

Law and Economics of Environmental Crime: a Survey

Michael G. Faure

Marjolein Visser

May 2003

Table of contents

§ 1. Introduction	1
§ 2. Why criminal law?	2
2.1 Prices or sanctions?	2
2.2 Low probability of detection	3
2.3 Protection of values and interests	4
§ 3. How to deter?	6
§ 4. Optimal sanctions	10
4.1 Trade-off between probability of detection and magnitude of the fine	10
4.2 Flexibility versus sentencing guidelines	12
4.3 Complementary sanctions	13
§ 5. Administrative or criminal law?	15
5.1 Non-monetary sanctions need criminal law	15
5.2 Co-operation versus deterrence	16
5.3 Criminal law as ultimum remedium	18
§ 6. Companies or individual actors?	19
§ 7. Concluding remarks	23
§ 8. List of references	27

§ 1. INTRODUCTION

In the economic analysis of law, much attention has been paid to the instruments to be used for the control of environmental pollution. However, lawyers seem to focus mainly on environmental standards (emission standards and quality standards) and on the question of how these standards should be set, whereas economists (mostly interested in environmental economics) focus mainly on 'economic instruments' (emission trading and taxes). Environmental law is often categorised as administrative law. However, in practice the whole body of environmental law is, to a large extent, also criminal law. The usual way in which environmental law is structured consists of the imposition on industry of specific administrative requirements, specifying the permissible amounts and quality of polluting emissions, and the punishment, as environmental crimes, of violations of these requirements. In legal literature, much attention has been paid to the way in which the law should use penal sanctions to deter environmental pollution, but environmental criminal law has not, so far, been very often subjected to an economic analysis.

The goal of this paper is to provide an overview of the way in which traditional theories on the economics of crime have been applied to environmental criminal law. We will therefore begin by addressing the question of why, according to the economist literature criminal law should at all be used to deter environmental pollution. An inevitable question in that respect, obviously, is whether other instruments, such as civil liability, would not suffice for the deterrence of environmental pollution (§ 2). In addition, we will address the manner in which the literature on the economics of crime relates to environmental pollution (§ 3). The paper also looks at what the optimal

penalties for environmental pollution would be (§ 4). Moreover, in practice it can be observed that there is an increasing interest in administrative penal law. Hence, the question arises as to why, in some cases, administrative law might provide better results than criminal law (§ 5). In addition, given that environmental crimes are committed mostly within the corporate sphere, it is necessary to ask whether criminal law should be applied to companies and/or to individual actors. (§ 6).

Thus, our paper attempts to provide a survey of the literature concerning the way in which criminal law has been, and can be, used in the fight against environmental pollution.

§ 2. WHY CRIMINAL LAW?

2.1 Prices or sanctions?

Several reasons have been put forward in literature as to why criminal law should be used for controlling certain types of externalities. One reason that is often put forward is that the internalisation of harm via civil law will not be perfect. Civil law and more particularly, tort law, will indeed never be able to guarantee the victim full compensation. A full compensation of the victim would mean that he would be indifferent. This is only possible if civil law would be able to completely compensate the victim for the harm caused to him. However, it is well known that even if the victim receives substantial financial compensation, e.g. for the loss of an arm, this compensation will never put him in the position he was in before the accident occurred. The same is the case with pain and suffering. Traditional tort law often compensates, e.g. when a child dies as a result of an accident. In these cases, there is often no material

loss, but the non-pecuniary losses can be substantial. However, the amount that will be awarded under civil law is often too low to guarantee effective deterrence from an economic point of view (Faure 2000, p. 143-159). Hence, some have argued that the goal of criminal law in these types of cases is not to compensate, but primarily to deter. Cooter has articulated this viewpoint by claiming that in civil law, individuals in principle have the right to cause damage to someone else, on the condition that they are willing to pay the price for that damage, i.e. to compensate the victim. Criminal law, however, aims to prohibit certain antisocial behaviour even if the offender were willing to pay the price in the form of compensation to the victim. Therefore Cooter has argued that whereas civil law fixes a price for behaviour in the form of a sanction, criminal law simply wishes to deter by imposing sanctions (Cooter 1984, p. 1523).

2.2 Low probability of detection

Another reason that has been advanced in economic literature in favour of the use of criminal law is that in some cases there may be a relatively high degree of damage and a relatively low chance of catching the offender (Posner 1985, pp. 1193-1209). The economic theory of crime and punishment is grounded on the deterrence viewpoint. According to this viewpoint, threatening a potential polluter with serious punishment, such as imprisonment or high fines, would deter him from his intended pollution. The question obviously arises as to why this justifies the use of criminal law. The argument is that a similar deterrent effect could not be achieved through the use of other legal instruments such as tort law. This is because while liability rules, for example, do indeed also have a deterrent effect, the problem is that the only risk that a potential

polluter runs under liability rules is that he will have to pay compensation equal to the amount of damage he caused. With environmental pollution, the probability of being caught for violation of a regulatory norm is often much lower than 100%. As a consequence, deterrence only works if the sanction to which the potential polluter is exposed is much higher than the amount of damage he might be causing.

