrain or dictate behavior, but rather to provide mechanisms or structures to increase the amount of self-reflection and social communication concerning serious environmental issues").

12. *See* James W. Broderick et al., *Environmental Risk Management and the Role of Environmental Insurance*, ENVTL. QUALITY MGMT., Autumn 2000, at 4.

tions to reduce the likelihood and scope of potential loss.[13] Additionally, the insurer's policy will specify the price (premium), and any exclusions and limitations on the amount to be paid in a claim (known as "maximum possible loss"). Not all risks can be insured. Ideally, the features of an insurable situation are: (i) the insurance contract is economically feasible for the parties, in terms of the cost of insurance relative to the potential loss; (ii) the prospective insurer is able to accurately calculate the probability of the loss and the possible magnitude of the damage should the accident occur; (iii) there is a sufficiently large number of insureds sharing a similar risk exposure profile, so that the insurer can use past experience to predict accurately the risk faced by any individual; (iv) the insurer is able to determine the circumstances of the loss so as to decide if the loss was within the terms of the insurance contract; and (v) only a small proportion of the group should be exposed to the risk of a loss at any one occasion so that the insurer is not prone to numerous hefty claims simultaneously.[14]

Environmental damage has emerged as an important risk issue to insurance markets.[15] The escalation of claims associated with natural disasters and contaminated site repairs has driven insurers to scrutinize their policyholders according to standards often well beyond government regulatory requirements. The environmental performance of prospective policyholders can be reflected through the availability of insurance and the cost of premiums. With suspect environmental performers excluded from insurance or paying higher premiums, the insurance market *prima facie* provides financial incentives for improved corporate conduct.[16] As a risk manager, insurance companies can encourage loss reduction by requiring insureds to adopt appropriate safety measures and by monitoring implementation efforts. Insurers may also be able to contribute to planning for disaster mitigation; according to Knoepfel and others, insurers have "the skills to provide the assessment, quantification and mapping of risks, prompt disaster recovery, fraud control, avoidance of duplicate

13. *See* DENNIS S. HANSELL, INTRODUCTION TO INSURANCE 153-156 (1996) (outlining the basic elements of insurance contracts).

14. JAMES L. ATHEARN, ET AL., RISK AND INSURANCE 32-36 (6th ed. 1977) (describing the attributes of a risk that is perfectly suited to insurance).

15. *See Insurers can be Environmentalists*, NAT'L UNDERWRITER: PROP. & CASUALTY RISK & BENEFITS MGMT., Nov. 8, 1993, at 26.

16. *See* STEPHEN SCHMIDHEINY, CHANGING COURSE: A GLOBAL BUSINESS PERSPECTIVE ON DEVELOPMENT AND THE ENVIRONMENT 65 (1992).

administration and the access to international resources."[17] Kehne argues that insurance also has an advantage over administrative regulation in the context of dynamic new risks, such as associated with biotechnologies, as insurers generally are able to make adjustments to policies, conditions, and premiums more flexibly and efficiently than administrators.[18]

B. *Development of Pollution Insurance Markets*

Following the extension of statutory environmental liabilities, market demand for insurance against costly pollution risks has intensified. It began in the early 1970s with the appearance of mass tort suits in the United States for long-latency diseases, such as asbestosis.[19] During the 1980s and 1990s demand for pollution liability insurance in the United States became more pressing in the wake of the 1980 Superfund legislation which created obligations to cleanup contaminated land.[20] Historically, pollution liabilities were encompassed within general public liability policies (also known as "comprehensive general liability" (CGL)). These policies aimed to provide insurance against a person's potential legal liability to a third-party, whether in statute, contract, or tort, but did not cover intentional acts or omissions.[21] Pollution that is not intentional or expected is classified as "accidental," for which there are two categories in insurance policy—"sudden and accidental" pollution, and "gradual" pollution where there is delay between the polluting acts and the manifestation of damage.[22] Further, damage to the insured's property, such as cleanup of a contaminated site, is excluded and must be the subject of a separate policy.

---

17. *See, e.g.*, IVO KNOEPFEL, ET AL., THE KYOTO PROTOCOL AND BEYOND: POTENTIAL IMPLICATIONS FOR THE INSURANCE INDUSTRY (UNEP Insurance Initiative for the Environment) § 3.2 (June 10, 1999).

18. Jeffrey Kehne, *Encouraging Safety through Insurance-Based Incentives: Financial Responsibility for Hazardous Wastes*, 96 YALE L.J. 403, 410-11 (1986).

19. *See, e.g.*, M. Elizabeth Medaglia & Peter A. von Mehren, *Beyond Asbestos and Environmental Litigation: Coverage Disputes in the Twenty-first Century*, 33 TORT & INS. L.J. 1023, 1024 (1998).

20. Comprehensive Environmental Response, Compensation and Liability Act 1980, 42 U.S.C. §§ 9601-9675 (1994). *See also* Robert N. Sayler & Adam M. Cole, *The Mother of All Battles: The Dispute over Insurance Coverage for Environmental Contamination in the United States,* 1 ENVTL. LIABILITY 29, 29-30 (1993).

21. *See* Hansell, *supra* note 13, at 15 (stating that typical contract damages arise by accident).

22. *See* Thomas C. Gilchrist, Note, *Insurance Coverage for Pollution Liability in the United States and the United Kingdom: Covering Troubled Waters*, 23 CASE W. RES. J. INT'L L. 109, 121-40 (1991) (regarding differential treatment of gradual and sudden pollution).

An important distinction in pollution insurance concerns the period for making claims.[23] An occurrence policy provides coverage for liability arising out of damage that occurs during the policy period, regardless of when a claim alleging liability is made. In contrast, a claims-made policy only covers liability arising out of claims actually made during the policy period. There is often a delay between the polluting incident and resulting claims; this is inherent in the nature of "gradual" pollution, but it can also occur in relation to sudden pollution where the harm is not immediately obvious when the incident happens (for example, a substance that escapes into the atmosphere or water from a process is carcinogenic, and the symptoms do not appear in victims for many years). Given the delay between occurrence and the resulting claims, an occurrence policy is more advantageous to the insured, subject to uncertainty about the meaning of "occurrence." With claims-made coverage, once the insurer perceives that vast numbers of costly claims will be lodged in the approaching years the insurer will recoil at underwriting next year's policy.

Public liability policies traditionally were written on an occurrence basis, often providing coverage for all premises of the insured without any form of environmental assessment.[24] The first qualified pollution exclusion was introduced in the 1973 revision of the standard form CGL policy in the United States, and was widely availed until 1985.[25] Mounting claims for historical pollution caused underwriters to amend the CGL policy to exclude gradual pollution and to limit coverage to sudden and accidental incidents on a claims-made basis.[26] Protracted litigation over the extent of the exclusion caused many insurers to withdraw entirely from the pollution liability insurance market, although this did not immunize them against drawn-out pollution liabilities for historical gradual pollution.[27]

In the wake of seepage of United States claims into European insurance markets,[28] insurers in Europe devoted increasing attention to the problem of pollution risks. In the early 1990s the Association of

---

23. Kathy D. Bailey and William Gulledge, *Using Environmental Insurance to Reduce Environmental Liability*, 11 NAT. RESOURCE & ENVT 26, 26-27 (1997).

24. *See id*.

25. ABRAHAM, *supra* note 8, at 145.

26. *See* Eugene R. Anderson et al., *Liability Insurance: A Primer for Corporate Counsel*, 49 BUS. L. 259, 264-65 (1993).

27. Joseph Tanega, *Implications of Environmental Liability on the Insurance Industry*, 8 J. ENVTL. L. 115, 127 (1996).

28. *See, e.g.*, John Jennings, *U.S. Jury Hits London for $70M in Pollution Losses*, NAT'L UNDERWRITER: PROP. & CASUALTY RISK & BENEFITS MGMT., May 15, 1995, at 2.

British Insurers (ABI) coordinated policy revisions by publishing a recommended pollution exclusion clause and incorporating an aggregate limit for pay-outs.[29] In Italy, all pollution risks were excluded from public liability policies for businesses by the late 1970s on the advice of the National Insurance Association of Italy.[30] Most insurers have moved to claims-made policy coverage,[31] although the legality of this has been challenged in several jurisdictions. Pollution risks were only systematically excluded from French CGL contracts from 1993, but attempts to rewrite policies on a claims-made basis were nullified by the French Supreme Court (Cour de Cassation), causing great consternation among insurers.[32] Similarly, efforts have been made to restrict claims-made policies in Belgium and Spain.[33] Some European insurers have also sought to better manage pollution risks through the creation of insurance pools, especially in Denmark, Italy, the Netherlands and France. The pools typically offer liability coverage for gradual pollution from fixed industrial facilities and emergency costs, and require an environmental appraisal of properties proposed for coverage.[34]

For companies desiring more extensive coverage there is a newer market in specialist Environmental Impairment Liability (EIL) insurance, offering coverage for *gradual* environmental pollution.[35] Because of the higher liability exposure, EIL policies are generally drafted on a claims-made basis, exclude cases of deliberate breach of legislation and contain a retroactive limitation clause. They are also written on a site-specific basis with proposed sites subject to an environmental assessment before coverage may be offered. Because of such exclusions and its high cost, EIL insurance did not initially ap-

---

29. *See* ABI, JOINT POLLUTION WORKING GROUP, RECOMMENDATIONS FOR THE UNDERWRITING OF POLLUTION RISKS (1998).

30. Fabrice G. Lorvo, *Insurance and Environment in the European Union: In Need of Action*, 6 ENVTL. CLAIMS J. 495, 499 (1994).

31. *See, e.g.*, Robert G. Lee & Stephen Tupper, *Claims-made Policies: European Occurrences*, 4 ENVTL. LIABILITY 25 (1996).

