



Economic Analysis of environmental Law : An Introduction

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Édition électronique

URL : <http://journals.openedition.org/economiepublique/1592>

DOI : [10.4000/economiepublique.1592](https://doi.org/10.4000/economiepublique.1592)

ISSN : 1778-7440

Éditeur

IDEP - Institut d'économie publique

Édition imprimée

Date de publication : 15 janvier 2001

ISBN : 2-8041-3634-5

ISSN : 1373-8496

Référence électronique

Michael G. Faure, « Economic Analysis of environmental Law : An Introduction », *Économie publique/ Public economics* [En ligne], 07 | 2001/1, mis en ligne le 07 décembre 2005, consulté le 12 septembre 2020. URL : <http://journals.openedition.org/economiepublique/1592> ; DOI : <https://doi.org/10.4000/economiepublique.1592>

économie publique public economics

Revue de l'**Institut d'Économie Publique**

Deux numéros par an

n° 7 – 2001/1



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Editions De Boeck Université
Rue des Minimes 39, B-1000 Bruxelles

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Imprimé en Belgique

Dépôt légal 2001/0074/226

ISSN 1373-8496
ISBN 2-8041-3634-5

économiepublique sur internet : www.economie-publique.fr

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La revue **économie**publique bénéficie du soutien du Conseil régional Provence-Alpes-Côte d'Azur

ISSN 1373-8496



Economic Analysis of environmental Law : An Introduction

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1 Introduction

The problem of environmental pollution is caused by the fact that some activities which are as such beneficial, such as the production of pharmaceuticals, can cause negative side effects for third parties, the traditional externalities. Precisely because pollution is an externality, the starting point of the economic analysis of environmental pollution is that a decision maker, such as the pharmaceutical company of our example, will not take into account the externality when it takes decisions on e.g. the production level and the investments in measures to avoid pollution, such as the instalment of a water treatment plant. Environmental pollution is considered by many scholars to be the example of an externality (see generally Van den Bergh, 1988, 234).

In the absence of the law there will – in principle - be no incentive for the polluting factory to take in account the pollution it is causing. In other words : in the absence of legal rule the externality will not be internalised. This immediately indicates in a very simple way the economic goal of environmental law : it should lead to an internalisation of the externality by forcing the potential polluter to take into account the pollution it is causing in its decision making process (Faure, 1996). If the law can reach this, the pollution would no longer be external to the activity, but would be internalised e.g. because the potential polluter decides as a consequence of the pollution to invest in abatement techniques. The body of environmental law subsequently deals with the question how environmental law can give incentives to internalise the externality the pollution is causing. A variety of legal instruments can lead to such an internalisation. Economists would traditionally advance the use of taxes to reach this goal, although increasingly attention is paid to market based instruments, such as emissions trading and marketable pollution rights.

In this paper I will try to show how a variety of traditional legal

instruments can be used to remedy environmental pollution. First the crucial question will be addressed whether liability can be considered as an instrument to prevent environmental pollution. This is an important question, since many studies on environmental economics seem to neglect the importance of environmental liability. Liability rules are considered by some also as a market solution and therefore certainly merit attention. However, the traditional public interest criteria for regulation can be used to explain why liability rules alone can not suffice to control the risks posed by environmental harm (2). However, the conclusion that in environmental law some regulatory invention (through licences and emission standards) will be necessary does not exclude the role of environmental liability. Hence the question arises how liability rules and regulation can be used jointly to remedy environmental pollution and how they mutually influence each other (3). Finally, the question will have to be asked which of these liability rules is optimal to internalize environmental risks (4) and a few concluding remarks will be formulated.

Thus this paper on the one hand attempts to show, without fancy economic modelling, how traditional economic analyses (theory of regulation, liability rules) can be used to analyse environmental law. This may provide useful insights to lawyers wondering about the potential use and applications of “law and economics” to environmental law. The concrete application of well known theories to the specific field of environmental law has the advantage that it immediately shows the usefulness of economic theory for legal doctrine and policy. At the same time, a reminder of the classic theories of law and economics may be useful for environmental economists as well who on the one hand some times tend to be overenthusiastic of market based instruments, forgetting some benefits of regulation (mainly information advantages) and sometimes neglecting that liability rules can be considered as a market solution as well.

Turning back to the crucial question of this paper, how the law can contribute to an internalisation of environmental harm, the first crucial question is obviously whether environmental risks should primarily be internalized via regulation or liability rules.

