Retroactive Liability or the Public Purse?¹

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Abstract
The article addresses the question of whether responsibility for pollution created in the past should be retroactively applied to firms, or if the costs of cleaning up existing pollution should be financed by the public. We show that making firms liable for retrospective environmental costs can weaken the incentive to take precautions against future environmental costs. This follows since public financing of these costs can lead to greater prospective risk deterrence by allowing firms to more fully internalize the costs of future environmental risks. However, an analysis of existing public financing approaches highlights a set of concerns associated with their practical use.

1. Introduction

Throughout both the developed and developing worlds, accumulated environmental degradation and heightened public concern have triggered a legal and regulatory evolution toward more stringent environmental controls. Environmental reform has both a prospective and retrospective aspect. Changes in law and regulation offer the hope that future economic development and industrial production will be less polluting than in the past. In addition, however, an immediate, practical consequence of new environmental rules is that they assign responsibility for pollution costs that have accumulated over decades of relatively unregulated economic activity.

This article addresses the question of whether responsibility for pollution created in the past should be retroactively applied to polluters and property owners, or if some or all of the costs of cleaning up existing pollution should be financed by the public. The way in which accumulated environmental costs should be borne is a question of significance, if for no other reason than that the costs are huge.²

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The way in which historic environmental costs are assigned varies both across and within countries. For instance, in Germany and Denmark, polluters are not responsible for cleanup costs if their practices were legal at the time of disposal. This places the burden of cleanup, for historic pollution sources, on the public sector. Public financing via state funds is used even more extensively in Central and Eastern Europe where both past and future remediation costs are borne by the state. In contrast, the United States and the Netherlands favor private sector financing. Private sector responsibility is established by making polluters retroactively liable, even if they were in full compliance with applicable law when the pollution occurred. In the United States, an exception to this rule is that the cleanup of leaking underground petroleum tanks is primarily financed through public funds.

Because of the scale of costs, the chosen method of cost allocation is typically controversial. Moreover, the variety of approaches seen in practice around the world suggests that there is no single alternative that is unambiguously most desirable. In the United States, the debate is currently focused on whether CERCLA’s imposition of retroactive liability should be preserved or repealed—an issue which rages 16 years after the statute’s enactment. Political debate over the way to impose historic pollution costs typically focuses on the fairness of the policy and—at least in the United States—on the institutional costs associated with resolving legal claims involving numerous parties. This is a set of issues that we will not focus on in this paper.

Rather, our analysis highlights a connection between the effectiveness of prospective deterrence and the way in which historic environmental costs are assigned. We show that making firms liable for retrospective environmental costs can weaken the incentive to take precautions against future environmental costs. In other words, the way in which past liabilities are treated affects incentives for future risk reduction. Thus, the disposition of historic environmental costs is more than just an institutional and fairness issue. Mechanisms for environmental cost allocation have broader consequences for the efficiency of future environmental decision-making.

The next section presents a simple model to demonstrate the linkage between responsibility for past environmental costs and the way in which future costs are deterred. The section motivates the desirability of public funding for certain, proscribed environmental costs. Section 3 explores the issue of public funding in more detail, highlights dangers associated with the use of public funds, and advocates the desirability of privately demonstrated financial responsibility for prospective risks. Section 4 applies the analysis to evaluate United States policy toward underground petroleum storage tanks—a policy that currently

2 While highly uncertain, estimates of the costs and the frequency of environmental occurrences suggest problems of great social magnitude. For instance, the U.S. Congress estimates a $500 billion cost for the remediation of polluted sites under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) alone (U.S. Congress 1989). Estimates for the costs of cleanup in Central and Eastern Europe run into the hundreds of billions of dollars (Berz and Connolly 1992, 6) and it is estimated that in the newly united Germany alone there are 140,000 potential contaminated sites (Goldstein 1994, 56). Remediation of underground petroleum storage tanks in the United States alone is estimated to cost $240 billion (Environmental Times 1992, 31; Environmental Information Digest 1993).

3 Consider language used by Congressional proponents of retroactive liability repeal to describe the existing system: "[It is] unfair to small businesses, continues EPA’s bureaucracy, and perpetuates the litigation-based fund-raising system that has produced delays, transaction costs and more lawyers, lawyers, lawyers” (The Environment Reporter 1995, 1275).
features public liability financing and financial responsibility. The concluding section extends the analysis to address environmental liability issues arising in developing countries, such as the transitional economies of Central and Eastern Europe.