32. Cour de Cassation, l'ère Chambre Civile, 12 Dec. 1990, RGAT 1 (1991); Cour de Cassation, l'ère Chambre Civile, 3 Feb. 1993, RGAT 2 (1993). S*ee* Mikael Hagoplan, *France: The Supreme Court Rules that 'Claims-Made' Coverage is a Nullity,* 1 INT'L J. INS. L. 52 (1994) (analysing the Supreme Court's decision).

33. Marcel Fontane, *Claims-Made Policies Under Belgian Law—New Developments*, 2 INT'L J. INS. L. 117 (1995).

34. *See* Lorvo, *supra* note 30, at 501-508 (summarising the common aspects of pools found in various Western European countries).

35. *See* Michael Misch et al., *Recent Developments in Insurance Coverage Issues*, 31 TORT & INS. L.J. 335, 341-44 (1996).

peal to markets, but as EIL underwriting fees and premiums have stabilized and coverage has broadened, the policies have become more popular.[36] Strengthening environmental regulations have stimulated demand for EIL coverage,[37] and some insurers have also felt confident enough in the maturing of the environmental insurance market to underwrite certain policies on an occurrence basis.[38] Besides EIL, over 20 niche liability insurance products have emerged, providing coverage for contractors, transporters and other niche operators.[39] Insurers have also developed a new product specifically for lenders, generically labeled Financial Institution Environmental Liability Insurance.[40] The development of new environmentally oriented insurance techniques and policies has not been confined to contaminated land cleanup. In Europe a number of insurers have created policies that convey incentives for improved environmental performance for motorists and building owners.[41]

III. POTENTIAL CONSTRAINTS TO INSURANCE MARKETS

Despite changes in the insurance sector, one would be naïve to believe that insurance markets offer a straightforward solution to environmental risk control. The ability of insurance techniques to provide incentives for sustainable development and ensure funds for environmental restoration is affected by a number of factors.

---

36. Sue Neuman, *The New Environmental Insurance Products: When Does it Make Sense to Buy Them?*, ENVTL. L. IN NEW YORK, Nov. 1998, at 179.; Joseph Catanese, *A New Era in Pollution Coverage*, WASTE AGE, Apr. 1, 2000, at 68.

37. *See* Carolyn Aldred, *U.K. Pollution Regs Driving EIL Market*, BUS. INS., Nov. 29, 1999, at 19.

38. Christopher Winans, *Setting the Standard*, BEST'S REV.: PROP./CASUALTY INS. EDITION, Apr., 1997, at 32-33 (1997).

39. *See* Susan Neuman, *Tailored to Fit: Sophisticated Insurance Tools Make Property Protection Easier*, ENVTL. COMPLIANCE & LITIG. STRATEGY, May 2000, at 3-5; *see* Corey Stein, *Pollution Insurance Comes of Age*, PUB. MGMT., Jul.-Aug. 1999, at 14 (providing a general overview of potential pollution exposure and the coverages offered).

40. John L. Riedl & Armin R. Callo, *Financial Institution Environmental Liability Insurance: New Panacea for Lenders' Pollution Ills*, 6 ENVTL. CLAIMS J. 341 (1994).

41. ASSOCIATION FOR ENVIRONMENTAL MANAGEMENT IN BANKS, SAVINGS BANKS, AND INSURANCE COMPANIES, TIME TO ACT: ENVIRONMENTAL MANAGEMENT IN FINANCIAL INSTITUTIONS 12 (1998), *available at* http://www.vfu.de/time2act.pdf.

A. *Liability Standards*

One of these factors concerns uncertainty surrounding the risks sought to be insured.[42] Complete uncertainty about the extent of the risks would "resemble a naked gamble," while a future entirely predictable would make insurance superfluous.[43] Between these poles, insurance functions best when there are predictable probabilities of the frequency and magnitude of losses that will be suffered by relevant policyholders. Escalating pollution liabilities initially posed a major challenge to underwriters because of the paucity of historical claims necessary for actuarial modeling of losses. Unpredictable judicial decisions and legislative changes can heighten this uncertainty, making it impossible to quantify and thus insure environmental liability risks.[44] The nature of the applicable environmental liability rules is crucial to the functioning of insurance markets because companies make decisions about their level of care and desired coverage based on their expected losses. If there were no liability rules, other than for protecting their own property, polluters would have no financial incentive to take care and would not benefit by purchasing liability insurance.

Modern environmental legislation has increasingly adopted strict liability standards in relation to environmental damage, with fault-based liability confined to personal injury.[45] Adopting a strict liability standard arguably reduces the need to resort to expensive litigation to determine culpability, as it makes claims more predictable than they would be under a negligence standard.[46] The efficiency of fault liability by contrast depends on whether the courts can accurately determine both the optimal standard of care and the injurer's actual level of care—a potential source of uncertainty for insurers. In a variety of jurisdictions, insurance markets have now successfully arisen for environmental harms subject to strict liability rules.[47]

---

42. *See* Kenneth S. Abraham, *Environmental Liability and the Limits of Insurance*, 88 COLUM. L. REV. 942, 946 (1988).

43. *Id*.

44. Paul. K. Freeman & Howard Kunreuther, *The Roles of Insurance and the Well Specified Standards in Dealing With Environmental Risks*, 17 RISK MGMT. & DECISION. ECON. 517, 521 (1996).

45. *See generally* CHRIS CLARKE, UPDATE COMPARATIVE LEGAL STUDY (2001), *available at* http://europa.eu.int/comm/environment/liability/legalstudy_full.pdf.

46. Kehne, *supra* note 18, at 419.

47. *See* Russ Banham *Pollution Protection Gets Easier*, TREASURY & RISK MGMT, Nov.-Dec. 1999, at 61 (focusing on developments in U.S.); Lisa S. Howard, *EIL Covers are Catching*

But where strict liability is married with joint and several liability and retroactive liability, insurance markets may unravel. Abraham sees retroactive liability as problematic because the introduction of unanticipated liability necessarily undermines insurers' ability to predict legal regimes and risks accurately.[48] If, however, insurers can foresee the possibility of future changes in the liability system that would create liability for historical pollution, in theory this could be accommodated through an additional risk premium to address the "insurer ambiguity."[49] Regarding joint and several liability rules, while they advance the compensation function of environmental policy by giving claimants access to a wider pool of tortfeasors, they can undermine underwriting decisions since any claim has the potential to attain the policy limit ceiling regardless of the contribution by the insured. Kehne believes, "where net assets, rather than contributions to release problems, represent the primary determinant of liability, insurance markets cannot provide effective loss avoidance incentives."[50] Of course, secondary redistribution mechanisms could be introduced allowing for contributions among multiple tortfeasors,[51] but the viability of redistribution mechanisms depends significantly on the transaction costs incurred.

Uncertainty in insurance markets can also arise from the interpretation of insurance contracts, as exemplified by the Superfund experience. The three areas of major contention in the interpretation of liability under Superfund have been the meaning of "damages" covered by CGL policies, the meaning of the property damage exclusion under such policies, and the ambit of the gradual pollution exclusion.[52] One of the biggest setbacks Superfund delivered to insurers was the interpretation made by courts that the costs of remedial action by an insured at the behest of a public authority through compulsory order or voluntary settlement qualified "as damages" to be compensated

---

on in United Kingdom, NAT'L UNDERWRITER: PROP. & CASUALTY RISK & BENEFITS MGMT., Feb. 1, 1999, at 3.

48. Abraham, *supra* note 42, at 957-958; *see also* Michael Faure & Paul Fenn, *Retroactive Liability and the Insurability of Long-Tail Risks*, 19 INT'L REV. L. & ECON. 487 (1999) (discussing the benefits of retroactive liability generally).

49. *See* Howard Kunreuther et al., *Insurer Ambiguity and Market Failure*, J. RISK & UNCERTAINTY, Dec. 1993, at 71-72.

50. Kehne, *supra* note 18, at 419.

51. *See* Lewis A. Kornhauser & Richard L. Revesz, *Sharing Damages Among Multiple Tortfeasors*, 98 YALE L.J. 831, 837 (1989) (describing the different rules of apportionment available).

52. Jonathan R. Nash, *Environmental Law: An Economic Approach to the Availability of Hazardous Waste Insurance*, 1991 ANN. SURV. AM. L. 455, 474.

under insurance contracts.[53] Courts have also tended to overlook the pollution exclusion by reinterpreting gradual pollution as "sudden" from the standpoint of the insured's awareness of the damages.[54] Despite these setbacks, as relevant actuarial information accumulated and liability precedents settled, insurers have resumed coverage of Superfund-type pollution liabilities.[55]

B. *Adverse Selection and Moral Hazard*

The pooling and differentiation of risks is crucial to alleviating problems of uncertainty in insurance calculations. Insurance is most effective when it pools many independent risks of known probability and is then able to segregate those risks.[56] In statistical terms, better certainty about the likelihood and severity of loss flows from pooling many risks. Further, segregating high- from low-risk insureds can reduce risk variance, and, consequently, reduce the expected costs of claims. Segregating risks means policyholders can be charged premiums that reflect their risk profile, and, thus, insureds can be better influenced on how much to engage in the activity generating the risk.

Risk pooling and differentiation can be undermined by the problems of adverse selection and moral hazard.[57] Adverse selection derives from information asymmetry between parties, as applicants for insurance generally possess substantially more information about their risk profile than insurers. The hypothesis is that a disproportionate number of high-risk applicants then seek to buy insurance while low-risk choose to avoid it.[58] The effect is to undermine the entire premise of risk pooling and differentiation.[59] Priest argues for example that the crisis in product liability insurance in the United States

---

53. *See id*. at 475.