In many cases of environmental pollution, the probability of being caught may not be 10 %, but in fact much lower. This means that the efficient sanction for deterring the potential polluter should be correspondingly higher. In general, this effect cannot be achieved with tort law, since tort law in principle only forces the injurer to compensate the victim the amount of damage he caused, and no more. The only way of imposing a much higher sanction than the actual harm caused, in order to compensate for the low detection rate, is through the use of criminal law. To summarise, the fact that the probability of detection is less than one is therefore a powerful argument in favour of using the criminal law to deter environmental pollution (Skogh and Stuart 1982, pp. 171-179 and Skogh 1973, pp. 305-311).

2.3 Protection of values and interests

One of the other (non-economic) arguments made in favour of the use of criminal law for the purpose of environmental protection is that the severe types of sanction under criminal law are also used to protect classical interests such as health, property and honour. These were the interests that were protected by most of the penal codes that were enacted in the twentieth century. Under environmental legal doctrine, it is argued that given the deteriorating state of the environment in many industrialised countries, a

clean environment is nowadays at least as important as the above interests are. Hence, if criminal law is used to protect these traditional individual interests, it should also be used to protect collective interests, such as environmental ones. This, it is argued, is because most of these individual interests (such as health and property) cannot be enjoyed if the basic requirements for a clean environment have not been met.

This argument is particularly strong in environmental legal doctrine where it is held that the goal of criminal law is to protect rights, interests and values. It is argued that in industrialised societies nowadays it is as important to protect the right to a clean environment as it is to protect the interests (health, property and honour) traditionally protected by criminal law. It is argued that whereas traditional criminal law only protected individual rights and values, in the course of the last century the protection of collective interests and values has become more and more as important a task of criminal law. Hence, it is argued, this is why the criminal law should be used in the protection of the environment.

To summarise, both economic and legal arguments are advanced in the literature in favour of using criminal law to protect the environment, namely, that civil law is an insufficient or inadequate tool of deterrence and/or that criminal law ought to protect ecological values and interests. The insufficiency of civil law can also be understood: environmental crimes often cause damage that is so widespread that there is no individual claimant. The other elements (low probability of detection and the insolvency risk) equally point at the necessity of the criminal law.

§ 3. HOW TO DETER?

Since the first publications of Gary Becker (1962, p. 13 and 1968, p. 169-217) and George Stigler (1970, pp. 526-536) in the nineteen-sixties a rich and abundant literature on the economics of crime and punishment has emerged, while economic notions have been introduced into the criminological literature on crime and punishment (Otto 1982). The bottom line of the economic theory is relatively simple: it is assumed that the offender weighs the costs and the benefits in deciding whether or not to commit a crime. The rational prospective offender is assumed to be a profit maximizer who weighs the costs and the benefits of committing a crime and does not undertake illegal action unless the expected benefits of the crime exceed the expected costs. From this point of view, it can be said that the function of criminal law is simply to increase the expected costs in order to deter the prospective offender (Bowles 1982, pp. 54-105).

In calculating the expected costs two important factors should be taken into account:

One is the authorities' ability to catch and convict the offender (p); the other is the expected maximum punishment (S). The multiplication of these factors then constitutes the expected costs of the crime to the offender. By raising either the probability of getting caught or the expected maximum punishment, the expected costs for the criminal can increase. However, it is not equally easy to achieve either of these two changes. Increasing the expected maximum punishment might demand less effort from the government than increasing and subsequently stabilising the probability of catching the offender. Therefore the point has been made in the literature that increasing the punishment rather than the probability of catching offenders inflicts less costs on

society (Posner 1992, pp. 223-231; Polinsky and Shavell 1991, p. 618 and Adams and Shavell 1990, p. 337). Although one could formulate criticisms with respect to this point of view, it is important to note that, from an economic point of view, the costs of crime control should also be taken into account when deciding how much to invest in the deterrence of environmental pollution through criminal law. Given the relationship between the detection rate and the optimal sanction, a reduction of the detection rate should, other things remaining equal, be compensated by a higher expected sanction in order to retain the same expected costs for the potential offender (Polinsky and Shavell 1979, pp. 880-891).

Empirical (criminological) studies with respect to the impact of criminal sanctions on environmental pollution usually show that the deterrent effect can be low. This, however, is not because criminals do not act as rational utility maximizers and are therefore not deterred. Environmental pollution is in most cases a result of corporate behaviour. 'White-collar' criminals can certainly be considered to be rational in their choice as to whether to commit a crime, and therefore fit in Beckers' model. In many cases where the potential polluter balances the expected costs of a crime against the gain that may be obtained by committing it, he may find that the potential benefits are higher. In some cases, a lot of money can be earned by behaving in a manner that pollutes the environment, e.g. postponing an investment in water-cleaning equipment. Assume that the water-cleaning equipment that is necessary for compliance with the conditions of a licence costs millions of euros. If criminal law is the only legal instrument available to force a potential polluter to make this investment, he will only do so (and thus avoid the crime) if the fine that will eventually be imposed multiplied

by the probability of detection and conviction is higher than the money he can save by not investing in the equipment. In some cases, the gains for his company might simply be higher. This is due to the relatively low detection rate of environmental pollution and to the fact that the maximum punishments provided for in legislation are almost never imposed by judges in western European countries.