2 Environmental regulation

2.1 Variety of legal instruments

Assuming that, as will be the case in many pollution cases, Coasean

bargaining is not possible because of prohibitive transaction costs¹, the question arises what kind of policy instruments should be used to give incentives to a potential polluter to prevent environmental harm. Traditionally there were three possible instruments which were addressed. First of all it is possible to tax the pollution and thus to use a system of levies or charges, which will give the potential polluter an incentive to reduce environmental harm. Second, it is possible to use the liability system, assuming that the potential polluter will be deterred by the foresight of having to pay compensation to a victim for the environmental harm he caused. Third, it is possible to fix pollution standards (notably emission standards) *ex ante* in regulation and more specifically in environmental licenses. Now, in addition to these, a whole new set of policy instruments has been developed. Economists increasingly advocate the use of market oriented policy instruments, such as systems of emission trading and marketable permits. In addition attention is given to voluntary compliance mechanisms, such as environmental agreements.

It is obviously not possible to discuss this whole set of possible environmental policy instruments within the scope of this paper². I will focus on two traditional instruments, being on the one hand liability rules and on the other hand safety regulation.

2.2 Criteria for safety regulation

Let us examine under what kind of circumstances liability rules may not suffice to deter environmental harm and a regulatory intervention may be necessary. The choice between regulation and liability rules has been thoroughly examined by Steven Shavell in 1984, in a paper in which he advances several criteria that influence the choice between safety regulation and liability rules (see Shavell, 1984 and 1987).

2.2.1 Information asymmetry as a criterion for regulatory intervention

Information deficiencies have often been advanced as a cause of market failure and as the justification for government intervention through regulation (see Stigler, 1961; Schwartz and Wilde, 1979; Mackaay, 1982). Also, for the proper operation of a liability system, information on e.g. the existing legal rules, the accident risk, and efficient measures to prevent accidents, is a precondition for an efficient deterrence. According to Shavell, the parties in an accident setting generally have much better information on the accident risk than that possessed by the regulatory body (see Shavell, 1984, 359). The parties themselves have, in

¹ We assume here indeed positive transactions costs so that this internalisation can not automatically be reached via the Coase Theorem (see Coase, 1960).

² An excellent overview of these instruments is presented by Gunningham and Grabosky, 1998.

principle, the best information on the costs and benefits of the activity that they undertake and of the optimal way to prevent accidents. This "assumption of information" will, however, be reversed if it becomes clear that some risks are not readily appreciated by the parties in an accident setting. Therefore, for every activity the question that will have to be asked is whether either the government or the parties involved can acquire the information at the least cost.

2.2.2 Insolvency risk

If the potential damages can be so high that they will exceed the wealth of the individual injurer, liability rules will not provide optimal incentives. The reason is that the costs of care are directly related to the magnitude of the expected damages. If the expected damages are much greater than the individual wealth of the injurer, the injurer will only consider the accident as having a magnitude equal to his wealth. He will take, therefore, only the care necessary to avoid an accident equal to his wealth, which can be lower than the care required to avoid the total accident risk (see Shavell, 1984, 360). This is a simple application of the principle that the deterrent effect of tort liability only works if the injurer has assets to pay for the damages he causes. If an injurer is protected against such liability, a problem of underdeterrence arises³ (see Shavell, 1986).

Safety regulation can overcome this problem of underdeterrence caused by insolvency. ⁴In that case the efficient care will be determined *ex ante* by regulation and will be effected by enforcement instruments which induce the potential injurer to comply with the regulatory standard, irrespective of his wealth.

In that case a problem might still arise if the regulation were also enforced by means of monetary sanctions. Again, if these were to exceed the injurer's wealth, the insolvency problem would remain. Hence, if a safety regulation is introduced because of a potential insolvency problem, the regulation itself should be enforced by non-monetary sanctions (see Shavell, 1985).

2.2.3 The threat of a liability suit

Some activities can cause considerable damage, but even so a law suit to recover these damages may be never brought. If this were the case, there would of course be no deterrent effect of liability rules. Therefore, the absence of a liability suit would again be an argument to enforce the duty of efficient care by means of safety regulations rather than through liability rules (see Shavell, 1984, 363). There can be a number

³ Below we will show that insolvency causes especially a problem under a strict liability rule, but less so under negligence.

⁴ If insurance would come into the picture it could overcome the problems of underdeterrence, provided that the moral hazard problem, caused by insurance, can be cured.

of reasons why a law suit is not brought, even though considerable damages have been caused.

Sometimes an injurer can escape liability because the harm is thinly spread among a number of victims. As a consequence, the damage incurred by every individual victim is so small that he has no incentive to bring a suit. In particular, this problem will arise if the damage is not caused to an individual but to a common property, such as e.g. the surface waters in which each member of the population has a minor interest. In addition, a long time might have elapsed before the damage becomes apparent; in this case much of the necessary evidence may be either lost or not obtained. Another problem is that if the damage only manifests itself years after the activity, the injurer might have gone out of business.