54. *See* Eugene R. Anderson & Avraham C. Moskowitz, *How Much Does the CGL Pollution Exclusion Really Exclude?,* RISK MGMT., Apr. 1984, at 31-32.

55. *See* Stephen J. Smirti Jr., *After CERCLA—The Litigious Explosion on Environmental Coverages Reached Everest Magnitude*, INS. ADVOC. Dec. 9, 1995, at 19 (arguing that 15 years after the passage of CERCLA, the scope of the defenses available to issuers was well settled).

56. PAUL K. FREEMAN & HOWARD KUNREUTHER, MANAGING ENVIRONMENTAL RISK THROUGH INSURANCE, 23-24 (1997).

57. ROBERT COOTER & THOMAS ULEN, LAW AND ECONOMICS 66-67 (1988).

58. George A. Akerlof, *The Market for 'Lemons': Quality, Uncertainty and the Market Mechanism,* 84 Q.J. ECON. 488 (1970) (detailing the phenomenon of adverse selection in the famous paper).

59. *See, e.g.*, Mark Pauly & Sean Nicholson, *Adverse Consequences of Adverse Selection*, 24 J. HEALTH POL., POL'Y & L. 921 (1999) (describing the costs of adverse selection).

in the 1980s stemmed mainly from low risk firms dropping out of the insurance market.[60]

Lack of adequate information can also arise in relation to monitoring changes in the risks posed by parties after securing insurance. This results in the moral hazard phenomenon, whereby the availability of insurance may reduce incentives to be careful.[61] If polluting enterprises can "ignor[e] the consequences of their actions by insuring against financial liabilities thereby incurred," then environmental liability insurance would seem at odds with environmental protection law.[62] Insurers seek to reduce the information deficiencies that fuel adverse selection and moral hazard through various risk assessment and classification techniques, deductibles and policy exclusions, and where possible, by enhanced monitoring. The main methods currently used for calculating insurance premiums are guaranteed cost insurance, experience-rated insurance and retrospective-rated insurance,[63] but some methods face problems addressing the situation of small and medium sized enterprises (SMEs) that lack a credible statistical profile of past loss experience.[64] Risk differentiation is also not costless, and is generally only worthwhile for larger enterprises or by organizing the market into general categories.[65] The growth of corporate subscription to environmental management systems (EMSs) such as that prescribed by the International Organization for Standardization (e.g., ISO 14001 standard) or the E.U.'s Eco-Management and Audit Scheme (EMAS) may however provide a convenient means of extending risk differentiation to control adverse selection.

Pollution prevention by insureds also may be encouraged through the environmental appraisal of their activities and the differentiation of insurance coverage and premiums to reflect insureds' level of care. Imposition of deductibles can be an effective discipli-

60. George. L. Priest, *The Current Insurance Crisis and Modern Tort Law*, 96 YALE L.J. 1521, 1524-25 (1987).

61. *See* Jean-Jacques Laffont, *Regulation, Moral Hazard and Insurance of Environmental Risks*, 58 J. PUB. ECON. 319 (1995); Steven Shavell, *On Moral Hazard and Insurance*, 93 Q.J. ECON. 541 (1979).

62. Jacqueline Lipton, *Insurance for Environmental Liability: Some Policy Issues*, 6 INT'L INS. L. REV. 198, 200 (1998).

63. Jan McDonald, *Financial Responsibility Requirements: Liability Insurance as an Environmental Management Tool*, 4 ENVTL. LIABILITY 2 (1996).

64. *Id*.

65. *See especially* Severin Bohrenstein, *The Economics of Costly Risk Sorting in Competitive Insurance Markets*, 9 INT'L REV. L. & ECON. 25 (1989).

nary tool as it exposes the insured to some potential losses.[66] Exclusions can also promote responsible behavior by precluding coverage for certain types of losses. As already noted, CGL policies now generally exclude coverage for damages caused by gradual pollution, and in some cases also for sudden and accidental discharges.[67] Abraham suggests that exclusion of gradual pollution from coverage reduces moral hazard because gradual pollution "is more likely than a sudden and accidental discharge to result from the inherent character of the insured's operations than from an unintended mishap."[68] Gradual losses are usually more predictable costs, and are more likely to be expected or intended by the insured.

C. *Insurers' Financial Resources*

An additional assumption of reliance on insurance markets to control environmental problems is that they hold sufficient financial resources to meet claims. The financial resources of the insurance industry are, like other business sectors, finite and it would appear impossible for insurers globally to cover the range of environmental harms generated by modern societies. For instance, the U.S. Environmental Protection Agency in the early 1990s predicted hazardous site cleanup costs of between USD $500 billion to $1 trillion over the next fifty years,[69] and average remediation costs for individual Superfund sites estimated at some $35 million.[70] By contrast, the total reserves of the property and casualty insurance industry in the United States were estimated for the same period at between only a third to a fifth of these global sums.[71] Although insurance regulation usually specifies minimum capital adequacy, insurers like other companies are not immune from insolvency. Massive environmental liability claims incurred by insurers that failed to properly forecast risks have

66. *See* Vernon L. Grose, *Risk Management from a Technological Perspective*, 17 GENEVA PAPERS ON RISK & INS. – ISSUES & PRAC. 335 (1992).

67. Peter E. Kanaris & Lawrence D. Mason, *Common Exclusions in the First-party Property Insurance Policy and Their Application to Environmental Claims*, TORT & INS. L.J. 809 (1995).

68. Abraham, *supra* note 42, at 953.

69. Dale Jensen & Cynthia Unger, *Environmental Liability*, DENVER BUS. May-April 1991, at 18 .

70. LLOYD S. DIXON et al., PRIVATE-SECTOR EXPENDITURES AND TRANSACTION COSTS AT 18 SUPERFUND SITES (1993).

71. *Id*. *See also* Standard & Poor's, *Environmental Liability Strains P/C Insurers*, CREDIT WEEK, Oct. 30, 1995, at 43.

been known to cause the collapse and insolvency of insurance firms.[72] If insurers go bust, then ultimately government (public) resources will be tapped to finance environmental restoration.

The problem of insuring against major, long term environmental risks could be overcome through the development of secondary markets for risk trading. Recognizing the limits of insurers' and reinsurers' ability to finance catastrophe risk on their own, financial engineers have devised new alternative risk transfer markets based around catastrophe futures and weather derivatives as a means of financing risks using a capital market solution.[73] This process of "securitization" in effect enables insurers to share catastrophe risk with investors.[74] To date, the principal forms of securitization are catastrophe or "act of God" bonds, contingent surplus notes and exchange-traded catastrophe options. For example, an insurance-based catastrophe bond typically provides that if the issuer suffers a particular predefined catastrophe loss (such as a hurricane or earthquake), repayment of principal is deferred or forgiven.[75] If a disaster occurs, the insurer that issued the catastrophe bond can pay claims with the funds that would otherwise have gone to the bondholders. If good weather prevails during the bond period, investors gain by the return of their principal plus considerable interest payments. A number of European and North American insurers have now introduced such mechanisms to financial markets as a way to expand the insurance capacity to cover natural catastrophe risks.[76]

Besides the challenge of ensuring funds to meet large environmental risks, the financial integrity of insurance markets depends on limiting the often high transaction costs and diversion of resources

---

72. *See, e.g.*, Lisa S. Howard, *Russian UK Insurer Goes Bust*, NAT'L UNDERWRITER: PROP. & CASUALTY RISK & BENEFITS MGMT., Aug. 31, 1998, at 2 (discussing impact of U.S. asbestos, pollution and health claims on Baltic General Insurance Company); Lisa S. Howard, *Insurer Stability Seen Tied to Superfund Reform*, NAT'L UNDERWRITER: PROP. & CASUALTY RISK & BENEFITS MGMT., May 9, 1994, at 29 (warning regarding possible insolvency of insurers in the United States).

73. *See also* Stephen P. D'Arcy & Virginia G. France, *Catastrophe Futures: A Better Hedge for Insurers*, 59 J. RISK & INS. 575 (1992); Dwight M. Jaffee & Thomas Russell, *Catastrophe Insurance: Capital Markets and Uninsurable Risks*, 64 J. RISK & INS. 205 (1997).

74. *See* Graciela Chichilnisky & Geoffrey Heal, *Managing Unknown Risks*, J. PORTFOLIO MGMT., Winter 1998, at 85; Richard E. Smith, et al., *Reinventing Reinsurance through Capital Markets*, 22 GENEVA PAPERS ON RISK & INS. – ISSUES & PRAC. 26 (1997).

75. *See* Johannes S. Tynes, *Catastrophe Risk Securitization*, J. INS. REG., Fall 2000, at 3.

76. Don L. Kirk, *Insurers Voice Need to Combat Climate Risks*, BUS. INS., Nov. 8, 1999, at 45-46.

into litigation rather than pollution cleanup.[77] The deep-pocket syndrome has led, particularly in the United States, to insurers joining banks as primary targets for the imposition of financial liability to rehabilitate polluted sites.[78] Abraham observes, "mass tort and [Superfund] coverage claims are rarely paid without dispute. Too much money is at stake, too many other provisions in [public liability] policies potentially limit or eliminate coverage . . . and insurers apparently collected too few premium dollars in anticipation of long-tail coverage liability."[79] Most obviously, government can assist private insurance functioning by setting well-specified legal standards to provide the predictability the industry needs so that it can accurately calculate risks. In recent years evidence suggests that the initial "insurance crisis" in the United States has subsided as clearer liability precedents have become judicially established and claims patterns stabilized.[80]

D. *Addressing Ecological Damage*

There is also the question of the kinds of environmental damages that insurance markets can be expected to cover. Insurance is a financial tool that arose to protect economic resources wherein another potential limitation lies. Protection of property and public health is an important aspect of environmental policy served by pollution insurance, but where ecological processes lack an economic proxy then they may fail to receive adequate protection. There may be no economic proxy because liability for environmental damage, such as to fauna and landscapes, cannot be effectively imposed. Harm caused to the natural, unowned environment poses difficulties in terms of the ready applicability of liability rules unless legislation confers public rights to recover, perhaps along the lines of the public trust doctrine.[81] Secondly, problems may exist in measuring environmental damage for compensation purposes. Insurers expressed concern regarding the European Commission's *White Paper on Environmental Liability* be-

77. JAN P. ACTON & LLOYD S. DIXON, SUPERFUND AND TRANSACTION COSTS (1992).

78. Richard K. Harper & Stephen C. Adams, *CERCLA and Deep Pockets: Market Response to the Superfund Program*, 14 CONTEMP. ECON. POL'Y 107 (1996).