The low probability of detection, combined with the relatively low sanctions, gives rise to pessimism about the effectiveness of criminal law in deterring environmental pollution. In fact, some of these studies show that the probability of detection is so low - as are the fines actually imposed by judges - that one may well ask why potential polluters comply with legislation at all. The potential gains of violating environmental legislation usually by far outweigh the expected costs. However, there are a few reasons why potential polluters may nevertheless abstain from committing environmental crime. One reason is that we have thus far assumed risk neutrality on the part of the potential criminal. However, potential criminals may well be risk averse. Although the probability of detection is relatively low, the expected sanction may theoretically be high. Indeed, in some jurisdictions, e.g. in the U.S., environmental crime is punishable by imprisonment. Corporate directors may well be highly averse to the risk of being put in prison, even if the probability of ending up there is relatively low. Hence, the risk aversion of the potential criminal may to some extent contribute to deterrence (Bowles 1982, p. 59).

Secondly, factors other than the actual sanction may serve to deter environmental crimes. For example, in legal systems where individuals can be prosecuted, members of, e.g., a board of directors might have to appear as defendants

before a criminal court over a period of several weeks. This could be a very unpleasant experience, even if the sanction that is ultimately imposed (e.g. a fine) is relatively low. The time spent and the loss of reputation involved in having pictures of directors on trial appear in the newspapers may also be a serious cost to the firm.

This is linked to a third argument as to why there may be a greater deterring effect even if the probability of detection and the imposed sanctions are relatively low. This has to do with the fact that in addition to the sanction imposed, the criminal prosecution itself (and certainly a conviction) may lead to a (significant) loss of reputation for the firm in question, because it will now have been branded as a polluter. Such a loss of reputation can entail considerable costs for firms e.g. through loss of business and, hence, may provide additional deterrence.

Furthermore, depending on the legal system, environmental crime could be deterred by possible substantial legal costs and the risk of obtaining a criminal record and the associated consequences. For example possible consequences are: licences will become more difficult to obtain, exclusion from new contracts and/or work, problems when starting a new legal entity, more and thorough inspections, higher legal costs and higher insurance rates.

To summarise: the fact that many firms abstain from committing environmental crime cannot be reduced to mere irrationality (given the low expected sanction) but may actually be efficient behaviour, based on the arguments just presented.

§ 4. OPTIMAL SANCTIONS

4.1 Trade-off between probability of detection and magnitude of the fine

In fact, in presenting Beckers' social loss function we have already reached one conclusion concerning the optimal sanction, taking into account both the costs of detection and punishment. This conclusion assumes that there is a trade-off between optimal deterrence and enforcement costs, since an increase in the detection rate requires an increase in policing costs (Easterbrook 1983, p. 293). This, in turn, leads to a number of conclusions (Faure and Heine 1991, pp. 39-58).

1. When optimal deterrence can be achieved equally by fines and prison sanctions, fines are to be preferred since they are less costly to impose than prison sanctions.
2. A higher punishment will be preferred over a higher detection rate because it reduces enforcement costs. However, if offenders are risk averse, heavy punishment may also result in a welfare loss due to risk aversion (Skogh 1982, pp. 67-80). On the other hand, as mentioned above, such risk aversion has the potential advantage of providing additional deterrence where the expected sanction is low.
3. In addition, the costs of imposing sanctions must be taken into account. Therefore many economists, following Becker, have shown themselves to be opponents of prison sanctions, simply because the costs for the implementation of those sanctions are much higher than in the case of fines, which can be administered relatively easily. Also, Posner has argued that in cases of economic crime in particular, a high fine would act as a much better deterrent than a costly prison sanction (Posner 1980, pp. 400-418). This, however, has been criticised by Coffee

(1980, pp. 419-476), as well as Shavell (1985, pp. 1232-1262). Shavell has powerfully argued that the Becker/Posner point of view, which assumes that fines are an effective deterrent, only works when the potential polluter has money at stake to pay these fines.

4. In the event that there is a risk of insolvency, the fine will inevitably not have enough of a deterrent effect. In this respect we should recall the point that the probability of detection of environmental pollution is often very low. This therefore means that the optimal sanction to deter pollution becomes relatively high. The likelihood that this optimal sanction might outweigh the individual wealth of an offender is relatively high in the environmental context. Environmental polluters are often organised as corporate entities that benefit from limited liability (Hausmann and Wraakman 1991, p. 1879 and Cortenraad 1999). Hence, there is always a risk that environmental harm may cause costs that are higher than the assets of the firm or, in the criminal law context, that the optimal fine (to outweigh a low detection rate) will be much higher than the assets of the firm. Indeed, the optimal monetary sanction required for deterrence so frequently exceeds the offenders' assets that non-monetary sanctions, such as imprisonment, are necessary. The major advantage of the fine (lower administrative costs) therefore only leads to favouring this type of sanction when the risk of insolvency can be controlled.

