

May 2010; revised June 2010

Deterring Oil Spills

Who Should Pay and How Much?

Mark A. Cohen

1616 P St. NW
Washington, DC 20036
202-328-5000 www.rff.org

Deterring Oil Spills: Who Should Pay and How Much?

Mark A. Cohen*

Deterring and/or punishing firms that spill oil would seem at first glance to be issues left to the courts and lawyers. Yet, economists have studied the optimal penalty for environmental harms for many years and have a useful framework for analyzing the appropriate sanctions in the case of an oil spill. The optimal penalty literature begins with Gary Becker's (1968) economic analysis of crime. The basic insight of that seminal article is that potential criminals respond to both the probability of detection and the severity of punishment if detected and convicted. Consequently, deterrence may be enhanced by raising the penalty, increasing monitoring activities to raise the likelihood that the offender will be caught, or changing legal rules to increase the probability of conviction. Becker's model ultimately leads to an "efficient" level of crime, whereby the marginal cost of enforcement is equated to the marginal social benefit of crime reduction.

In earlier work, I adopted this model to analyze optimal policies to prevent oil spills (Cohen 1986, 1987). If there were no penalty for spilling oil, firms that produce or transport oil would take into account their private costs of an oil spill, primarily the value of lost oil, damaged equipment, and so forth. They would then do an internal cost benefit analysis and spend more money on preventing oil spills only as long as it was expected to save them money. What this ignores, of course, is the external harm caused by oil spills: namely the damage to third parties (fisheries, tourism, etc.) and to natural resources.

To change the private cost-benefit analysis into a public one, economists would first impose a penalty equal to the harm caused by the spill, both the costs of cleanup and any residual damage from oil that is not cleaned up. When added to the private costs incurred by the party that spills oil (that is, the value of lost oil, costs of litigation and any residual property losses they incur), this aligns the incentives of oil producers and transporters with the social goal of

* Mark A. Cohen is vice president for research and senior fellow at Resources for the Future; cohen@rff.org. He also serves as a professor of management and law at Vanderbilt University.

© 2010. Resources for the Future. All rights reserved. No portion of this paper may be reproduced without permission of the authors.

minimizing the costs associated with oil spills. One complicating factor, however, is that not all oil spills are detected. If this penalty was only imposed on detected spills, firms will not take into account the full costs they impose; they will discount this by the risk that they will be held liable. Economists would instead impose a penalty equal to the harm divided by the probability of detection and punishment. This effectively changes the incentives of private firms from one of pure profit maximization to social welfare maximization. Of course, in the case of very large oil spills such as the Exxon *Valdez* or the BP *Deepwater Horizon*, the probability of detection is one, so the optimal penalty is simply equal to the harm caused by the spill.

Another implication of this model is that there is an optimal level of cleanup, restoration, and containment. In particular, oil should be cleaned up as long as the marginal cost of cleanup is less than the marginal damages caused by an additional gallon of oil spilled. Accordingly, it might make sense to devote a huge amount of resources to protect sensitive coastal areas, while it might not make sense to do the same to oil that is likely to become dispersed and cause little harm to natural ecosystems.

Strict liability versus negligence standards. Oil pollution laws in the United States are largely strict liability offenses. There generally is no need to determine the cause of the spill when determining whether or not damages will be assessed. Instead, the responsible party is strictly liable for all cleanup and damages. From an economics standpoint, this is generally efficient for two reasons. First, a negligence standard requires considerable resources to investigate the cause of the spill and to prove in court that adequate care was not taken to prevent the spill. Second, a strict liability standard has a built-in incentive for firms to invest in better prevention technologies.

Under a negligence standard, there is less of an incentive as firms are only held liable if existing levels of care are not met. One argument in favor of a negligence standard, however, would be the case where the potential penalty from spilling oil is so large that it would bankrupt the firm. Here, firms would gain the benefits of risky behavior but not bear the full costs – and hence would underinvest in prevention. Accordingly, a negligence standard, coupled with increased (but costly) government monitoring, is one solution to potential catastrophic risks such as large spills. (Note, however, that none of the spills we have seen to date come close to risking the financial viability of the firms involved.)

Limits to Liability. The Oil Pollution Control Act of 1990 contains certain limits to liability in the case of an oil spill, although those limits may be breached if there is gross negligence or violations of the law (see “*Deepwater Horizon* and the Patchwork of Oil Spill

Liability Law” by Nathan Richardson). As discussed earlier, this would appear to be an inefficient policy and would lead to inadequate incentives for firms to prevent oil spills from occurring. In the case of offshore oil drilling, the only economic arguments that can be made for limited liability are: (a) there are social benefits from oil drilling that are not captured by the companies involved in drilling, and (b) unlimited liability would result in uninsurable risks that would make drilling too risky. Both arguments have been made from time-to-time. For example, energy security in the United States has often been used as justification for offshore oil drilling, a benefit that oil companies would not internalize, and therefore not consider in their decision calculus.