A related problem is that it is often hard to prove that a causal link exists between an activity and a type of damage (see Landes and Posner, 1984, 417). The burden of proof of a causal relationship becomes more difficult with the increasing passage of time since the damaging incident took place. Often a victim will not recognise that the harm had been caused by a tort, but might think that his particular ailment, e.g. cancer, had a "natural cause", associated with a general ill health. For all these reasons a liability suit might not be brought and hence safety regulation is necessary to ensure that the potential polluter takes efficient care⁵.

2.2.4 Administrative costs

When examining the pro and contra's of liability versus regulation, the administrative costs of both systems should also be compared. Liability rules are clearly costly in terms of time for both parties and in court fees. A part of these costs is borne by the whole community, such as e.g. the cost of the legal system, fees for the judges etc. Regulation produces costs for the community, including the costs of making the regulation, setting the standards, passing the statutes etc. and of subsequent enforcement (see Shavell, 1984, 363-364).

In this respect the liability system seems to have an advantage: the administrative costs of the court system are only incurred if an accident has actually happened. The main advantage of the tort system is that a lot of accidents will be prevented by the deterrent effect of being held liable and having to pay damages to the victim. In case of safety regulation the costs of passing the regulation and of enforcing it are always there, whether there are accidents or not.

⁵ For alternatives to liability suits see Bocken, 1987, 83-87; 1988, 3-10.

2.3 The need to regulate environmental pollution

After having discussed these criteria for regulation⁶ I will now discuss the question of how these criteria relate to environmental pollution. If one takes the criteria for safety regulation discussed above and applies them to the potential risk caused by environmental pollution, there is no doubt that liability rules alone are not sufficient.

If one looks at the first criterion, that of information costs, it must be stressed that an assessment of the risks of a certain activity often requires expert knowledge and judgement. Small organisations might lack the incentive or resources to invest in research to find out what the optimal care level would be. Also, there would be little incentive to carry out intensive research if the results were automatically available to competitors in the market: this is the well-known “free rider” problem. This problem can partially be countered by legal instruments granting an intellectual property to the results of the research. However, the problem remains that it may not be possible for small companies to undertake studies on the optimal technology for preventing environmental damage. Therefore, it is often more efficient to allow the government itself to do the research on the optimal technology (e.g. in a governmental environmental research institute). The results of this research can then be passed on to the parties in the market through the regulation. Hence, the setting of environmental standards in regulation can be seen as a means of passing on information on the minimal environmental technology required. Obviously, it is more efficient for the government to acquire information on the optimal emission standard than it would be for e.g. an individual firm to find out what additional reduction in pollution would produce an optimal reduction of the expected damages from the emission. There are undeniable “economies of scale” advantages in regulation.

Also, the insolvency argument points in the direction of regulation. Pollution can be caused by individuals or firms with assets which are generally lower than the damages they can cause by the pollution. In this respect it should not be forgotten that even a small firm can cause harm to a large number of individuals or to entire ecosystems. The amount of damages caused by this emission can of course largely exceed his individual assets. Moreover, most firms have been incorporated as a legal entity and therefore benefit from limited liability. Hence, the individual shareholders are not liable to the extent of their personal assets, but a creditor of the firm can only lay claim to part on all of the total assets purchased in the firm by the shareholders.

Also the chances of a liability suit being brought for damage caused by wrongful pollution is naturally very low. The damage is often spread over a large number of people, who will have difficulties to organise themselves to bring a law suit. In addition, the damage could only

⁶ These are often referred to as “public interest” criteria for regulation to contrast them with “private interest” explanations for regulation, as advanced by public choice scholars.

become apparent some years after the emission took place. This will bring proof of causation and latency problems, which will only make it difficult for a lawsuit to be brought against the polluter.

For these reasons it is clear that some form of government regulation of environmental pollution is necessary. To reformulate : this shows that liability rules alone can not suffice to prevent environmental harm, but there might be other, publicly imposed, instruments than the command and control type regulation which can be used to reach this goal. Taxes are obviously such an alternative. But also these are publicly imposed and can hence be considered as 'regulation'. Another question, which will be discussed below, is whether this necessarily implies that environmental law should solely depend upon regulation or whether regulation can still fulfill a supplementary role.

2.4 Safety regulation in practice

When Shavell's criteria for safety regulation are applied to the environmental risk, one can easily note that a strong argument can be made that the efficient care to be taken to avoid environmental damage should also be fixed *ex ante* by regulation.

In many cases this regulation consists of licences or permits in which an administrative authority fixes an emission standard which must be followed by the potential polluter. These licences play a crucial role in environmental policy in most countries. An improvement of environmental quality will mostly be effected by imposing more stringent emission standards in administrative licences. Hence, the general requirement that emissions are controlled through licences and that the quality and quantity of the emissions are regulated by the conditions in this licence, is a cornerstone of environmental law. Since these licences are administrative acts, in most legal systems environmental law is considered to be a part of administrative law. Criminal law usually only comes into the picture to sanction a violation of administrative regulations or emission standards in the licences.