It should be recalled that the fact that the detection rate of environmental pollution is often less than 100% was one of the reasons for introducing criminal law in the first place. This insolvency problem explains why increasing the amount of compensation due by a tortfeasor, for instance by introducing punitive damages (as in American tort

law) will not eliminate the need for criminal sanctions. Indeed, the insolvency problem that arises if monetary sanctions are imposed would make the injurer judgment proof. Thus, non-monetary sanctions will often be needed to achieve deterrence.

However, the imposition of non-monetary sanctions remains costly. Therefore, it has been argued in the literature that it is sometimes more effective to increase the probability of detection than just to combine a low probability of detection with a high sanction (Ehrlich 1973, pp. 521-552). Therefore, the literature has indicated that a combination of a low probability of detection with a high sanction is efficient only as long as (relatively cheap) monetary sanctions can be used. Therefore, monetary sanctions should be used as long as the optimal fine can be imposed, given the available assets of the potential polluter. When an insolvency risk emerges, it may be cheaper to raise the probability of detection than to move to costly non-monetary sanctions (Polinsky and Shavell 1979, pp. 880-891 and Posner 1980, pp. 400-418).

4.2 Flexibility versus sentencing guidelines

A result of this is that the optimal sanctions in the case of environmental crimes depend upon a lot of factors, namely, the probability of detection, the harm caused, available assets, the risk of insolvency and the costs of the sanctions to be imposed. The bottom line is that an optimal policy would consist of applying fines as long as possible (given the insolvency risk) and to combine them in a differentiated manner (given the insolvency risk) with non-monetary sanctions (Cooter and Ulen 2000, pp. 449-451). Of course, from an *ex ante* perspective one could argue that the policy maker might have to invest more in raising the probability of detection when he is aware of a possible

insolvency risk. However, the problem for the judge is that he will only be able to apply the sanction from an *ex post* perspective, when obviously the probability of detection can no longer be influenced. These detailed criteria for an optimal sanction for environmental crime show, as indicated by Easterbrook, that there is no correct price for crime in the same way that there is no correct price for apples. The price of environmental crime depends on a variety of elements, indicated above, which enable the judge to apply the optimal sanction (Easterbrook 1983, p. 295 and p. 325). It is exactly for the same reason that Easterbrook is a great supporter of the discretionary sanctioning powers of the judge, since these will allow him to differentiate the sanctions in a more precise manner, taking into account the relevant economic criteria. Easterbrook therefore opposes sentencing guidelines e.g. mandatory sanctions that must be applied by the judge in all cases (Easterbrook 1983, pp. 325-330). This is a relevant criticism since such sentencing guidelines are applied, for instance, in the U.S., in respect of both environmental crimes and other types of crime. At first blush, one may consider them to be efficient because they clearly signal to potential offenders what sanctions will apply in the event of a violation. However, Easterbrook has shown that the lack of flexibility of these guidelines leads to inefficient sanctions since they do not allow judges to take into account the relevant economic criteria when determining the optimal sanction.

4.3 Complementary sanctions

Although the most common non-monetary sanction is probably imprisonment, one should note that in modern environmental statutes, judges are also given the power to

impose direct measures upon the convicted polluter, such as a duty to restore the harm committed, e.g. by cleaning up polluted soil. In some cases these direct measures can even go as far as an order to shut down a plant, or the damages are restored by the local authorities on the expense of the polluter. In some cases, legislation also gives judges the power to order the publication of judgments through the mass media. Although the application of these special sanctions still varies between the different European legal systems, one can certainly note an increase in their use. For instance, if a polluter is prosecuted for illegally depositing waste, he will often be ordered or convicted to clean up the waste he has discharged. In some legal systems, it is even possible to enforce such orders by means of a severe penalty payment that will be due if the duties are not fulfilled within the time limit laid down in the judgment. One can understand that these specific duties can have a highly deterrent effect. The costs of a soil cleanup can be quite high and the stigmatising effect connected with the publication of a judgement in a national newspaper can be disastrous for a company's reputation. In many cases, one can see that board members of a company who are prosecuted for environmental crime consider the publicity that is given to a major criminal case as the most serious consequence of the whole affair. For multinational companies, particularly those with a clean environmental image, their prosecution in a criminal case that attracts a lot of attention from the mass media can cause a major loss of reputation and thus have a significant deterrent effect as well.

Therefore, one can say that although the sanctions that are used in practice are, in and of themselves, probably not always that much of a deterrent, the prospect of

criminal prosecution and conviction does have a preventive effect, certainly for well known companies that have a reputation to defend within the community.

§ 5. ADMINISTRATIVE OR CRIMINAL LAW?

5.1 Non-monetary sanctions need criminal law

The issues discussed above have important consequences for determining the best enforcement system to induce compliance with administrative regulations. Monetary sanctions can in principle be both criminal and administrative in nature. An administrative agency, however, cannot impose non-monetary sanctions such as imprisonment. Under the European Convention for the Protection of Human Rights and Fundamental Freedoms, only an impartial judge following a legal procedure prescribed by law can impose non-monetary sanctions, such as imprisonment. Consequently, imprisonment is almost always only available as a criminal sanction, not as an administrative sanction. Therefore, the exposé above which indicates that environmental pollution cannot be deterred only through monetary sanctions implies - again - that an enforcement system, backing up administrative environmental law, cannot rely solely on administrative sanctions and that criminal law is needed to enforce environmental regulations (Faure, Koopmans and Oudijk 1996, pp. 529-569).