79. Kenneth S. Abraham, *The Maze of Mega-Coverage Litigation*, 97 COLUM. L. REV. 2102, 2106 (1997).

80. *See, e.g.*, *Environmental Liabilities Decline*, BEST'S REV.: PROP./CASUALTY INS. ED., Sep. 1997, at 86 (showing U.S. stabilising trend).

81. Brian Jones, *Deterring, Compensating, and Remedying Environmental Damage: The Contribution of Tort Liability*, *in* HARM TO THE ENVIRONMENT: THE RIGHT TO COMPENSATION AND THE ASSESSMENT OF DAMAGES 11, 13 (Peter Wetterstein ed., 1997).

cause of the perceived difficulty for placing a clear value on natural resource losses for underwriting purposes.[82]

These problems however may not be insurmountable. Firstly, legal systems are increasingly sensitive to compensatory damages beyond traditional indicia of harm to person or property. In relation to pure ecological loss, the possible solution to difficulties of measuring damage to environmental systems is to restrict liability (and hence insurance coverage) to situations involving *significant* damage with damages measured according to the costs of ecological restoration.[83] Both the *White Paper* and some legislation covering natural resource damage deal with compensation in this way.[84] Internationally, protocols to the oil pollution liability treaties adopted in 1992 expanded the definition of pollution damage to include compensation for costs incurred in reinstating impaired environments.[85] Where environmental damage is not repairable, polluters could be directed to fund reparation of equivalent ecosystems. To the extent that problems of uncertainty surrounding damage remain that could undermine the insurability of the situation, Kunreuther and others propose the inclusion of an additional ("insurance ambiguity") risk premium.[86]

Secondly, a number of jurisdictions enable the state or designated public interest groups to act as plaintiffs on behalf of damaged environments. The United States's Superfund legislation authorizes designated trustees on behalf of the public to recover damages for harm to or loss of natural resources caused by a hazardous substance release.[87] Italy legislated in 1986 to allow the state to recovery for pure ecological restoration costs without being limited to the market

---

82. Lisa S. Howard, *Superfund's Lessons Cause European Union to Proceed with Caution on Pollution Liability*, NAT'L UNDERWRITER: PROP. & CASUALTY RISK & BENEFITS MGMT., Feb. 21, 2000, at 3, 4.

83. There is considerable literature on natural resource damage valuation. *See, e.g.*, Richard C. Bishop & Robert E. Unsworth, *Assessing Natural Resource Damages Using Environmental Amenities*, 11 ECOLOGICAL ECON. 35 (1994).

84. EUROPEAN COMMISSION, WHITE PAPER ON ENVIRONMENTAL LIABILITY, 19 (2000) *available at* http://europa.eu.int/comm/environment/liability/el_full.pdf. *See, e.g.*, Oil Pollution Act 1990, 33 U.S.C. §§ 2701, 2706(f); Superfund, 42 U.S.C. § 9607(f)(1); Environmental Liability Act (Germany), § 16.

85. *See* David J. Wilkinson, *Moving the Boundaries of Compensable Environmental Damage Caused by Marine Oil Spills: The Effect of Two New International Protocols*, 5 J. ENVTL. L. 71, 82-85 (1993).

86. Kunreuther et al., *supra* note 49, at 71-72.

87. CERCLA, 42 U.S.C. § 9607(a)(4)(C). *See also* Frederick R. Anderson, *Natural Resources Damages, Superfund, and the Courts*, 16 B.C. ENVTL. AFF. L. REV. 405, 406 (1989); Carl W. Breeding & Lloyd R. Cress, Jr., *Natural Resource Damages under CERCLA: A New Beginning?,* 20 N. KY. L. REV. 23 (1992).

value.[88] Where difficulties persist with environmental damage valuation, and if appropriate plaintiffs are lacking, measures that reduce the likelihood of such losses are obviously required. Within insurance contracts, inclusion of claim ceilings and high deductibles to promote safety practices by insureds may help. But since neither monitoring nor additional risk premiums can entirely solve the problem of risk of ecological damage, the problem may sometimes need to be addressed through criminal sanctions and other measures that compel developers to adopt environmentally careful practices.

IV. COMPULSORY ENVIRONMENTAL INSURANCE

A. *Regulating Insurance Markets*

The foregoing discussion has canvassed various potential threats to environmental liability insurance markets. While the state can facilitate insurance by creating appropriate liability standards, other responses are needed from insurers themselves, such as adapting policies to control adverse selection and moral hazard, or tapping the capital markets to ensure adequate financial resources to meet claims. Another possibility is for the state itself to more actively regulate the provision of insurance including mandating coverage for those engaged in environmentally sensitive activities. The challenge is to determine the circumstances when insurance should be made compulsory or otherwise regulated to offset incentives to externalize environmental risk.

According to Shavell's seminal model of third-party liability insurance, regulation of insurance is generally unnecessary, since the market will normally generate the socially optimal level of insurance.[89] Shavell argued that few insureds would be careless and cause loss if they knew that their premiums would increase or coverage would be denied. Accordingly, where insurers can efficiently monitor insureds' level of care, regulating the insurance market would not enhance insureds' willingness to reduce risk. However, where insurance markets fail to produce adequate incentives to reduce risk, Shavell advocated mandatory coverage provided the insurer is able to moni-

88. Act No. 349 of July 8, 1986, 162 Gazzetta Ufficiale, Suppl. Ord. No. 59, 5ff, *discussed in* Andrea Bianchi, *Harm to the Environment in Italian Practice: The Interaction of International Law and Domestic Law*, *in* HARM TO THE ENVIRONMENT, *supra* note 81, at 103, 105. *See also* Environmental Damage Act 1994 (Finland), § 6; Pollution Control Act 1981 (Norway), para. 58.

89. STEVEN SHAVELL, ECONOMIC ANALYSIS OF ACCIDENT LAW, chs. 8-10 (1987).

tor an insured's conduct.[90] Market failure may occur where injurers are able to avoid full liability because victims cannot identify the culprit or declines to sue (e.g., owing to a fear of high litigation costs).[91] Without insurance, there is an insufficient deterrence imperative since injurers will base their level of care on their expected liability, which in this situation is less than the entire expected losses caused by their activities.[92]

A second reason for regulating insurance is that businesses protected by limited corporate liability[93] may be inclined to purchase less than full insurance to cover their potential harms.[94] Schwartz reasons the basic problem is that a company's incentives to insure against knowable risk decline when "its liability exposure greatly exceeds its wealth."[95] In Shavell's analysis, "insuring against liability that one would not otherwise fully bear, because one's assets would be exhausted, is in a sense a private waste for a potentially judgment-proof party."[96] But an insurance requirement would compel the business to internalize victims' expected losses through the premium.[97] Mandatory environmental insurance may be a more politically feasible and economically efficient means of addressing corporate environmental externalities than diluting corporate limited liability or expanding creditor liabilities.

But if insurers' cannot monitor their insureds' level of care, Shavell's analysis suggests the injurer's incentives to exercise proper care may be lacking, and the insured will not seek full coverage for reducible risks. In the context of pollution cleanup costs that are both uncertain and uncapped *ex ante*, Shavell believed that insurance would create a moral hazard because premiums would not correspond to expected losses.[98] This problem can be compounded by the

90. Steven Shavell, *The Judgment Proof Problem*, 6 INT'L REV. L. & ECON. 45, 53-55 (1996).

91. Kehne, *supra* note 18, at 410.

92. SHAVELL, *supra* note 89, at 7.

93. *See, e.g.*, Henry Hansmann & Reinier Kraakman, *Toward Unlimited Shareholder Liability for Corporate Torts,* 100 YALE L.J. 1879 (1991) (explaining the economic effects of limited corporate liability). *See also* Janet C. Alexander, *Unlimited Shareholder Liability Through a Procedural Lens*, 106 HARV. L. REV. 387 (1992).

94. Jost, *supra* note 4.

95. Alan Schwartz, *Products Liability, Corporate Structure, and Bankruptcy: Toxic Substances and Remote Risk*, 14 J. LEGAL STUD. 689, 709 (1985).

96. SHAVELL, *supra* note 89, at 10.

97. *See* Mattias K. Polborn, *Mandatory Insurance and the Judgment-Proof Problem*, 18 INT'L REV. L. & ECON. 141, 141 (1998).