2. Retroactive Liability and Prospective Deterrence

Belated social recognition of environmental degradation combined with legal and regulatory reforms inevitably present two related, but distinct policy problems. The first is the need to limit the social consequences of pollution accumulated over decades of lax regulation. The second is the creation of policies to deter future pollution.

Consider a model of this situation. Let $L_p$ denote the social cost of past pollution if left unremediated by a representative firm or property owner. This social cost can be avoided through remediation, at a cost of $C$. Assume that in all cases remediation is efficient, so that

$$C < L_p.$$  \hspace{1cm} (1)

This policy problem should primarily be thought of as a public financing issue. Because the decisions which led to the pollution were made in the past, these environmental costs should be treated as given, or sunk. Therefore, the primary focus of this retrospective component of the problem should be on how remediation costs $C$ are best financed.

Firms' ongoing operations also present the risk of additional, future pollution. Assume that the social cost of future pollution is $L_f$ and occurs with a probability $r(s)$, where $s$ denotes expenditures on environmental precaution. Optimal deterrence requires investment in the level of precaution that minimizes

$$L_f + r(s) + s.$$  \hspace{1cm} (2)

Social welfare is maximized if all costs $L_p$ are avoided via remediation and firms are induced to invest $s^*$, the level of precaution that minimizes (2).

The effective remediation of historic pollution sources and improved deterrence of future risks are conceptually distinct policy challenges. In practice, however, environmental policy reforms typically do not draw a distinction between these two goals. For instance, most countries in the process of environmental policy reform have elected to use a strict liability standard for environmental damages that applies both prospectively and retroactively.\(^4\) Strict liability places the full burden of environmental costs on the pollution generator, regardless of fault. Prospectively, this means that strict liability forces polluters to internalize environmental costs.\(^5\) When it successfully leads to prospective cost internalization, strict liability is well-suited to the welfare goal described in equation (2). However, when applied retroactively strict liability is used, not only to deter future risks, but also as a mechanism to assign responsibility for the costs $C$ of remediating past environmental problems. As we

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\(^4\) While differing substantially in detail and implementation, most developed countries and some developing countries—such as Chile, Russia, and the countries of Central and Eastern Europe—have adopted strict liability standards for environmental damages.

\(^5\) See Landes and Posner (1987) for a history of the development and justifications for the theory of strict liability. Strict environmental liability is also mandated by statute, as in the Superfund amendments.
now argue, the joint application of liability to prospective and retroactive problems is undesirable.

The retroactive application of liability yields no deterrence-related benefit.⁶ The decisions that led to the retroactive liabilities were made years or decades earlier. In fact, retroactive liability can have the perverse effect of reducing the ability of environmental reforms to promote future risk reduction. To understand why, it is important to examine how the potential insolvency of firms affects liability and deterrence.

Strict liability fails to adequately promote deterrence when firms are unable to meet the financial obligations implied by their liability.⁷ In most countries' legal systems, liability claims are considered debts that can be discharged when a firm declares bankruptcy. When firms are "undercapitalized" relative to the scale of harm they may generate, there is the possibility that large-scale liabilities will drive them to insolvency. And because insolvency truncates the internalization of social costs, it weakens the deterrent effect of liability.

Retroactive responsibility for accumulated environmental costs reduces firm asset values. As a consequence, retroactive liability reduces the value that firms seek to protect from future environmental costs. This can mean a weakened incentive to protect against such costs. To see this more formally, let \( A \) denote the net worth of a representative firm, including the value of capital investments, real estate and expected future revenues.⁸ If the firm's liabilities exceed its value \( A \), it is insolvent and will declare bankruptcy. Any liabilities above and beyond the firm's value cannot be recovered by any party.

Now consider the way in which the assignment of retrospective costs can influence prospective deterrence. Assume that liability is strict and retroactive. First note that firms cannot be forced to bear a cost greater than their value \( A \). It follows that if \( A < C \) the remediation of accumulated costs alone will result in the firm's insolvency and hence lead it to not remediate.⁹

If \( A > C \) the firm will remediate. However, the imposition of retroactive liability can reduce liability's prospective deterrent effect. If remediation costs \( C \) are imposed on the firm, then these costs need to be financed either by cash outlays or a stream of debt payments to creditors. In either case the costs \( C \) consume resources and thus reduce the firm's value. A firm with gross value \( A \) has a net value \( A - C \) if it is retroactively liable.