There is also an economic argument as to why society does not want very stringent sanctions, such as imprisonment, to be imposed in administrative proceedings. The reason, as Easterbrook has pointed out, is that the goal of criminal and administrative proceedings is simply to find out all the appropriate information about the facts at the lowest cost possible, and to provide the necessary information for the

judge to apply the optimal sanctions as described above (Easterbrook 1983, p. 338). Obviously the cost of administrative proceedings may be lower than that of criminal proceedings, but the accuracy of the latter (where the investigations are often undertaken by professional lawyers) may be a lot higher. This aspect is important because the task of criminal law is not only to apply optimal sanctions to the guilty, but also to avoid punishing the innocent. This is referred to as the goal of reduction of error costs (Miceli 1990, pp. 189-201). The error cost is obviously a lot higher when very serious sanctions, like imprisonment, may be imposed, rather than monetary sanctions only. It is therefore understandable that less costly administrative proceedings are chosen in all cases where the consequences (and thus the error cost) will not be too high (Ogus and Abott 2001) in the event of wrongful conviction.

5.2 Co-operation versus deterrence

Another argument is also made in the literature in favour of criminal law enforcement. It is argued that administrative authorities often follow a compliance strategy by which they seek to achieve voluntary compliance of the offender through a co-operation strategy. Although these compliance strategies of administrative authorities can sometimes be quite effective, they have obvious disadvantages as well. One problem is that this does not *ex ante* give enough incentives to potential polluters to follow the requirements of the law in the first place. If all a polluter risks after detection is having to make the investments he was supposed to make anyway, deterrence will, of course, fail. Moreover, problems often arise when attempts at voluntary compliance finally fail following a period during which administrative agencies have been co-operating with

offenders to this end. In such cases, administrative authorities often find themselves with 'their hands tied', due to which they are unable to act effectively as enforcers against the offenders with which they initially co-operated.

In this respect, one can note a remarkable difference in approach between public prosecutors in some western European countries like Belgium and The Netherlands, on the one hand, and in the USA, on the other. In Europe, prosecutors primarily seem to focus on the result of the criminal act, i.e. that the investments should be made and the environmental pollution stopped, rather than on deterrence. By contrast, public prosecutors in the USA, especially those from the specialised Environmental Protection Agency, seem to aim primarily at deterrence through high criminal sanctions. The discretionary powers of U.S. judges are also limited by federal sentencing guidelines that set minimum sanctions for specific offences and have to be followed by the judge.

One should, however, be careful about making a generalised judgement to the effect that administrative proceedings would be inefficient because of the risk of collusion between industry and agencies. Of course, proponents of public choice theory have argued that especially where badly informed administrative officials try to control powerful and well informed enterprises, there is a serious 'capturing risk', i.e. a danger that compliance will not follow and deterrence will fail. However, it is too simple to reject administrative proceedings and the resulting co-operative strategies altogether based on this capturing risk. Indeed, Fenn and Veljanovski have demonstrated that it is precisely this model of co-operation followed by administrative agencies that may well lead to compliance by the regulated enterprises (Fenn and Veljanovski 1988, p. 1055). Indeed, the results may even be better than in a pure deterrence model in which no

account is taken, for example, of particular difficulties that enterprises may be facing in following environmental law. Especially in cases in which administrative authorities are better informed and (smaller) enterprises not, the co-operative strategy may result in a situation in which the former assist the latter in complying with environmental legislation. According to this hypothesis, the co-operative strategy could lead to better results than the pure deterrence model (which would only lead to the imposition of a small fine by the judge). Hence, the co-operative model followed by administrative agencies should not be totally rejected because of 'capturing risk' and the risk of collusion. Indeed, in many countries there is now a tendency towards the increasing use of administrative penal law, also for the prosecution of environmental offences. The argument given is that the costs will always be lower than in the case of expensive criminal proceedings. However, administrative lawyers too will demand the protection of the regulated enterprises as well as administrative review and appellate proceedings and hence administrative penal proceedings may, in practice, become as complicated (and as costly) as criminal proceedings. Obviously this cannot be generalised and depends very much on how administrative penal law, on the one hand, and criminal law, on the other, is organised in particular countries. Which of the two systems is less costly is therefore often an empirical matter.

5.3 Criminal law as ultimum remedium

Several scholars of criminal law have argued that criminal law is an *ultimum remedium*, a last resort that should not be used too quickly. The *ultimum remedium* theory is of particular interest in light of the existence of other legal instruments that can deter

environmental pollution, such as administrative or civil sanctions. The *ultimum remedium*-doctrine can be interpreted as meaning that criminal law should only be resorted to if the other legal instruments do not work. It could indeed be argued that, although the theoretical arguments in favour of criminal sanctions are convincing, certain minor violations of licence conditions committed in good faith by a company could easily be dealt with by means of an administrative fine or sanctions under civil law. However, even when only administrative sanctions are used, it should be borne in mind that the authorities in question will have more power in their negotiations concerning the measures to be taken to comply with the conditions of a licence, if they know that they are backed by a public prosecutor, who can initiate criminal proceedings if the company is not willing to follow the proposals made by the administrative authorities. Thus criminal law also has a very useful role in backing up the enforcement of administrative law.