98. SHAVELL, *supra* note 89, at 198.

presence of statutory retroactive and joint and several liabilities, which interferes with insurers' ability to predict or limit the range of accidents covered. In such circumstances, Shavell recommended prohibiting insurance or, at most, allowing partial coverage involving high deductibles so as to minimize moral hazard.[99] Forbidding insurance, argued Shavell, would increase the risk enterprises need to bear. To ensure that victims receive compensation, he favored victims retaining first-party insurance to protect themselves from accidents and to provide compensation in case of personal injury or property damage. First-party insurance is seen as offering a more efficient means (due to lower transaction costs) of compensation for injured persons than third-party liability insurance.[100]

The Shavell model can be criticized for its overemphasis on the deterrence and risk-spreading functions of insurance at the expense of compensation goals. By restricting investment and reducing compensation payable to victims, Polborn argues "it is never possible to increase welfare by prohibiting the voluntary purchase of insurance."[101] Leiter suggests there are situations in the environmental context in which liability insurance is socially desirable despite imperfections in insurance markets.[102] She argues that the compensation function deserves greater weight because "many environmental accidents involve losses to the commons rather than to private individuals, and no suitable analog (sic) to first-party insurance exists for such public losses."[103] Furthermore, "even in situations involving only private victims, first-party insurance may prove an inefficient and ineffective source of compensation for victims of environmental losses."[104] An additional reason for compulsory liability insurance may exist where responsible parties lack adequate information to correctly determine whether they should seek insurance coverage.[105] There is empirical evidence regarding people's distorted perception of environmental risks, especially individuals' underestimation of the

99. *Id*. chs. 8-10.

100. Steven Shavell, *On the Social Function and the Regulation of Liability Insurance*, 25 GENEVA PAPERS ON RISK & INS. – ISSUES & PRAC. 166, 178 (2000).

101. Polborn, *supra* note 97, at 141-42.

102. Amanda C. Leiter, *Environmental Insurance: Does it Defy the Rules?,* 25 HARV. ENVTL. L. REV. 259, 261 (2001).

103. *Id*.

104. *Id*.

105. MICHAEL G. FAURE & DAVID GRIMEAUD, FINANCIAL ASSURANCE ISSUES OF ENVIRONMENTAL LIABILITY 148 (2000).

probabilities or scale of low probability environmental disasters.[106] Underestimation of risks can lead to a lower than socially optimal level of insurance.

B. *Organizing Mandatory Environmental Insurance*

Mandating insurance before enterprises engage in environmental liability-generating activities is therefore one significant alternative to the constraints of current voluntary approaches.[107] Provided the moral hazard problem can be controlled, compulsory insurance offers the prospect of a better compensation safety-net for economic injuries and environmental damage, while possibly maintaining the deterrence effect of liability at least as well as in the circumstances where the Shavell model suggests that insurance be proscribed.[108] The principle of compulsory insurance is well established in many sectors of the economy, including: occupational liability; automobile liability; aircraft operators and carriers' liability; and professional indemnity for certain vocations.[109]

McDonald argues mandatory insurance offers several advantages over other fiscal options to ensure environmental harms can be addressed.[110] Obliging all operators to obtain insurance would minimize the problem of adverse selection. As both high- and low-risk firms must have insurance (although with individual premiums) a larger pool from which payments may be made is created. In due time, the larger pool could also reduce the cost of such insurance. Companies may also prefer the insurance option for meeting mandatory financial responsibility regulations because it frees up company funds for other purposes that might not be available where bonds or other indemnities are availed.[111] By assigning prices to risk in competitive markets, insurance may provide more accurate assessments than other financial tests. Insurance companies are far more likely to give meticulous

106. *See* JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES (D. Kahneman, et al., eds., 1982) (describing risk perception and bias); T. McDaniels, et al., *Characterizing Perception of Ecological Risk*, 15 RISK ANALYSIS 575 (1995).

107. *See generally* J. Cowell, *Compulsory Environmental Liability Insurance*, *in* INSURANCE OF ENVIRONMENTAL DAMAGE 327 (H. Bocken & D. Ryckbost eds, 1991); Feess & Hege, *supra* note 4.

108. Kehne, *supra* note 18, at 403.

109. OECD, INSURANCE REGULATION AND SUPERVISION IN OECD COUNTRIES, ASIAN ECONOMIES AND CEEC AND NIS COUNTRIES 22-23 (1999).

110. McDonald, *supra* note 63, at 6.

111. Peter List, *Insuring the Spill*, GLOBAL FIN., Sep. 2000, at 55, 56.

attention to risk portfolios than would shareholders and managers of non-financial enterprises.

Compulsory liability insurance schemes complemented by the statutory provision for direct action against the insurer can facilitate the enforcement of claims to the benefit of victims.[112] Availability of direct action means an insurer cannot avoid payout by reason that their client was negligent or otherwise breached conditions of insurance. Direct action provisions can also stimulate deterrence because of the strong incentives on the part of guarantors to police the activities of insureds. For example, Superfund's financial responsibility rules require that guarantors of the assurance be liable for direct action.[113] Typical defenses of fraud or misrepresentation by the insured cannot be used to deny coverage, and the only defense available to a guarantor under Superfund is that the loss was caused by the "willful misconduct" of the insured.

Under compulsory insurance, enterprises considered by insurers as too risky for coverage would be compelled by financial responsibility stipulations either to adopt appropriate safety measures or suspend operations. Company adherence to international environmental standards (e.g., ISO or EMAS) could provide a convenient proxy for measuring environmental safety with respect to processes and plants.[114] Insurance companies are often better placed than investors or other financial institutions to monitor corporate environmental performance. Corporate participation in approved environmental management systems (EMSs) would facilitate insurers' monitoring efforts. Should, however, insurers decline coverage, firms wishing to continue operations would be compelled to appeal for government intervention in the form of waiver of the applicable financial responsibility requirements (FRRs). Because mandatory environmental insurance may have an adverse economic impact on industry, particularly small and medium sized enterprises unable to afford insurance, regulators would need to undertake some form of risk-benefit analysis on behalf of the community to determine whether the benefits of the activity are sufficient to justify waiving the FRR.

---

112. The term "direct action" means a party suffering injuries or damage for which another is legally responsible may bring suit against the other's liability insurer without joining or first obtaining a judgment against the insured.

113. 42 U.S.C. § 9608(c)(1-2).

114. On the emerging relevance of environmental management system standards to the financial services sector, see Bettina Furrer & Hugenschmidt, *Financial Services and ISO 14001*, GREENER MGMT. INT'L, Winter 1999, at 32.

In addition to providing the basis for the insurance policy, environmental site surveys under mandatory insurance offer various benefits. Kehne discovered that "insurers' advantage over individual insureds in collecting and analyzing risk data, and in researching and developing safety standards often outweighed any attenuation of safety incentives that resulted from the pooling of risks."[115] While individual insurers may lack the resources and expertise to undertake detailed risk assessment, Faure and Grimeaud suggest that insurers can carry out joint research and so achieve economies of scale.[116] Surveys undertaken can disclose areas of risk which are effectively uninsurable, but which may be removed or mitigated by investment in technological improvements. Secondly, by facilitating accurate specification and description to underwriters of the risks to be insured, an environmental survey could eventually assist reduction of premiums and minimize the chance of non-disclosure that insurers' would otherwise exploit in seeking to reject claims. Furthermore, the environmental survey could provide a basis for formulating corporate safety procedures and contingency plans for pollution incidents.

In terms of the design of a CGL policy for a compulsory insurance regime, it may be appropriate to exclude gradual or expected pollution, as these are generally reducible risks that can often be avoided by more care on the part of the insured, but unexpected events that are sudden and accidental (from all parties' perspectives) should be covered. In defining the parameters of the "sudden and accidental" exception, Leiter argues that it should be interpreted "to restore coverage only for pollution events that are unexpected, abrupt and short-lived because allowing coverage of slower events (even if unexpected) fosters moral hazard, as insureds are more likely to escape liability or to be insolvent by the time suit is brought."[117] Further, government may have to allow insurers to choose between occurrence and claims-made coverage. Forcing insurers to offer occurrence-based coverage in the context of highly uncertain pollution risks would probably be unacceptable to the industry.[118] The acceptability of occurrence-based coverage will depend on improvement in relevant scientific information and stabilization of liability rules so that insurers can properly assess and price environmental risks they take on. Uncertainty regarding some environmental risks means they

115. Kehne, *supra* note 18, at 407.

116. Faure and Grimeaud, *supra* note 105, at 98.

117. Leiter, *supra* note 102, at 308.

118. *Id*. at 141.

cannot be insured as readily as long-established mass risks, such as in relation to automobile insurance or employers' liability.

Introduction of mandatory insurance, of course, changes the nature of the relationship between insurer and insured. By casting insurers as surrogate regulators it would affect a variety of aspects of the insurance industry's traditional role. As mandatory insurance amounts to a license to operate, "the insurer would become, in effect, a watchdog over its customers rather than a service provider."[119] At a minimum, insurers would check to see if clients are properly licensed, and coverage would expect to be conditional upon the insured's compliance with the license operating conditions. Many insurance policies already deny coverage where there is a violation of applicable regulations.[120] Optimal care however could be higher than mere regulatory compliance, in which case insurers need means to promote superior levels of safety among clients, such as offering incentives for subscription to relevant third-party EMSs that provide for systematic auditing and reporting of environmental performance.

A further consequence of making insurers surrogate regulators would be to dramatically enhance their involvement in the assessment and management of their insureds' risks.[121] Access to all relevant information to assess corporate environmental performance of course is crucial if insurers are to be effective risk managers. Insurers are *prima facie* strategically well placed to gather information and engage in risk management, and reflect these costs through premium differentiation. Major environmental insurance providers in the United States now often include environmental engineering support, serving to improve project supervision and review project data relevant to underwriting decisions.[122] But insurers' ability and willingness to monitor for risky activities can be limited in a variety of ways.[123] Unlike voluntary insurance situations where future coverage can be denied, the cooperation of the insured cannot be readily guaranteed under a compulsory liability insurance model. Further, because environmental risk analysis is costly, the calibration of premiums according to risk cannot be pursued indefinitely, but only to the point where the marginal gains

119. Freeman and Kunreuther, *supra* note 56, at 102.

120. Faure and Grimeaud, *supra* note 105, at 125.

121. *Id*. at 142.