Although environmental pollution is in the first place controlled through these administrative licences, in individual cases there can still be damage to the environment. Then again liability under tort law comes into the picture and the question is raised of the influence of regulation on the liability system and *vice versa*⁷. These complementarities between tort law and regulation shall be discussed below.

Although it is difficult to examine whether the environmental regulation is generally also effective in reducing environmental harm, some studies have attempted to examine the effectiveness of safety regulation in controlling environmental harm. These studies do not

⁷ Complementarities between tort law and regulation have been addressed by Rose-Ackerman, 1991, 1992a and 1992b.

address the specific quality of every environmental law, but examine whether regulation has generally been more important in reducing environmental harm than liability rules. Dewees demonstrated that in North-America the quality of the environment has improved substantially as a result of regulatory efforts, not so much in response to legal action in tort (see Dewees, 1992).

This empirical evidence of the success of regulation, compared to tort law, has been stressed in the recent book of Dewees/Duff/Trebilcock (see Dewees, Duff and Trebilcock, 1996). They hold that the large regulatory effort to improve the environment has met with considerable success when measured by the reduction of emissions, but that it is more difficult to argue that the environmental regulations of the 1970's in U.S. equally had a considerable influence on the ambient environmental quality. Moreover, they also stress that while environmental regulation is a determining factor in pollutant emissions and ambient concentrations, other non-regulatory factors such as economic growth and even the weather also influence environmental quality (see Dewees, Duff and Trebilcock, 1996).

3 Liability and regulation combined

3.1 Necessity of the combination

I just stressed that according to Shavell's criteria there is a strong argument to control the environmental risk through *ex ante* regulation (or taxes). However, in individual cases there can still be damage to the environment. Then again liability under tort comes into the picture and the question has been addressed in the literature how regulation influences the liability system and vice versa. These complementarities between tort law and regulation have more particularly been addressed by Rose-Ackerman (see Rose-Ackerman, 1992b and 1996), Faure/Ruegg (see Faure and Ruegg, 1994) and Kolstad/Ulen/Johnson (see Kolstad, Ulen and Johnson, 1990). Rose-Ackerman also compared US and European experiences in using regulation versus tort law in environmental policy (see Rose-Ackerman, 1992a and 1995). The first point which is often stressed, is that the fact that there are many arguments in favour of *ex ante* regulation of the environment, does not mean that the tort system should not be used any longer for its deterring and compensating functions. One reason to still rely on the tort system is that the effectiveness of (environmental) regulation is dependent upon enforcement, which may be weak. In addition the influence of lobby groups on regulation, to which public choice theory has rightly pointed, can to some extent be overcome by combining safety regulation and liability rules. Moreover, safety regulation, e.g. emission standards in

licences, can be outdated fast and often lacks flexibility, which equally merits a combination with tort rules.

Hence, from the above it follows that although there is a strong case for safety regulation to control the environmental risk, tort rules will still play an important role as well. Hence, the question arises what the influence is of regulation on the liability system and vice versa. How do these two systems mutually influence each other?

3.2 Violation of regulation and liability

The first question to be answered in that respect is whether a violation of a regulatory standard should automatically be considered a fault under tort law and thus lead to liability of the licensee.

Assuming that the licence sets the regulatory standard at the efficient care level a violation of the regulatory standard should indeed lead to liability to give the licensee an incentive to spend on care. However, Shavell argues that the costs of following the regulatory standard are not the same for all injurers. Following the standard might be inefficient for some injurers. The injurers for whom following the regulatory standard would only be possible at high costs should not be held to follow this standard since it would create inefficiencies (see Shavell, 1994, 365-366; Faure and Van den Bergh, 1987, 109-100). The question is whether this means that these injurers should not be held liable if they violate the regulatory standard.

This problem can be compared with the *bonus pater familias* standard used in tort law. Although a detailed individualisation of standards of efficient care would be the optimal solution in a first best world this is often impossible given the costs of an individualised standard setting. Therefore, the legal system sets the required level of care at an average level, the so-called *bonus pater familias* standard. The same can be said for regulation. If various groups can be identified at low costs a separate standard for a certain group is efficient as long as the gains from selecting a further group outweigh the further administrative costs. In most cases, however, the regulator will not have the possibility of identifying atypical parties that might be able to avoid a loss at lower costs, for instance because they pose lower risks than normal. Therefore, a single regulatory standard will be used (see Posner, 1998, 183-184; Shavell, 1987, 74).