§ 6. COMPANIES OR INDIVIDUAL ACTORS?

In cases of environmental pollution, the crime in question is often committed not by individual actors, but by persons acting on behalf of a company. Many of the serious cases of environmental pollution have been committed by corporations. In such cases, the question arises as to whether the corporation, the employee or both should be criminally liable. There are obviously three ways that laws can impose criminal liability for environmental corporate crime. Criminal law can hold liable (i) only the corporation (ii) only the individual employee involved in the violation of the law, or (iii) both the corporation and the individual employee.

From an economic point of view, designating the liable party is unimportant so long as the sanctions are freely transferable and the parties are fully informed. With transferable sanctions, either the corporation charges to the liable employee the fine that it paid, or the employee asks the corporation for reimbursement of the fine that he paid. According to this line of reasoning, it is unimportant whether the fine is imposed on the corporation or the individual because the contractual relationship between the individual and the corporation governs these matters. This, obviously, is an application of the Coase-theorem (Coase 1960, pp. 1-44).

Nevertheless, in the literature arguments are put forward in favour of holding both the corporation as well as the individual(s) liable. One argument is that even monetary sanctions are not always freely transferable between the employer (the corporation) and the employee in a contractual relationship, because sometimes the law prohibits this practice. For instance section 2679 (d) of the United States Code provides that tort recovery from the employee is specifically foreclosed (28 USCA § 2679 d). Paying someone else's fines constitutes a criminal offence in Germany (Jescheck and Weigend 1996 and Faure and Heine 1991, pp. 43-44). Another argument is made to argue why sanctions should be imposed on corporations as well. This is related to an important principle in tort law, being that of *respondeat superior*. *Respondeat superior* means that an employer is strictly liable for the torts of its employees committed in furtherance of the employment (Black's Law Dictionary 1990, p. 1311). The employer, however, is strictly liable only for damages that result from negligence on the part of his employees. In economic literature, this *respondeat superior* inquiry focuses on the problem of insolvency. For example, because the employee is unable to pay for the

damage he caused, liability imposed on him alone is ineffective. Holding the employer strictly liable for damage caused by the employee's negligent behaviour provides adequate incentives to force the corporation to exert effective control over its employees. The employer can threaten termination, or refuse to promote the employee, as an inducement for careful conduct (Landes and Posner 1981, p. 914). In the context of environmental corporate crime and from an economic point of view, one can therefore argue that, given the limited funds of the employee, corporate criminal liability may be an efficient instrument to urge the corporation to issue prudent guidelines and exert effective control over its employees.

Given the higher assets at stake within the corporation, it might be more effective to impose monetary sanctions on the corporation rather than on the individual. However, we have shown that non-monetary sanctions may have to be applied as well. Indeed, corporate entities may also be equally unable to pay for the damage caused by their pollution. A polluting corporation may escape a liability suit because the damage to the environment is widely dispersed and therefore difficult to trace. Monetary sanctions may exceed the corporation's assets and thus not be an effective deterrent. Because non-monetary sanctions are hard to apply to corporations (this is obvious for incarceration), they must also be applied to individual employees as well. Polinsky and Shavell have made a strong economic argument in favour of the individual criminal liability of the employee. One of the arguments they make is that monitoring by firms may often be imperfect: another problem is that if employees only face fines they may not be induced to exercise socially optimal levels of care. Therefore they argue that non-monetary sanctions on employees (imprisonment) should be used in addition to fines

applied on the corporations (Polinsky and Shavell 1993, pp. 239-257 and Kornhauser 1982, pp. 1345-1392). Also legal authors argue in favour of the individual liability of employees. The level of control decreases when corporate liability totally replaces individual liability. The employee who must either pay damages (in tort) out of his own pocket or risks personal criminal liability is less likely to act wrongfully than one who knows that he will be protected by the immunity caused through corporate liability.

This leads to the conclusion that corporate liability (leading to fines and non-monetary sanctions applicable to corporations) should be combined with the individual criminal liability of employees. However, some criticism has been formulated against corporate criminal liability, stressing even more the need to have individual liability on the part of the employee. Wheeler has argued that, in general, criminal statutes should not be used to regulate product safety (Wheeler 1984, pp. 593-622). His arguments against criminal law are mainly arguments against punishing the corporation and are, to a certain extent, interesting for environmental law as well. One of his points is that a civil lawsuit may be as much of a deterrent as criminal sanctions (Shavell 1984, pp. 357-374). Another is that criminal law may lead to costly overdeterrence and that the costs of detecting, investigating, prosecuting and sentencing are much higher than the benefits of marginal deterrence. His argument that the existing market forces in place, such as private tort actions and civil regulatory systems, can better regulate product safety than criminal law might hold true for the field of product liability. However, it is obviously less convincing with regard to the area of environmental law, precisely because this area requires *ex ante* regulation, without which potential polluters might otherwise escape liability.