122. U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, ENVIRONMENTAL INSURANCE FOR BROWNFIELDS REDEVELOPMENT: A FEASIBILITY STUDY 23 (1997).

123. *See* Steven A. Kunzman, *The Insurer as Surrogate Regulator of the Hazardous Waste Industry: Solution or Perversion?*, 20 FORUM 469, 477 (1985) (detailing the inspection and risk assessment activities of insurers).

from differentiation equal the marginal cost of further analysis and monitoring.[124] Moreover, where an insured considers it is concluding a period of insurance coverage, there may be no incentive to avoid incurring higher premiums. Monitoring can also be complicated where environmental protection insurance does not comprise a plain, unitary contract, but, as is often the case, involves complex arrangements of interconnected covers with reinsurance support.

There are, on the other hand, several ways these information deficits and monitoring weaknesses can be mitigated. The problem of multiple, overlapping covers can be managed through the development of new integrated insurance policies, as has occurred in Dutch insurance markets.[125] Secondly, the effectiveness of insurers' environmental site surveys could be supplemented with government-supplied data such as that generated through corporate environmental reporting rules and other forms of compulsory reporting by business.[126] Insurers could also rely on compliance with third-party EMS certifications as evidence of clients' environmental performance. The ISO standards, EMAS and industry-generated codes of practice provide a wealth of surrogate environmental standards and information that insurers can avail in assessing the risks of prospective policyholders.[127] There is already evidence that insurance markets are acknowledging firms' accreditation to EMSs when underwriting and determining coverage; discounts of up to 30% on EIL insurance have been reportedly offered to chemical manufacturers subscribed to the Responsible Care voluntary program.[128] Beyond premium discounts, insurers could possibly make coverage contingent on adherence to relevant EMSs.[129]

To cast insurers into active risk management also requires equipping them with the means of directly influencing their clients'

---

124. Martin T. Katzman, *Societal Risk Management through the Insurance Market, in* MARKET-BASED PUBLIC POLICY 21, 30 (Richard C. Hula ed., 1988).

125. Michael Faure, *Environmental Damage Insurance in the Netherlands,* 10 ENVTL. LIABILITY 31, 37 (2002).

126. *See, e.g*, Elizabeth Ann Glass Geltman, *Disclosure of Contingent Environmental Liabilities by Public Companies under the Federal Securities Laws*, 16 HARV. ENVTL. L. REV. 129 (1992) (describing disclosure requirements under the U.S. securities laws).

127. *See How to Open Pollution Coverage Market - Make Policy Contingent on Obeying Environmental Code*, INS. ADVOCATE, Apr. 5, 1997, at 10.

128. *See* Ellen Rafferty, *Participants in Responsible Care Offered an Insurance Discount*, CHEMICAL ENGINEERING, Feb. 1998, at 48; David Hunter, *Responsible Care Earns Discount on EIL-Premiums*, CHEMICAL WK., July 23, 1997, at 11.

129. *See* Christopher Winans, *Setting the Standard*, BEST'S REV.: PROP./CASUALTY INS. ED., Apr. 1997, at 32.

behavior. Insurers need possession of suitable sanctions to control recalcitrant businesses, at a minimum non-renewal of coverage where there has been a breach of prescribed safety measures. Cancellation would compel the insured to return to the insurance market to buy new coverage from another insurer who, doubtless, discovering the reasons for the original coverage cancellation would charge a higher premium. Compulsory insurance markets will ultimately need government assistance and intervention to have credible sanctions. In other insurance contexts, for example, government penalties are imposed where individuals fail to carry compulsory insurance such as the case with third-party automobile insurance.[130] But compulsory environmental insurance would likely be more contentious because of its ability to restrict major development projects. In Germany, for instance, a government proposal to amend the Environmental Liability Act 1990 to enroll insurers as an alternative or replacement to conventional development authorization procedures has so far not been implemented.[131] The German proposal for a combination of liability insurance and independent expert assessment/approval for new facilities has been resisted not merely because insurers wished to avoid a policing role, but also out of fear of being drawn into political debates regarding development preferences.[132] Compulsory liability insurance is likely to be more acceptable to relevant stakeholders where the regulatory system retains other options for demonstrating financial responsibility, such as positing of bonds and passing regulatory financial tests, so that new, innovative industries posing uncertain risks would not be stymied by insurance barriers.[133]

The ability of insurers to deny claims because of fraud or other violations of the insurance contract is the most basic sanction insurers possess in ordinary insurance markets. But this can conflict with allowing direct action against insurers to facilitate the enforcement of victims' claims. Denying coverage for losses caused by breach of safety standards would be at odds with the compensation function of insurance systems.[134] Compensation to third-party victims of pollution would be sacrificed in the quest for deterrence. Yet, by allowing en-

130. *See, e.g.*, *Velella Omnibus Auto Insurance Reform Bill Would Sharply Increase Uninsured Penalties*, INS. ADVOC., Jan. 11, 1997, at 4.

131. Don L. Kirk, *German Industry Ill at Ease with EIL*, 30 BUS. INS., May 27, 1996, at 17.

132. *Id*.

133. Lynn M. LoPucki, *The Death of Liability*, 106 YALE L.J. 1, 88-89 (1996).

134. Kenneth S. Abraham, *Cost Internalization, Insurance, and Toxic Tort Compensation Funds*, 2 VA J. NAT. RESOURCES L. 123, 143-44 (1982).

forcement of claims despite fraud, insurers could no longer be "assured of the cooperation of their insureds in determining insurability and rating risk."[135] One compromise solution proposed would be to invalidate exclusions as between the insurer and insured's victims but allow such exclusion between the insurer and the insured.[136] Furthermore, the imposition of criminal sanctions for fraud or failure to cooperate in the processing of claims would strengthen the provision of insurance.

Competitive pressures that encourage reduced coverage and reduced premium fees could also undermine the regulatory effectiveness of compulsory insurance regimes unless there is corrective government intervention. Not only would insureds tend to seek the cheapest insurance policies that enable them to meet FRRs, but insurers, competing for business on the basis of price, would also tend to offer the minimum coverage allowable because the fewer injured persons claiming against insurers the lower the insurance premiums. As LoPucki sees it, "unscrupulous insurers might trade off enforcement of expensive loss prevention rules for minor increases in the premium."[137] Because compulsory liability insurance is primarily for the benefit of the injured third-party, the shift to a compulsory insurance system would require insurance regulators to intervene and limit market-produced exclusions and exceptions that could undermine the regime's goals.

Finally, there has also been debate about the appropriateness of statutory financial caps on liability insurance coverage. Leiter argues that cleanup damages that cannot be estimated with reasonable accuracy arguably should be either capped or excluded from coverage.[138] The E.U. *White Paper on Environmental Liability* also suggested that there should be a statutory financial cap on environmental damages so as to reduce uncertainty and thereby enhance the viability of insurance markets.[139] But besides detracting from the compensation and deterrence aims of environmental liability, Faure and Grimeaud believe caps are often unnecessary since "it is usually not the amount of the expected damage that causes uninsurability of risks, but more often the unpredictability of certain risks."[140] If insurability problems

135. LoPucki, *supra* note 133, at 82.
136. Abraham, *supra* note 134, at 145.
137. LoPucki, *supra* note 133, at 80.
138. Leiter, *supra* note 102, at 308.
139. EUROPEAN COMMISSION, *supra* note 84.
140. FAURE & GRIMEAUD, *supra* note 105, at 165.

exist, they suggest that obligations to insure should be up to a certain level of coverage, but with the liability of the injurer unlimited, as is the case already in regard to insurance requirements for nuclear power facilities.[141] The advantage with this approach is that "the incentives for care-taking by the injurer remain at least partially into (sic) existence because the injurer is still exposed to risk in case the magnitude of the harm would be higher than the insured amount."[142]

C. *Implementing Mandatory Environmental Insurance*

Requirements for environmental liability insurance typically feature within the financial responsibility rules contained in pollution control legislation. Financial responsibility is commonly required in relation to activities where the size of potential environmental damage costs is large compared to the value of the firm generating risks, especially in the case of latent environmental risks that may not manifest for many years, and for ensuring the availability of financial resources for site restoration and post closure monitoring and maintenance. Financial responsibility is often at the discretion of the regulator; for example, under Britain's Environmental Protection Act 1990, in considering whether the prospective license holder is a "fit and proper person,"[143] the Environment Agency is to consider whether the holder must make "financial provision adequate to discharge the obligations arising from the license."[144] Besides insurance, FRRs may be satisfied by, *inter alia*, lodgement of a performance bond, self-insurance (involving demonstration of corporate financial strength) and financial guaranty (involving an indemnity agreement with another firm). Insurance tends to be regulators' preferred FRR as it requires less administrative oversight than self-insurance and financial guaranty, and better ensures future cost recovery. Compulsory insurance has been long established in various countries in relation to nuclear facility liability and oil pollution liability, and is increasingly required in the context of handling hazardous materials and ordinary pollution emission licensing.[145]

---

141. *See generally* Michael Trebilcock & Ralph A. Winter, *The Economics of Nuclear Accident Law*, 17 INT'L REV. L. & ECON. 215 (1997).

142. FAURE & GRIMEAUD, *supra* note 105, at 166.

143. Environmental Protection Act, 1990, § 74 (U.K.).

144. *Id*. § 74(3)(c).

145. *See* Ridgway M. Hall, Jr., *The Problem of Unending Liability for Hazardous Waste Management*, 38 BUS. L. 593, 615-617 (1983) (explaining U.S. statutory requirements for environmental liability insurance).