It follows that retroactively liable firms will base their prospective precaution decisions on the net firm value \( A - C \). If \( A - C \) is less than \( L_f \), then the firm does not expect to bear the full social cost in the event that the liability \( L_f \) arises. Specifically, the firm picks \( s \) to minimize

\[
\min (A - C, L_f) : r(s) + s.
\]

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⁶ It might be argued that making the private sector retroactively liable sends a strong signal that future polluting behavior will not be tolerated. But the appropriate mechanism for sending such a signal is meaningful and enforceable prospective environmental law, not the retroactive imposition of costs.

⁷ For analyses which explore this "judgment-proof" problem, see Schwartz (1985), Shavell (1986), and Boyd and Ingberman (1994).

⁸ \( A \) should be thought of as the value of assets that are recoverable—i.e., convertible into payments used to satisfy liability obligations or capable of being used as collateral. \( A \) does not capture less tangible forms of value that are lost in bankruptcy, such as human or firm-specific capital.

⁹ Forced insolvency can entail additional social costs in the form of abandoned capital, lost firm-specific capital, and reduced competition.
Note the truncation of liability costs when $A - C < L_f$. This signifies incomplete social cost internalization and, from a comparison with (2), implies inadequate deterrence. Note that as the magnitude of $C$ increases, so does the magnitude of the truncation. Firms with assets eroded by retroactive liability may not expect to fully internalize future liability costs. In turn, liability can fail as an effective deterrent against future risks.

In contrast, when liability is prospectively strict but not retroactive, the firm's value is not eroded by retroactive remediation obligations. This means that precaution $s$ is chosen to minimize

$$
\min \{ A, L_f \} \cdot r(s) + s
$$

rather than (3). Because $A$ may be smaller than $L_f$ it is still possible that the firm will not completely internalize social costs. However, this inefficiency is less likely and of a smaller potential magnitude than when liability is retroactive.

Firms that expect large retroactive liabilities to ultimately force insolvency pose a significant environmental threat. If the enforcement of remediation is delayed in any way due to an overburdened legal system or delayed regulatory knowledge of polluted sites, those firms that expect to be bankrupt have no incentive to reduce their ongoing pollution. Given the likely prospect of insolvency, it is profit-maximizing for such firms to pollute at will until closure is forced by the imposition of liability or other legal action.

This highlights a benefit of publicly-financed remediation costs. Public financing preserves the economic strength of future polluters and in so doing promotes prospective deterrence. While it may be philosophically, politically, or ethically appealing to “make the polluter pay” retroactively, doing so cannot correct inefficient past decisions. What retroactive liability does unambiguously is consume the assets of firms that are potential future polluters. This weakens liability’s ability to deter. We turn now to questions that arise if accumulated environmental costs are to be borne by the public.

3. Publicly-Financed Environmental Costs

The analysis above suggests that it may be desirable to provide public financing for existing remediation costs when a transition is made to more stringent environmental regulation. During the period of transition, public financing promotes the timely remediation of existing pollution and promotes compliance with the prospective aims of the law. It needs to be emphasized, however, that public financing is not without costs of its own since it involves the creation of pooled environmental funds. In this section, we describe potential difficulties associated with the use of pooled funds for environmental remediation.

First, pooled environmental funds must be financed through either targeted or general taxation. In either case, this taxation is costly to administer and generates deadweight losses. Of course these costs can be compared to the transaction and litigation costs today associated with strict retroactive liability, which are large.\(^\text{10}\) We focus here on the way in which pooled

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funds can create incentive problems that thwart the goal of prospective pollution deterrence. The primary concern with public financing schemes is that they will not in practice draw a clear enough line between historical and prospective environmental damages. While the public financing of historic pollution costs can be beneficial—as argued above—public financing of prospective environmental costs is unequivocally undesirable. This is because prospective public financing creates moral hazard. If liability pools subsidize the costs of future environmental hazards, firms' have an insufficient private incentive to avoid those risks.

As is discussed in Section 4, existing pooled liability funds often fail to draw a distinction between retroactive and prospective costs. By design, funds typically are used as a long-term, rather than short-term financing option. Even if the fund is designed to be short-term, moral hazard is present if there is any uncertainty regarding whether a pollution source was created in the retroactive or prospective period. Typically there will be a significant time lag between the reform of environmental law and the full implementation of remediation strategies.\(^\text{11}\) During this period, efforts must be made to ensure that firms do not inflate the value of remediation costs associated with what were historic pollution sources. Otherwise, newly-created hazards may be claimed as past, and thus be subsidized by public funds. The need to clearly identify existing environmental problems underscores the importance of government risk assessment efforts and capabilities. The ability to assess risks accurately allows the government to limit the amnesty it offers to historic pollution sources. This allows for the benefits of retroactive public financing to be realized, without the prospective moral hazard costs associated with a pool that subsidizes future environmental damage.