Another criticism of the use of corporate criminal liability has been formulated by Jennifer Arlen. She argues that the traditional argument in favour of what is referred to as vicarious liability¹ is seen as an indirect means of sanctioning wrongful employees, assuming that corporations subject to criminal liability will in turn sanction the wrongful agency. This regime can, however, according to Arlen lead to potentially perverse incentives for the following reason: if a corporation is able to monitor its employees optimally, it will have to increase its level of corporate enforcement expenditures. This might reduce the number of agents who commit crime by increasing the probability of detection and thus reducing the costs of crime. On the other hand, the increased enforcement expenditures may also increase the probability that the government will detect those crimes, whereby the corporations' expected criminal liability for those crimes is increased. This means that additional enforcement by the firm only increases the firms' expected criminal liability. Thus vicarious liability could lead to the perverse incentive that the corporation will reduce the monitoring of its employees in order to avoid the detection of corporate (environmental) crime (Arlen 1994, pp. 833-867).

§ 7. CONCLUDING REMARKS

In writing this paper, we only had a modest ambition: to provide a survey of the legal and the economic literature on crime and applying it to environmental pollution. Indeed, economists have traditionally paid a lot of attention to the optimal instruments to be used in environmental policy (Gunningham and Grabosky 1998), but a lot of belief was apparently attached to traditional economic instruments, such as emission trading and taxes. The reality of environmental law in many countries was and still is, however,

very different. Command and control systems still determine the behaviour of environmental actors and the violation of environmental regulations is backed up by criminal sanctions. With a few exceptions (Cohen 1987, pp. 23-51; Cohen 1992, pp. 1054-1108; Cohen 1992, pp. 75-108 and Cohen 2001, pp. 198-216) environmental criminal law has rarely been subjected to an economic analysis. The least one can say is that there seems to be a striking gap between, on the one hand, the (modest) economic research into environmental crime (Deweese, Duff and Trebilcock 1996, pp. 323-324)² and, on the other hand, environmental criminal law, which is heavily influenced by criminal legal dogmatics.

In this survey paper, we have merely tried to show, first of all that the basic insights of economic theory on the use of criminal law can also be applied to environmental pollution. Thus one can easily come to the conclusion that, given the relatively low probabilities of detection, other means than the civil law should be used to deter environmental pollution. Also the basic insights of Becker and Stigler on deterrence and optimal sanctions can easily be applied to environmental crime as well. Given the potentially available assets of corporate actors, the primary sanction to be applied on environmental crime should be the fine, which should be used until the insolvency limit is reached. In case of insolvency either the probability of detection should be increased or non-monetary sanctions should be applied, although they can be costly. However, we also indicated that precisely in this domain of environmental criminal law, many new complementary sanctions apply as an alternative to the classic non-monetary sanction, being imprisonment. Obviously this can also be understood from an economic framework. Since environmental polluters usually are organised as

legal entities and since therefore they will also have a limit to their solvency, the traditional non-monetary sanction, imprisonment, can obviously not be applied to the legal entity itself. Hence, sanctions containing specific duties e.g. to clean up polluted soils may have a substantial additional deterrent effect. Moreover, also corrective justice arguments could be made that these complimentary sanctions e.g. imposing a duty to restore the harm done, are more appropriate than traditional sanctions which in fact leave the offender with the advantages of the crime committed or leave the environmental pollution caused unsolved. A sanction which is becoming more popular nowadays is publication of the judgment and which may be quite important more particularly for firms which have a reputation to uphold. More generally, this approach of 'naming and shaming' can also contribute to, notwithstanding the relatively low detection rate and low sanctions, compliance with environmental regulations. A criminal prosecution may amount to serious negative publicity, of which the costs should not be underestimated.

Indeed, the modest empirical evidence available makes one wonder why the criminal law is used at all since it hardly seems able to provide an efficient deterrence, at least if one would just regard the relatively low fines and low detection rates. However, actual practice shows that there may be other reasons for companies to comply with environmental regulations than merely the fear of being convicted to pay a fine. The same perspective could also explain the relative success of administrative enforcement. One could be critical towards such a model of administrative enforcement of environmental law, arguing that this can hardly be effective given the co-operative strategy followed by administrative authorities. However, in practice such a co-

operative strategy may well direct actors towards compliance with environmental regulation, e.g. as a result of an informative strategy followed by administrative authorities. Still one should always be careful and realise that this co-operative strategy ends where the ties between the regulated and the controlling agency become that close that sufficient distance is lacking to prosecute in case the co-operative strategy does not lead to effective compliance. The co-operative strategy always holds the risk of collusion, but should therefore not as such be rejected immediately.

Obviously, in this overview we could not discuss every detail of environmental criminal law; we just wanted to show that the combination of environmental legal doctrine and law and economics has a huge potential. Obviously we could not discuss the results of the empirical studies into environmental criminal law either, but as we indicated there are not that many available. However, the historic evolution clearly shows an increasing reliance on criminal law as an instrument of environmental policy. Hence, there is all the more reason to pay more attention to this fascinating area of the law and economics of environmental crime also in the future.