Elaborate mandatory financial responsibility rules exist in the United States. Various environmental statutes impose FRRs on waste managers, landfill operators and other polluters, such as the Resource Conservation and Recovery Act 1976,[146] Superfund,[147] and the Clean Air Act.[148] While these Acts do not require insurance as the financial responsibility option, they have encouraged its use.[149] Licensed operators must typically demonstrate financial responsibility in relation to third-party liabilities, gradual pollution damage and for site closure and after care.[150] Superfund's financial responsibility provisions, which may apply to cargo ships and generators and transporters of hazardous substances, oblige coverage of liability for cleanup expenses and natural resource damages.[151] Not all business operations regulated by Superfund must demonstrate financial responsibility and, significantly, financial responsibility is generally not associated with the controversial hazardous waste site remediation requirements of the Act.

Internationally, there are increasing requirements for environmental insurance or equivalent in treaty law. Thus, the International Convention on Civil Liability for Oil Pollution Damage 1969 obliges ship owners to maintain liability insurance (or other financial security) when carrying cargo that exceeds the specified tonnage.[152] Ship owners' liability backed by a compulsory insurance system is also provided for in the 1996 International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea.[153] Both conventions provide for environmental damage to be compensated where it is related to restoration measures. International treaties governing liability for nu-

146. 42 U.S.C. §§ 6901-87 (1994).

147. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601-9675 (1994).

148. 42 U.S.C. §§ 7401-671 (2001).

149. *See* Martin T. Katzman, *Pollution Liability Insurance and the Internalization of Environmental Risks*, 5 POL'Y STUD. J. 614 (1986).

150. Jonathan R. Nash, *Environmental Law: An Economic Approach to the Availability of Hazardous Waste Insurance*, 1991 ANN. SURV. AM. L. 455, 460.

151. 42 U.S.C. § 9608 (1994); *see also* Leslie Cheek, *Risk-Spreaders or Risk-Eliminators? An Insurer's Perspective on the Liability and Financial Responsibility Provisions of RCPA and CERCLA*, 2 VA. J. NAT. RESOURCES L. 149 (1982).

152. International Convention on Civil Liability for Oil Pollution Damage, Nov. 29, 1969, art. VII. 973 U.N.T.S. No. 3.

153. May 3, 1996, 35 I.L.M. 1406.

clear technologies also require that operators of plants maintain insurance (or other financial security).[154]

Although there is increasing interest among some E.U. member states for compulsory environmental insurance mechanisms, this option did not feature strongly in the European Commission's *White Paper on Environmental Liability*.[155] The Commission acknowledged that insurance regimes could be an important lever for improved environmental performance, but reasoned that a mandatory regime depended on improved "qualitative and reliable quantitative criteria for recognition and measurement of environmental damage."[156] It recommended "*the EC regime should not impose an obligation to have financial security*, in order to allow the necessary flexibility as long as experience with the new regime still has to be gathered. The provision of financial security by the insurance and banking sectors . . . should take place on a voluntary basis."[157] While some insurers have indicated their willingness to cover a liability regime along the lines proposed by the *White Paper*,[158] others oppose compulsory insurance partly because of expectations to cover uncertain environmental damage costs.[159]

Regarding existing national systems, Germany's Environmental Liability Act 1990[160] provides for compulsory environmental liability insurance for certain hazardous industries up to specified coverage levels, although as noted earlier this scheme has not yet been implemented.[161] The Danish Contaminated Soil Act 1999 obliges owners of large oil tanks to take out insurance against potential oil contamination liability costs, up to a limit of DKK 2 million.[162] Both Sweden and

154. Convention on Third Party Liability in the Field of Nuclear Energy, July 29, 1960, art. 10, 956 U.N.T.S. 251; Vienna Convention on Civil Liability for Nuclear Damage, May 21, 1963, art. VIII, 1063 U.N.T.S. 265.

155. European Commission, *supra* note 84.

156. *Id*. § 4.9.

157. *Id*.

158. Chris Clarke, *The European Commission's White Paper on Environmental Liability*, 3 INT'L J. INS. L. 188, 203 (2000).

159. *See, e.g.,* GESAMTVERBAND DER DEUTSCHEN VERSICHERUNGSWIRT-SCHAFT, SUBMISSION TO THE WHITE PAPER ON ENVIRONMENTAL LIABILITY: SUMMARY OF COMMENTS (June 2000), *available at* http://europa.eu.int/comm/environment/wel/main/commentator_detail.cfm?n_cmt_id=503.

160. Umwelthaftungsgesetz vom 10 Dez. 1990 [Environmental Liability Act of Dec. 10, 1990], GERMAN FEDERAL GAZETTE, Part I, 2634 [hereinafter Environmental Liability Act (Germany)].

161. Environmental Liability Act (Germany) § 20.

162. Clarke, *supra* note 45, at 32.

Finland have established pollution cleanup funds, financed by compulsory insurance payments for high-risk operations, to finance the restoration of orphaned sites and compensate personal injury and property damage where the liable party is unknown or insolvent.[163] At a regional level, there is already provision for mandatory insurance in the 1993 Council of Europe Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment,[164] and the E.U. Regulation of 1993 regarding the monitoring and supervision of shipments of waste also mandates insurance or other financial security to cover any damage.[165]

While existing practice does not suggest that mandatory environmental liability insurance is a well developed feature of environmental law systems, general financial responsibility requirements are generally well accepted and stakeholders' resistance to mandatory insurance can perhaps be understood partly in terms of unfamiliarity with this option. Before concluding, it is appropriate to examine briefly a few other insurance-type options.

V. OTHER ENVIRONMENTAL INSURANCE OPTIONS

A. *First-party Victim Insurance*

An alternative to third-party liability insurance is first-party insurance, already widely used in industrial countries in relation to personal injury compensation in healthcare and social security contexts. First-party insurance involves compensation being awarded directly by the insurer to the victim. The demand for first-party insurance will increase where fault-based liability standards prevail since the injurer will in theory take due care to avoid having to pay compensation to harmed third parties.[166] By contrast, victims will be compensated fully under a strict liability standard, and so risk adverse injurers will seek third-party liability insurance to meet their expected liabilities. A few commentators see first-party victim insurance as a superior alternative to mandatory liability insurance in a number of contexts.[167]

---

163. In the case of Sweden, see Swedish Environmental Code 1999, ch. 33. For Finland, *see* Environmental Insurance Act 1999 *as cited in* Pekka Vihervuori, *Finland, in* 1 YEARBOOK OF EUROPEAN ENVIRONMENTAL LAW, 477, 481 (H. Somsen et al. eds., 2000).

164. Art. 12, 32 I.L.M. 480 (1993).

165. Council Regulation 259/93 of 1 Feb. 1993 on the Supervision and Control of Shipments of Waste within, into and out of the European Community, art. 27(1), 1993 O.J. (L 30) 1.

166. FAURE & GRIMEAUD, *supra* note 105, at 136.

167. Shavell, *supra* note 100.

The advantages of first-party insurance are that the insured victim can arrange insurance protection that perfectly matches their desired extent of insurance coverage. Because insurers can more readily obtain information regarding victims' risk profiles and monitor their risk exposure, insurers are able to achieve better risk differentiation and so control the problem of adverse selection.[168] With third-party insurance, the definition of risk is harder because the insured is seeking coverage against liability of the insured to another, compared with first-party insurance where the insured is seeking coverage against loss or damage sustained by itself.[169] Third-party liability insurance also poses greater uncertainties to insurers because of changing judicial interpretations of applicable liability standards.

Concerning environmental damage, however, there appear to be two major drawbacks with first-party insurance. Firstly, many environmental accidents may involve damage to biodiversity and other ecosystem components for which there may be no individual harmed party able or willing to assert losses. Secondly, even where private victims are present, first-party insurance may be an inefficient means of compensating victims of environmental damage.[170] So often the cheapest solution may be to remove the cause of the pollution, instead of indefinitely compensating individual victims. One or a few polluters can usually much more cheaply organize to undertake a cleanup of contaminated land than a number of unrelated individual victims facing higher transaction costs and less information about the problem. Furthermore, because the polluting companies may also be aware of contamination dangers well before they harm third parties, it usually will be more efficient for the polluter to control the pollution before third-party injuries arise. It has also been suggested that companies may be able to stem pollution risks through relatively inexpensive improvements, such as adoption of new emission control technologies. Overall, first-party insurance appears anathema to the polluter pays principle and does not offer incentives for polluters to change their behavior.[171]

There could, nevertheless, be advantages in devising insurance products that combine first- and third-party coverage. Some commentators regard the Dutch environmental damage insurance policy as such an innovative approach that overcomes some of the potential

168. *See generally* Priest, *supra* note 60.

169. FAURE & GRIMEAUD, *supra* note 105, at 172.

170. *See* Leiter, *supra* note 102, at 313-14.

171. *Id*.

drawbacks of separate first-party and third-party insurance.[172] The Dutch Insurance Association offers integrated coverage for soil and water pollution that is sudden or gradual, which occurs both on and from the insured site. Coverage is provided whether or not the insured is liable for the pollution, with the trigger being the insurance policy. Protection is offered to both the insured's site and harmed third parties. Because coverage does not flow from tort law, compensation to victims can be quicker with reduced transaction costs. Although the insured remains in theory fully liable, because third-party beneficiaries of the policy can claim directly against insurers there is less need to resort to the courts to obtain relief unless the insured's level of coverage is inadequate to meet claims. Although the policy is not compulsory in the Netherlands, industry is reported to have shown greater interest in it than traditional liability insurance options.[173]

B. *Mutual and Self-insurance Schemes*

Other options are mutual and self-insurance schemes. Self-insurance schemes have recently grown at the expense of the insurance market controlled by commercial liability insurers. Following the United States's insurance litigation explosion, escalating premiums and coverage unavailability contributed to an increasing preference for insuring with a "captive" insurer owned by the policyholder to provide insurance to the owner alone.[174] In effect, captives are not true insurance as there is no risk spreading and instead they amount to a mechanism for building up reserves for future contingencies using the tax advantages offered by captives.[175] There is also no guarantee that the reserves would be quarantined for meeting future environmental liabilities. Self-insurance as such is considered an inadequate basis for meeting FRRs as the reserve "will simply be considered as one of the assets of the company" open to the claims of creditors.[176] Self-insurance is also unviable for SMEs lacking substantial financial resources.