Another set of issues arises when pooled funds are used to demonstrate prospective financial responsibility. Pooled funds in principle can provide compensation for victims and a stable and presumably reliable source of funding for remediation. But pooled funds create moral hazard. If prospective liabilities are subsidized by publicly-financed funds, deterrence is weakened. To avoid this problem, prospective liability should be coupled with privately-demonstrated financial responsibility.

Privately-demonstrated financial responsibility can be satisfied through self-insurance or the purchase of liability coverage from private insurance markets. Self-insurance leads to the direct internalization of expected liability costs and therefore induces efficient investment decisions. When financial responsibility is demonstrated through the purchase of third-party insurance, risk-based premiums motivate the same, efficient investments.\(^\text{12}\) Private insurance firms are likely to base premiums on risk reduction programs and the characteristics of technologies in order to avoid adverse selection problems. They may also engage in monitoring activities to detect environmental problems early and minimize cleanup costs. For safety characteristics that are verifiable only ex post, such as maintenance, the insurance contract can be written so that failure to comply with underwriting conditions raises premiums or voids coverage. In general, financial responsibility requirements represent a desirable market-based approach to environmental compliance.

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\(^{11}\) A study of the CERCLA program, for instance, found an average time lapse of more than 10 years between discovery of a problem site and its remediation (Acton 1989, 16).

\(^{12}\) Mandatory automobile insurance is desirable for the same reason. With required insurance, drivers pay premiums based on their driving record. This creates an incentive to take more care in driving. Also, insurance provides compensation for parties injured due to unsafe vehicle operation.
While public liability pools can mimic this function of private financial responsibility, in practice it is less common and in theory less likely. Private insurers provide a form of enforcement by (1) creating the risk-based premium incentives noted above, (2) denying coverage to unacceptable risks, and (3) raising premiums or withdrawing coverage from producers who fail to maintain adequate risk-reducing procedures or technologies. In competitive insurance markets, private insurers will “enforce” standards in this way in order to maximize profit and satisfy shareholders. The public-sector administrators of liability pools do not face the same incentives. Liability pools tend to serve a political function, often as a form of subsidy to the affected industries, and thus are less likely to condition coverage or exclude participation based on poor actuarial risks.

In summary, the optimal policy response to an environmental safety concern where historic liabilities are present involves public provision of funds for the remediation of existing risks, combined with private financial responsibility to guarantee the internalization of future liabilities. This set of policies leads to efficient safety and remediation decisions. In contrast, strict retroactive liability can lead to weakened prospective deterrence. Equally undesirable are long-term public funds which provide coverage for both past and future liability. Such programs weaken the incentive of firms to remediate in a timely manner and make prospectively efficient safety investments.

4. A Cautionary Example: UST Policy

The preceding analysis has emphasized the desirability of publicly-financed retroactive liability costs. In addition, however, we have also emphasized the ways in which public financing can be inappropriately implemented. To further illustrate some of the pitfalls associated with public financing, we briefly describe a United States financing program that deals with the costs of leaking underground storage tanks.

Leaking underground petroleum storage tanks represent one of the most common and serious environmental problems in the United States. Unfortunately, recognition of UST risks was belated and created a retrospective cleanup problem that is ongoing today. This, and the fact that remediation costs are large relative to the assets of a typical UST owner mean that public financing of retroactive remediation costs is desirable. The social costs of tank leaks, which can range up to millions of dollars, can easily dwarf a typical gas station or distributor’s ability to internalize them. Actuarial estimates place the average expected cleanup cost of a tank at between $60,000 and $100,000 (Environmental Information Digest

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13 This may involve inspections or other forms of monitoring over time.
14 USTs are the most common method of petroleum storage for fuel distributors, municipalities, large firms, or any other organization which stores large amounts of fuel. There are approximately 1.4 million such tanks in the United States and Environmental Protection Agency estimates of the fraction leaking have been as high as 35%. The social costs of such leaks are primarily associated with groundwater contamination. The average release is estimated at 600-700 gallons, and 21% of tanks are known to be installed partly or completely under the water table (EPA 1986).
15 In 1984, Exxon paid an out-of-court settlement to residents of East Meadow, New York of between $5 and $10 million to settle a leaking UST claim, while Chevron paid about $10-$12 million to avoid a similar suit in Northglenn, Colorado. Also, in Maryland a 1990 sample of ten sites calculated a per-site cleanup average of $710,000, including $3,000,000 in costs associated with the restoration of one community’s water line (State of Maryland 1990).
Comparing this figure to the gross annual revenues for retail gas outlets, which can be as low as $25,000, makes clear the magnitude of the distributional impact on firms in the industry.