Although one could, therefore, argue that a failure to satisfy the regulatory requirement should not necessarily result in a finding of negligence, so as to avoid some parties who pose lower risks taking wasteful precautions (see Shavell, 1984, 365-366), most legal systems generally consider a breach of a regulatory duty a fault. One of the reasons for introducing safety regulation to prevent environmental damage is, as was mentioned above, that the regulator will usually pos-

sess better information to evaluate the efficient standard of care than the parties involved. Hence, the regulation passes on information to the parties on the efficient standard of care. The regulation also gives information to the judge who has to evaluate the behaviour of the injurer *ex post* in a liability case. The judge might lack the information necessary to find out whether in a particular case an injurer should not be held to follow the regulatory standard, for example because he posed a lower risk than usual. Therefore, particularly in environmental cases a judge will accept a finding of negligence as soon as a regulatory standard has been breached⁸. Thus, the statutory standards can be applied to define negligence (see Rose-Ackerman, 1992a, 127).

3.3 Compliance with regulation and liability

Whereas according to tort law in many legal systems a breach of a regulatory standard results automatically in a finding of negligence, the opposite is not true : following a regulatory standard does not exclude a finding of liability. In environmental law this is particularly important, since the conditions under which an emission of pollutants is allowed are mostly laid down in a permit. The industry often argues that as long as they follow the conditions of the licence, no finding of negligence in tort law is possible.

This point of view is, however, firmly rejected in most legal systems, for instance in both Belgium and in the Netherlands⁹. The basic idea is that the administrative authority, when granting a licence and setting permit conditions, cannot take into account the possible harm that the licensed activity might cause to all possible third parties. Their rights on compensation for damages may not be impaired simply because the operator of a plant followed the conditions of a licence. Legal doctrine and case law clearly state that keeping the permit conditions is just a minimum; in addition, the plant owner has to take all possible precautions as deemed necessary under tort law to avoid his licensed activity causing harm to third parties.

For instance in Dutch case law it is indeed generally accepted that following the conditions of a licence does not release a plant owner from potential liability¹⁰. An exception would only exist if the interests of the potential victims were clearly taken into account when the conditions

⁸ Faure and Van den Bergh have also argued that an advantage of this system is that it gives victims incentives to prove that the regulatory standard has been breached. This makes the victim an enforcer of safety regulation. He can claim compensation under the negligence rule as soon as a causal relationship between the violation of the regulatory standard and his damage is established. See Faure and Van den Bergh, 1987, 110-111.

⁹ For a comparative analysis of the question whether following a permit excludes criminal liability see, Faure and Oudijk, 1994, 86-91.

¹⁰ See Supreme Court (Hoge Raad) 30 January 1914, *Nederlandse Jurisprudentie*, 1914, 497; Supreme Court 10 March 1972, *Nederlandse Jurisprudentie*, 1972, 278.

of the permit were set (see Rus-van der Veld, 1987, 111; Nieuwenhuis, 1991, 44-47). This point is made very clear in a famous case in the Dutch Supreme Court that dealt with pollution caused by the French salt mines in the Alsace region¹¹. The Salt Mines argued that the emissions were within the limits set by their permit and, therefore, not illegal. The court, however, judged that the licence had not taken into account the potential harmful effects of the emissions for third parties and could, therefore, not release the salt mines from liability.

One can find a clear economic rationale for this rule. If compliance with a regulatory standard or licence would automatically result in a release from liability, the potential injurer would have no incentive to invest more in care than the regulation asks from him, even if additional care could still reduce the expected accident costs beneficially (see Shavell, 1984, 365; Faure and Van den Bergh, 1987, 110). A first reason to hold an injurer liable (if the other conditions for liability are met), although he has followed the regulatory standard, is that this standard is often merely a minimum. Exposure to liability will give the potential injurer incentives to take all efficient precautions, even if this requires more than just following the licence. A second reason is that exposure to liability might be a good remedy for the unavoidable capturing and public choice effects that play a role when permits are granted. If a permit would always release from liability, all a plant operator would have to do, is get a good permit with easy conditions from a friendly civil servant. That would then exclude any law suit for damages from a potential victim. Finally, tort law can also be seen as a 'stopgap' for situations not dealt with by the statute (see Rose-Ackerman, 1992a, 123). This makes clear that the exposure to liability notwithstanding the permit is an important guarantee that the plant operator will take efficient care.