---

172. *See* FAURE & GRIMEAUD, *supra* note 105, at 184-88.

173. *Id*. at 185.

174. *See* PAUL A. BAWCUTT, CAPTIVE INSURANCE COMPANIES, ESTABLISHMENT, OPERATION AND MANAGEMENT 3-4, 8-13 (1991); *see also* Robert D. Hogue, *The Growing Captive Business*, INS. ADVOC., Jul. 17, 1999, at 38 (discussing relevant developments in the U.S.); *Do-it-Yourself Insurance*, ECONOMIST, Dec. 3, 1994, at 19 (focusing on a few European companies).

175. FAURE & GRIMEAUD, *supra* note 105, at 177.

176. *Id*.

Alternatively, polluters may seek to collectively organize coverage through niche "risk retention groups" that function like mutual insurers.[177] Their communal structure and self-interest in minimizing risks makes mutual insurance associations relevant to safety and environmental regulation.[178] The mutuality means that the insurance paid by one member depends on the claims by all other members of the groups. Because of this relationship, it has been argued that mutual insurance clubs create a form of "moral economy amongst members" whereby "it is in the interests of each member for all other members' claims to be as low as possible."[179] Further, mutual insurance arrangements have the advantage that profits from the mutual fund flow back to the insured participants, and reduced claims feed reduced premiums. Under a mandatory financial responsibility regime, government-approved mutual insurance pools could be an alternative to commercial insurance.

The most advanced mutual insurance pools exist in the shipping[180] and nuclear power sectors.[181] The shipping industry, for example, is subject to extensive compulsory insurance requirements principally in relation to the risk of oil spills.[182] The vast majority of the world's shipping by tonnage is controlled by mutual nonprofit arrangements whereby ship owners pool their third-party liabilities. Ship owners obtain liability insurance through their membership in the so-called Protection and Indemnity (P&I) clubs.[183] The P&I clubs have sought to minimize problems of moral hazard and adverse selection through recruitment of managers to control admission, set premiums to reflect the risks of each member and handle claims. Further, to reduce the scope for substandard ship owners to transfer freely between clubs in the search for lower premiums and softer standards, the major P&I groups have forged a mutual structure known as the

177. Michelle Baurkot, *Into the Pool*, BEST'S REV.: PROP./CASUALTY INS. ED., Apr. 1998, at 47.

178. *See* Paul Bennett, *Mutuality at a Distance? Risk and Regulation in Marine Insurance Clubs*, 32 ENV'T & PLANNING 147 (2000).

179. Paul Bennett, *Mutual Risk: P&I Insurance Clubs and Maritime Safety and Environmental Performance*, 25 MARINE POL'Y 13, 15 (2001).

180. *See* Joseph E. M. Hughes, *Safety at Sea: A P&I Perspective*, RISK MGMT., May 1997, at 45 (brief history of P&I insurance clubs).

181. ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, NUCLEAR POWER IN COMPETITIVE ELECTRICITY MARKETS 32 (2000).

182. *See, e.g.*, Oil Pollution Act of 1990, Pub. L. No. 101-380, 104 STAT. 484 (U.S.); Merchant Shipping Act 1995, §§ 163-64 (1997) (U.K.).

183. T.G. Coghlin, *Protection and Indemnity Clubs*, LLOYD'S MAR. & COM. L. Q. 403, 405 (1984).

International Group of P&I Clubs, covering some 90 percent of ship tonnage. The Group also offers a broader spread of risk so that large claims can be satisfied.[184] This institutional arrangement therefore ensures that rival clubs have strong reasons to be concerned about the safety standards and performance of other clubs in the Group.

There are, however, weaknesses with the P&I club system, which suggest that this approach may not always be a viable option to compulsory environmental insurance. Because of international variations in ship safety standards, Bennett argues that P&I premiums "may encourage the displacement of substandard ships to routes where the legal risks are not so great" and where compensation payments are lower because "crews employed on substandard contracts have fewer rights."[185] Consequently, the P&I club system may actually encourage inferior standards of shipping because substandard operators may be rewarded with lower premiums.[186] More generally, mutual insurance pools may be unhelpful where enterprises are undercapitalized or potentially insolvent. Potentially liable parties who are not sufficiently solvent may be unable to gain entry to a risk retention group. Perhaps the major disadvantage of such insurance pools is that the diversification of the risk is restricted to the particular collection, whereas commercial insurance can offer much greater specialization and diversification, and, through this, reduced transaction costs.[187] Insurance pools can unravel where managers are unable to efficiently discriminate between the risks of members and price their contributions to the pool accordingly.

Faure and Grimeaud suggest that risk insurance pools are likely to be efficient choices only in relation to risks "so technical and complicated that only the operators themselves can be judged able to monitor the risk and to require preventive measures accordingly."[188] Mutual insurance pools are likely to be most advantageous when commercial insurers are confronted with major new risks for which they lack sufficient experience to evaluate the technical aspect of the risk and when the evolution of such risks is uncertain both technologically and in terms of liability law. In such circumstances, grouping

184. Bennett, *supra* note 179, at 17.

185. *Id*. at 18-19.

186. *See* Paul Bennett, *Environmental Governance and Private Actors: Enrolling Insurers in International Maritime Regulation*, 19 POL. GEOGRAPHY 875, 889 (2000).

187. *See* Edwin Unsworth, *Stern Warning Issued for P&I Clubs' Future*, BUS. INS., Mar. 4, 1996, at 56.

188. FAURE & GRIMEAUD, *supra* note 105, at 196.

an entire market within a pool for a period gives time for devising a suitable product and assembling the capacity required. Unlike typical insurance pricing, mutual insurance pools can be based on an agreement to share losses *ex post*, and so can overcome the need for appropriate actuarial information *ex ante*.[189]

VI. CONCLUSION

This Article has analyzed how insurance markets can contribute to effective environmental risk management, and suggested ways in which some of the constraints to insurance can be overcome. In addition to stressing the importance of clarifying environmental liability standards, this Article has identified benefits from mandating environmental insurance. Risk aversion creates a natural demand for insurance, but its effect is dulled in the case of a judgment-proof enterprise. When an enterprise's potential environmental liabilities exceed its ability to pay for damages, there arises a disincentive to voluntarily purchase full insurance. The result is incomplete environmental cost internalization. Mandatory environmental insurance offers a way of overcoming insolvency threats and meeting the cost internalization demands of strict-liability based standards. The reinsurance sector coupled with insurers' exploitation of the capital markets through catastrophe bonds and similar financial instruments could give insurance markets substantial resources to meet claims under mandatory insurance regimes.

Implementation of a compulsory environmental insurance regime is not without potential difficulties. The acceptability of legislative intervention will depend *inter alia* on the terms on which insurance is made available, including the preventive measures required, specification of the type of pollution and damage covered (e.g., gradual and/or accidental pollution), methods of appraising environmental risks; and the basis of coverage (e.g., claims-made or occurrence).[190] There is also the problem of the status of existing polluting facilities already associated with gradual pollution and historic contaminated lands, which insurers would not wish to be associated with. If insurers are unwilling to take on responsibilities as compulsory insurers, then governments will need to provide financial inducements. Governments could exempt certain environmental liability policies from premium taxes typically applied to insurance transactions. Further,

189. *Id*.

190. Lorvo, *supra* note 30, at 513-515.

rather than blanket requirements for compulsory insurance, environmental regulators should be flexible and able to judge whether insurance or some other financial security should be required on an individual basis taking into account characteristics of the firm, the economic sector and environmental risks involved.

It is important to heed Clarke's warning that insurance cannot be equated with social security. He argues that it is a "misnomer" to assume that by making insurance compulsory all victims can be compensated and damaged environments repaired "without endangering the public purse."[191] Because of inevitable limits to indemnity, deductibles, conditions, exclusions, specific policy periods and triggers, insurance does not amount to a guarantee that an insured's losses will be covered. Other policy instruments such as environmental taxes and direct statutory controls will retain a place in environmental regulatory systems to influence corporate behavior. Moreover, there is arguably a need for a complementary compensation fund to finance environmental restoration and compensate victims where the polluters cannot be identified or sites abandoned by insolvent firms pose a threat to ecological and public health.[192] Proposals for public compensation funds need to be carefully structured to ensure that they do not discourage private cleanups nor undermine environmental law's focus on discouraging production of environmental harms and improper disposal of waste. There is also the problem of determining who should contribute to a compensation fund; to minimize violation of the polluter pays principle, arguably compensation funds should be financed from environmental taxes levied on relevant polluting industries according to the risks they pose.

Despite the uncertainties of the extent to which the insurance market can function as an instrument of environmental governance, it is a sector that will likely evolve in importance through its ability to price environmental risks, encourage precautionary measures and generate funds for environmental cleanup. In recent years, the reduced cost of coverage and lower premiums in most lines of environmental insurance promise wider availability of insurance as coverage becomes more affordable. Since the conditions of insuring environmental risks are constantly changing in the light of improved scientific understanding of hazards, accumulation of loss experience and changes in liability rules, the precise relationship between insurance

191. Clarke, *supra* note 158, at 201.

192. *See* Hubert Bocken, *Complementary Compensation Mechanisms: A General Environmental Fund?, in* INSURANCE OF ENVIRONMENTAL DAMAGE, *supra* note 107, at 425.

and direct regulation will concomitantly change and will need to be revisited.