The role of insurance. Much of the costs of an oil spill are paid for by insurance. Does this create a “moral hazard” problem and thereby reduce the incentive for firms to prevent spills? The answer to that question largely depends upon how the insurance arrangement is structured. For example, an insurance policy that had exclusions for negligence or rule violations maintains the incentive for the firm to take certain precautions, presumably shifting only the risk of purely accidental or natural causes to the insurer. In addition, insurers against such large risks often serve an independent monitoring role (either complimenting or substituting for government enforcement agencies).

By taking on certain risks, insurance companies have the incentive to directly inspect and monitor that preventive activities are taking place. While private insurance might be structured to keep the incentives of oil producers or transporters aligned, public insurance, such as the Oil Pollution Liability Trust Fund, has just the opposite effect. That fund, operating under the authority of the Oil Pollution Control Act of 1990, is funded by a per-barrel tax on oil production. When private-party liability limits are reached—or if the responsible parties are not known or are bankrupt—an additional amount from this fund is used to cover cleanup costs and damages. Since all parties pay into the tax and the fund pays for cleanup regardless of the cause, this reduces the incentive for producers to prevent spills.

The role of firm reputation. An important question is whether firm reputation can play a role in deterring oil spills. Information that a firm has been sanctioned for violating environmental laws may be of interest to shareholders or lenders if the monetary sanction reduces the expected value of the firm and thus its share price or bond rating. It may also give lenders and insurers pause about risking more capital on that particular firm. Other costs might include future debarment from government contracts, targeted enforcement by EPA, and lost sales to green consumers.

Several studies looking at bad environmental news, such as oil or chemical spills or the announcement of civil or criminal enforcement actions, have demonstrated a negative stock price effect. Since stock prices are generally thought to represent the market's best estimate of future firm profitability, if the stock price reduction exceeds the expected cost of penalties and cleanup, this could be attributed to a "reputation" penalty. However, most studies to date fail to find any reputation penalty from environmental violations. For example, Jones, Jones and Phillips-Patrick (1994) studied the impact of the Exxon *Valdez* spill on Exxon's stock price, and estimated a cost to shareholders of \$4.7 billion to \$11.3 billion, within the range of estimates of the ultimate cost of the spill itself to Exxon (see Cohen, "A Taxonomy of Oil Spill Costs: What are the Likely Costs of the Deepwater Horizon Spill?").

The role of criminal law. From a purely economic standpoint, criminal sanctions are perfect substitutes for civil sanctions if they are monetary. A fine is a fine. Yet, we have criminalized the spilling of oil, even the accidental discharge of oil. From an economics standpoint, there are two possible reasons for doing this. First, criminal sanctions can be nonmonetary, including prison time for individual offenders and "probation" for organizations. Second, it is possible that putting a criminal label on behavior is a signal of moral outrage in the community – perhaps having additional negative reputational impacts on those who have been labeled as criminally liable. On the other hand, labeling an accidental discharge of oil a crime might have just the opposite effect, sending a signal that the criminal law is arbitrary and reducing the respect for the law. To date, there is little or no evidence that criminalizing corporate behavior has any effect on firm reputation or deterrence.

References

- Becker, Gary. 1986. Crime and Punishment: An Economic Approach. *Journal of Political Economy*. 78: 169-217.
- Cohen, Mark A. 1986. The Costs and Benefits of Oil Spill Prevention and Enforcement. *Journal of Environmental Economics and Management* 13: 167–188.
- Cohen, Mark A. 1987. Optimal Enforcement Strategy to Prevent Oil Spills: An Application of a Principal-Agent Model with “Moral Hazard.” *Journal of Law and Economics* 30(1): 23–51. April.
- Cohen, Mark A. 1992. Environmental Crime and Punishment: Legal/Economic Theory and Empirical Evidence on Enforcement of Federal Environmental Statutes. *Journal of Criminal Law and Criminology* 82 (3): 1054–1108.
- Cohen, Mark A. 2006. Oil Pollution Prevention and Enforcement Measures and their Effectiveness: a Survey of Empirical Research from the U.S. in *Prevention and Compensation of Marine Pollution Damage: Recent Developments in Europe, China and the U.S.* (Michael G. Faure and James Hu, eds.) Volume in *Comparative Environmental Law & Policy Series*, Kluwer Law International, Eric W. Orts & Kurt Deketelaere (series eds.), pp. 25-59.
- Cohen, Mark A. 2010. A Taxonomy of Oil Spill Costs: What are the Likely Costs of the Deepwater Horizon Spill? RFF Backgrounder. Washington, DC: Resources for the Future.
<http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21168>
- Jones, J.D., C.L. Jones and F. Phillips-Patrick. 1994. Estimating the Costs of the Exxon Valdez Oil Spill. *Research in Law and Economics*. 16: 109.
- Richardson, Nathan. 2010. *Deepwater Horizon* and the Patchwork of Oil Spill Liability Law. RFF Backgrounder. Washington, DC: Resources for the Future.
<http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=21163>