Therefore, following the conditions of a license or – more generally – regulatory standards, should not have a justificative effect in tort. The opposite may only be true if it were clear that the administrative agency took into account all potential harm of all interested third parties when setting permit conditions. In such case a judge in an civil liability suit should not be “second guessing” efficient agency decisions. It is, however, rare that agencies will be able to take *ex ante* all these interests and possible damages into account when setting permit conditions. Hence, as a general rule, following licenses or regulatory standards should not free from liability; the opposite would be the exception. This is the case both under a negligence as well as under a strict liability rule. Indeed, holding an injurer liable, notwithstanding he followed regulatory standards will play an important role under a strict liability rule, since this will lead the injurer to take efficient care and adopt an efficient activity level, i.e. to take all efficient measures to reduce the potential accident

¹¹ Supreme Court 23 September 1988, *Rechtspraak van de Week*, 1988, 150 and see Faure, 1991, 128-129.

costs, although this might require more to be done than the regulation requires. Under a negligence rule this case law is also significant if the efficient care standard (which is assumed to be equal to the due care standard required by the legal system) is higher than the regulatory standard.

4 Environmental liability

Let us finally examine how exactly environmental liability could be used as a tool to prevent environmental harm.

4.1 Negligence versus strict liability : economic principles

One possible liability rule which will give the polluter an incentive to spend on care to reach the optimal standard is the negligence rule. This follows from the general literature on the economics of accident law (see Shavell, 1987, 8 and Calabresi, 1975, 658). Assuming that under a negligence rule the potential polluter will only have to pay compensation if he spends less on care than the legal system wants him to (due care) the firm will have an incentive to spend on care, since it is a way to avoid liability which will maximise his utility. Provided that the legal system defines the due care level as the optimal standard a negligence rule will therefore give the polluter incentives to follow the optimal standard. Also a strict liability rule will lead to optimal incentives for care taking for the polluter, since taking efficient care will minimise the expected accident costs which the potential polluter has to bear under a strict liability system (see Polinsky, 1983, 39; Shavell, 1980, 11 and 1987, 8). Therefore, the literature generally accepts that both a negligence rule and a strict liability rule will provide a potential polluter with incentives to take the efficient care level. However, this is only valid in a unilateral accident setting, i.e. an accident whereby only the injurer can influence the accident risk. If victims were also to be given incentives for accident reduction a contributory negligence defence should be added to the strict liability rule. Under negligence victims will always have an incentive to take efficient care as well since they will in principle not be compensated by the injurer who, under a negligence rule, will take efficient care to avoid liability.

However, the accident risk is not only influenced by the level of care, but also by the number of times that the parties are involved in the risky activity, i.e. the activity level. Hence, an optimal liability rule should also give the parties in a potential accident setting incentives to adopt an optimal activity level. A negligence rule will not give optimal incentives to the injurer to adopt an optimal activity level since the activity level is not incorporated in the due care standard which

the court applies (see Adams, 1989; Diamond, 1974; Shavell, 1980). Hence, under a negligence rule the injurer only has an incentive to take efficient care (to escape liability) but not to adopt an efficient activity level. Under a strict liability rule, on the contrary, an injurer has an incentive to adopt an efficient activity level since this is also a way to minimise the total expected accident costs which he has to bear. Moreover, under negligence the injurer will only take the due care, the legal system requires from him, but he has no incentive to take other precautionary measures which could reduce the risk of environmental damage. Strict liability has the advantage, that it gives incentives to the injurer to take all efficient precautionary measures to reduce the risk, also those which could not be incorporated into the due care level under negligence. In a unilateral accident model (whereby only the behaviour of the injurer influences the accident risk) strict liability is therefore the efficient liability rule since it leads both to efficient care and to an optimal activity level.

4.2 Legal justifications for strict liability

The reason that is often advanced in legal literature in favour of strict (environmental) liability is that strict liability will help the victim in obtaining compensation since he is released from the heavy burden of proving fault under the negligence rule. However, from a deterrence point of view victim compensation is not as such a goal of accident law. The duty of the injurer to compensate his victim is only an instrument to reach deterrence efficiency. Moreover, the victim compensation argument to introduce strict liability for environmental pollution is not that convincing in all cases. Indeed, many legal systems qualify every violation of a statutory or regulatory norm as a civil fault¹². Most industries are subjected to extensive safety regulation. Hence, in these systems the victim only has to prove the violation of one of these regulations to establish a fault¹³. If, in addition, the victim can prove a causal relationship with the loss suffered, he will be able to claim compensation. In many accident cases this burden of proof will therefore not be as heavy as has been argued. It is, therefore, at least questionable whether a strict liability rule substantially improves the situation of the victim in comparison with an already existing broadly interpreted civil fault regime. It should also not be overlooked that under the general fault regime of tort law no limitations apply and the victim is entitled to full compensation. In many of the environmental cases where strict liability was first introduced, more particularly in the international conventions concerning nuclear accidents and oil pollu-

¹² See for Dutch case law e.g. the so called Jumbo II case of 1 October 1993, *Nederlandse Jurisprudentie*, 1995, 182.