Interestingly, cleanup of UST leaks is the only type of environmental remediation in the United States that is consistently publicly-financed. At least two-thirds of all UST cleanup is paid for with public money (Environment Reporter 1992, 2091). Our analysis suggests that this is desirable, since USTs are commonly associated with small firm ownership. However, the UST program also highlights an important practical danger associated with public financing: namely, that public financing will dilute prospective deterrence.

USTs are regulated under the Resource Conservation and Recovery Act (RCRA). Because of the small firm problem, the act mandates financial responsibility for UST owners/operators. Unfortunately, when the regulations were enacted they did not distinguish between financial responsibility for prospective versus existing remediation costs. Because of the large number of already leaking tanks, the immediate effect was to require insurance for known (certain) remedial costs. The financial impact was expected to be very significant, particularly in the retail gas industry. As a result, there was a tremendous amount of political opposition to the regulations. Ultimately, the Environmental Protection Agency allowed states to establish publicly-financed state guarantee funds (SGFs) to provide tank owners with the financial responsibility required by RCRA.

Political opposition to the original financial responsibility requirement was vociferous. Contributing to opposition was a front page article in the New York Times with the headline “Fuel-Leak Rules May Hasten End of Mom and Pop Service Stations,” that included an estimate by the American Petroleum Institute that the rules would force the closure of 25% of the nation’s service stations (The New York Times, June 19, 1989: A1). Around the same time, Congress backed off of its original mandate to the EPA. Witness the comment by one representative that “It is the small- and medium-sized businesses which will be unable to meet the requirements and, in some cases, will be forced completely out of business... some action may have to be taken by the EPA, and some action may have to be taken by Congress...I am not going to just sit around and watch the small businesses be legislated out of business by the Federal Government” (Representative Richard Ray, Nov. 18, 1987, Hearing before the House Committee on Small Business Subcommittee on Energy and Agriculture, Y4.5m1/2:S.hrg.101-690). Thus, the SGFs serve a dual role: they provide public financing for existing remediation and serve as a source of compensation for prospective risks.

Because they have a long prospective time horizon, SGFs subsidize prospective risks with public funds. This creates moral hazard and reduces the law’s ability to deter future environmental problems. An additional implication is that SGFs have effectively eliminated the opportunity to use private insurance markets to promote risk reduction. Because the costs of SGF coverage are typically much lower than the premiums private insurers would have

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16 RCRA requires UST owners to demonstrate financial responsibility for corrective action and liability occurrence, through insurance or some other form of collateral in an amount typically exceeding $1 million for each tank system.

17 Forty three of these funds currently exist, with most earmarked for the remediation of existing tank pollution sources or for the payment of future liability claims. Under a typical plan, the fund is financed through flat rate taxes on gasoline sales or deliveries—ranging from 1 to 3 cents a gallon.
to charge, there is little incentive for tank owners to purchase even supplementary coverage (Freeman and Kneutheuer, in press). There is a role for private insurance in some states. In New Jersey, for instance, there is currently no SGF, so third-party insurance coverage is the only option for businesses with insufficient assets to self-insure. And the state of Washington requires tank owners to privately insure the first $75,000 of coverage, though the state covers costs above that figure. Also, firms in any state might purchase private insurance to guard against a loss of coverage in the event that their SGF becomes insolvent. Fund insolvency is a real possibility, as described below.

Moreover, financial difficulties plaguing many of the state programs have caused delay in the remediation of contaminated sites. When state funds are insufficient to finance cleanups, backlogs in compensation claims are a strong disincentive to initiating remediation activities. To illustrate a typical fund’s financial difficulties, consider the Michigan Underground Storage Tank Fund (MUSTFA). Adopted in 1988, the program reimburses tank owners for remediation costs and compensation owed to injured third parties. An audit of the MUSTFA program in 1993 found that, during the first two years of the program, total revenues were slightly less than $110 million and expenditures were approximately $250 million. A more detailed analysis of the program in 1995 projected that the existing claims would exceed available cash to pay claims by between $85 and $235 million dollars. MUSTFA has subsequently announced that it has stopped accepting claims because the fund is insolvent. It lost a court battle with the Michigan Petroleum Marketers Association, however, and is now under court order to continue accepting claims, even though it cannot afford to pay for them (Cowans 1995). By the end of 1995, the program had approximately a $50 million deficit. Similar problems have plagued other states, including Illinois, whose fund went bankrupt in 1995.