¹³ The economic rationale for this rule was discussed above.

tion¹⁴, financial caps and other limitations on the victim's rights were introduced. The alleged compensating benefit of the strict liability in those cases is therefore doubtful.

4.3 Strict liability for environmental damage ?

Although the classic victim compensation argument may as such not justify the introduction of strict liability for environmental pollution, there are on the other hand economic reasons based on deterrence efficiency for introducing a strict liability rule. Environmental pollution can in most cases certainly be considered a unilateral accident, i.e. an accident whereby only the injurer can influence the accident risk. In this case we noted that the economic model predicts that the advantage of the strict liability rule is that it will give the injurer an incentive both to adopt an optimal activity level and to take efficient care. Since the victim cannot influence the accident risk, strict liability seems to be the first best solution to give the potential polluter optimal incentives for accident reduction in those cases (see Faure, 1995).

In sum, if we apply the criteria of Shavell determining the choice between negligence and strict liability to the environmental case, there seem to be strong arguments in favour of an introduction of strict liability. In many cases environmental pollution will be truly unilateral in the sense that only the injurer's activity can influence the accident risk, which constitutes a strong case for strict liability¹⁵. In other cases the victim will certainly be able to exercise an influence on the risk as well. One can more specifically think about situations where the victim has the possibility to mitigate damages after the accident occurred. However, in those cases it is not the victim's activity level, but his level of care which influences the accident risk. This can be controlled by adding a contributory or comparative negligence defence to the strict liability rule.

4.4 A few refinements

Many scholars argued that there is indeed a strong case in favour of strict liability for environmental damage : this will give the potential polluter optimal incentives for accident reduction and hence, for optimal internalisation (see Endres and Staiger, 1996). There is, however, another important aspect of the difference between negligence and strict

¹⁴ See with respect to nuclear accidents OECD, 1994; Faure and Skogh, 1992, 499-513; Depri-moz, 1995, 1-24 and with respect to civil liability for marine oil pollution Faure and Heine, 1991, 39-54 and for recent evolutions Brans, 1994, 61-67 and 85-91.

¹⁵ In some cases it will be the victim's activity that caused the harm, e.g. if the victim knowingly came to the nuisance. This may then lead to a denial of a claim on compensation. See in that respect the discussion on the coming to the nuisance doctrine, by Wittman, 1980, 557-568.

liability which should be mentioned. This concerns the fact that the application of negligence requires high information costs from the judge, who will have to set the due care standard. The information necessary to weigh costs and benefits and fix the optimal care may not be readily available for the judge. Strict liability shifts all costs to the injurer, who will then have to define the optimal care level. If one therefore assumes that, as may be the case with environmental harm, the information on optimal precaution is better available with industry than with the judges, this constitutes an argument for strict liability. This information advantage may therefore constitute an additional argument in favour of strict liability for environmental harm. One should, however, remember that this finding only holds in all the models, such as the one which is e.g. developed by Shavell, which start from an assumption of risk neutrality. If risk aversion is introduced and the potential injurer is risk averse, Endres/Schwarze correctly argue that strict liability is only efficient if in some way risk can be removed from the risk averse injurer, e.g. through insurance (see Endres and Schwarze, 1991).

There are other reasons why the seemingly advantage of strict liability should be somewhat balanced. First of all, it was assumed until now that the injurer has money at stake to pay compensation to the victim. If, however, the amount of the damage exceeds the injurer's wealth, a problem of underdeterrence will arise. Under strict liability the injurer will consider the accident as one which is equal to his total wealth and will therefore only take the care necessary to avoid an accident with a magnitude equal to his total wealth. If that wealth is lower than the magnitude of an accident he will take less than the optimal care and therefore a problem of underdeterrence arises under strict liability. Insolvency is less of a problem under negligence since under that rule the injurer will still have an incentive to take the care required by the legal system as long as the costs of taking care are less than his individual wealth. Taking due care remains indeed a way for the injurer to avoid to have to pay compensation to the victim. If there would thus be a potential accident setting whereby the magnitude of the loss may be higher than the injurer's wealth (which can often be the case in environmental liability) this constitutes an argument in favor of negligence rather than strict liability.

4.5 White paper on environmental liability

As we already indicated, in many international conventions, a strict liability regime is introduced for environmental harm. This is equally the case in many legal systems. Recently the European Commission introduced a white paper on environmental liability (see COM (2000) 66 final of 9 Februari 2000). In that white paper the Commission took a rather balanced approach towards the choice between negligence and strict liability. The Commission opts for a strict liability rule for all

harm which originates from hazardous activities. For all the damage originating from other activities the Commission proposes a negligence rule.

This original approach of the European Commission is very much in line with the predictions of the economic model as presented above. Hazardous activities can often be considered unilateral and in those situations it is important to control the injurer's activity through a strict liability rule. The same is, however, not true in case of non-hazardous activities which may cause environmental harm. The dividing line (non-hazardous/hazardous) chosen by the European Commission, seems therefore to follow economic logic.

5 Concluding remarks

In this paper I tried, without using formal models or equations, to prove the importance of traditional concepts of law and economics for environmental lawyers and policy makers. By focusing on various aspects of environmental law (more specifically liability, regulation and the combination of the two) the practical use of the economic analysis of law was demonstrated. Law and economics may thus contribute towards a better understanding of environmental law, e.g. by providing an understanding of why environmental law is so often subjected to regulation. In addition, the paper showed that traditional law and economics can also contribute to environmental economics. Law and economics e.g. points at the deterrent effect of liability rules, a point which is often neglected in traditional writings on environmental economics. Moreover, law and economics stresses the importance of a combined use of various instruments to control environmental pollution by pointing at strength and weaknesses of each legal instrument, taken separately.

A rather reassuring conclusion for environmental lawyers is that current environmental law in many Western European legal systems seems to correspond to a large extent to economic logic. However, the fact that environmental law is e.g. relying heavily on regulation may correspond with Shavell's criteria for safety regulation, it does on the other hand not imply that every specific type of environmental regulation is always efficient. Indeed, there may be various reasons why regulatory outcomes may fail to be effective. One reason may be poor information by the regulator; another one concerns the risk that the regulator is captured by special interests. For these and many other reasons, some of the traditional (command and control) regulation in environmental law has often been considered inefficient by economists.

Moreover, the analysis presented in this paper could only provide a basic introduction to the economics of environmental law. There are,

however, various caveats which have to be considered :

This paper mainly addressed the question what instruments should be used to prevent environmental harm. It did, however, not concern the question to what level environmental pollution should be internalized. Obviously environmental harm should, from an economic point of view, not be prevented at all costs, but should imply some weighing of costs and benefits.

Second, I only focused on two specific, be it important, policy instruments to control environmental harm, regulation and liability. Many other instruments which become increasingly important today, such as taxes and more particularly market oriented instruments such as marketable permits have not been discussed. Future environmental law and economics research will focus on the possible combined use of various of those instruments.

Third, in this paper it was assumed that external force (e.g. the threat of being held liable) is necessary to give a potential polluter incentives to prevent environmental harm. However, there may be a number of reasons why companies would engage voluntarily in investments in environmentally friendly technology. In some cases a change to cleaner production technologies may lead both to reduction of environmental harm and to a better economic performance of the firm concerned. In addition, a firm may find it advantageous to present itself as "green" as a marketing tool. Thus it could e.g. submit itself voluntarily to eco-audits. Thus there may be many (economic) reasons for the voluntary implementation of technologies which lead to environmental improvements, without the necessity to have a legal rule coercing towards environmental improvement.

Finally it is important to remember that economics, how undoubtedly useful it can be, provides only "one view of the cathedral" (compare Calabresi and Melamed, 1972) by analysing legal rules on the basis of the efficiency criterion. Environmental lawyers and policy makers may, however, sometimes have other goals they want to achieve (at least on paper) than economic efficiency. But even if policy makers would e.g. define the goal of environmental policy as being something like "environmental justice", than economic analysis remains a useful tool. It can indeed explain to policy makers how to obtain the maximum "environmental justice" per dollar spend¹⁶.

¹⁶ Compare Easterbrook, 1983, 289-332 who argues the same with respect to those who would reject a deterrence-based approach to criminal law.

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Résumé

Cet article montre comment différents d'instruments juridiques peuvent être utilisée pour traiter les problèmes de pollution environnementale. On démontre pourquoi les règles de responsabilité ne peuvent suffire pour contrôler les risques environnementaux. Le recours à la réglementation ne peut non plus suffire. Il faut donc mélanger des règles de responsabilité et la réglementation. Comment ? Telle est la question que résoud cet article. Une autre question est également abordée : quel est le type de responsabillité optimal afin d'internaliser les risques environnementaux.

Abstract

The purpose of this paper is to show how a variety of traditional legal instruments can be used to remedy environmental pollution. Using the traditional public interest criteria for regulation, it is explained why liability rules alone can not suffice to control the risks posed by environmental harm. However, the conclusion that in environmental law some regulatory invention will be necessary does not exclude the role of environmental liability. Hence the question arises how liability rules and regulation can be used jointly to remedy environmental pollution and how they mutually influence each other. Finally, the question will have to be asked which of these liability rules is optimal to internalize environmental risks.

Mots clé

Environnement, responsabilité civile, réglementation, responsabilité sans faute

Key words

Liability, regulation, strict liability, environmental liability

Classification JEL : K00, K13, K32