Our analysis suggests that state guarantee funds are a desirable approach to retroactive liability. Unfortunately, in the case of UST policy the funds provide prospective coverage. This creates moral hazard and undermines private insurance markets which, in combination with financial responsibility, could provide strong incentives for risk reduction.

5. Conclusion

The analysis has emphasized the relationship between the assignment of retroactive remediation costs and prospective deterrence. As we have shown, retroactive liability can weaken prospective deterrence. And while it may be an overstatement to claim there is no economic rationale for retroactive liability, it should be recognized that retroactive liability can never erase or improve past environmental mis-management. Instead, retroactive liability is a cost allocation mechanism. Deterrence is the exclusive province of prospective liability law, perhaps augmented by financial responsibility requirements.

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18 For evidence of the inhibiting effect of state-sponsored coverage on private environmental insurance markets see GAO (1994).
19 SGFs typically spend a greater percentage of their funds on administration and fees than they do on cleanup. Of the $4 million MUSTFA collects monthly, $2.5 million goes to pay for debt service and administrative fees. Illinois is in the same situation, expending 60% of its monthly income on bonds it bought to keep the program alive.
The analysis shows that retroactive liability is likely to be less efficient than public financing when the scale of retroactive remediation costs is large relative to the value of firms bearing the cost. In the developed world, this situation will be predominately associated with "small firm" environmental problems, as in the case of USTs described above. In the less developed world, public financing is more broadly desirable due to the economic weakness of the private sector generally. Heavy industry in the West is associated with "deep pockets." In the developing world, even heavy, capital-intensive industry may be unable to finance remedial expenditures.

To explore the relevance of this analysis in a developing economy context, consider the environmental and economic problems associated with the breakup of the former Soviet Union. Severe environmental degradation—the product of decades of inadequate government attention to environmental conditions—forms the backdrop for privatization and market reform in this region. Significant environmental problems combined with the weakness of industrial enterprise in these countries argues for public, rather than private finance of existing environmental costs. In fact, public financing of environmental expenditures is relatively common in the region. 20 In relation to the West, the former Soviet-bloc economies have less advanced legal institutions, more pollution, and less economic vitality. All of this places a premium on policy approaches consistent with the promotion of privatization and foreign investment. Moreover, because the scale of problems is so large and economic conditions are so weak, policy should be consistent with the need to target revenues toward the environmental hazards that pose the greatest threat.

Assigning retroactive responsibility to newly privatized firms is problematic due to their already tenuous financial position. Moreover, this liability will fail to lead to effective prioritization of cleanups. With retroactive liability, only the most unpolluted properties are sought for development. As a result, resources are devoted to the cleanup of these properties, rather than those most in need of remediation. Foreign investors are likely to be particularly sensitive to the implications of retroactive liability and will tend to avoid investments with uncertain, and potentially large, liabilities attached to them. 21 Politically, the use of public moneys for cleanups in this region is more easily justified than in the West since state ownership and central planning imply that responsibility for existing pollution lies largely with the government.

Even more than in non-socialist economies, the state's omnipresent role in economic decision-making, however, makes it imperative that public funding be understood to be a transitional, rather than permanent financing option. As the role of private property is advanced in these nations, so too should the role of private, prospective environmental responsibility.

In conclusion, we have argued that public financing of retroactive environmental costs can encourage prospective environmental risk reduction. This holds true across a variety of international environmental applications and follows from the fact that retroactive liability can weaken deterrence. As we have shown, retroactive liability can have this effect because firms with assets eroded by retroactive obligations may not expect to fully internalize future

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20 For details on public environmental financing in Central and Eastern Europe, see OECD (1995).
21 See Bell and Kula (1993) and Boyd (1996) for a more detailed analysis of privatization and liability issues in Central and Eastern Europe.
liability costs. These ideas have relevance to debates over the Superfund program in the United States and liability reforms throughout the developed world. The analysis also provides a particularly strong justification for governments in developing countries to finance remediation costs due to past polluting activities. By recognizing that retroactive liability is a cost allocation mechanism and that future losses can be reduced by a combination of prospective liability, financial responsibility, and private sector involvement in risk reduction, countries will be taking a giant step toward reducing both past and future environmental risks.

References


Environmental Information Digest. 1993. (August): 16