§ 8. LIST OF REFERENCES

Adams, M. and Shavell, S. (1990), 'Zür Strafbarkeit des Versuchs', *Goldammer' Archiv für Strafrecht*, 337.

Arlen, J. (1994), 'The potentially perverse effects of corporate criminal liability', *Journal of Legal Studies*, 833-867.

Becker, G.S. (1962), 'Irrational behaviour and economic theory', *Journal of Political Economy*, 1-13.

Becker, G.S. (1968), 'Crime and punishment: an economic approach', *Journal of Political Economy*, 169-217.

Black's Law Dictionary, 6th edition, 1990, 1311.

Bowles, Roger (1982), *Law and Economy*, Oxford: Martin Robbertson.

Chu, C.Y. (1991), 'Note: an economic analysis of the criminal proceedings in civil law countries', *International Review of Law and Economics*, 111-116.

Coase, R.H. (1960), 'The Problem of Social Cost', *Journal of Law and Economics*, 1-44.

Coffee, J.C. (1980), 'Corporate crime and punishment. A non-Chicago view of the economics of criminal sanctions', *American Criminal Law Review*, 419-476.

Cohen, M.A. (1987), 'Optimal environmental strategy to prevent oil spills: an application of a principle-agent model with moral hazard', *Journal of Law and Economics*, 30, 23-51.

Cohen, M.A. (1992), 'Environmental crime and punishment: legal/economic theory and empirical evidence of enforcement of federal environmental statutes', *Journal of Criminal Law and Criminology*, 82, 1054-1108.

Cohen, M.A. (1992), 'Criminal penalties' in Tietenberg, Tom (ed), *Innovation in environmental policy, Economic and legal aspects of recent developments in environmental enforcement and liability*, Aldershot: Edward Elgar, pp. 75-108.

Cohen, M.A. (2001), 'Criminal law as an instrument of environmental policy: theory and empirics' in Hayes, A. (ed.), *The law and economics of the environment*, Cheltenham, UK and Lyme, US: Edward Elgar, pp. 198-216.

Cooter, R. (1984), 'Prices and sanctions', *Columbia Law Review*, 84, 1523.

Cooter, Robert and Thomas Ulen (2000), *Law and economics*, third edition, Reading: Addison-Wesley.

Cortenraad, Wouter H.F.M. (1999), *The corporate paradox: economic realities of the corporate form of organization*, Boston: Kluwer Academic.

Deweese, Don, David Duff and Michael Trebilcock (1996), *Exploring the domain of accident law, taking the facts seriously*, New York: Oxford University Press.

Easterbrook, F. (1983), 'Criminal procedure as a market system', *Journal of Legal Studies*, 325-330.

Ehrlich, I. (1973), 'Participation in illegitimate activities: a theoretical and empirical investigation', *Journal of Political Economy*, 81, 521-552.

Faure, M. and Heine, G. (1991), 'The insurance of fines: the case of oil pollution', *The Geneva papers on risk and insurance*, 58, 39-58.

Faure, M., Koopmans, I. and Oudijk, J. (1996), 'Imposing criminal liability on government officials under environmental law: a legal and economic analysis', *Loyola of Los Angeles International and Comparative Law Journal*, 18, 529-569.

Faure, Michael (2000), 'Compensation of non-pecuniary loss: an economic perspective', in Ulrich Magnus and Jaap Spier (eds), *European Tort law, Liber Amicorum for Helmut Koziol*, Frankfurt: Peter Lang, pp. 143-159.

Fenn, P. and Veljanovski, C. (1988), 'A positive economic theory of regulatory enforcement', *Economic Journal*, 98, 1055.

Gunningham, Neil and Peter Grabosky (1998), *Smart regulation: designing environmental policy*, Oxford: Clarendon Press.

Hausmann, H. and Wraakman, R.H. (1991), 'Toward unlimited shareholder liability for corporate torts', *Yale Law Journal*, 100, 1879.

Jescheck, Hans-Heinrich and Thomas Weigend (1996), *Lehrbuch des Strafrechts, allgemeiner Teil*, Berlin: Duncker & Humblot.

Kornhauser, L.A. (1982), 'An economic analysis of the choice between enterprise and personal liability for accidents', *California Law Review*, 70, 1345-1392.

Landes, W. and Posner, R. (1981), 'The positive economic theory of tort law', *Georgia Law Review*, 15, 914.

Miceli, T. (1990), 'Optimal prosecution of defendants whose guilt is uncertain', *Journal of Law, Economics and Organisation*, 6, 189-201.

Miceli, T. (1991), 'Optimal criminal procedure: fairness and deterrence', *International Review of Law and Economics*, 3-10.

Ogus, A., and Abott, C., 'Pollution and penalties', paper presented at the Symposium on Law and Economics of Environmental Policy, University College London, September 2001.

Otto, Hans-Jochen (1982), *Generalprävention und externe Verhaltenskontrolle. Wandel vom soziologischen zum ökonomischen Paradigma in der nordamerikanischen Kriminologie?*, Freiburg im Breisgau: Max-Planck-Institut für ausländisches und internationales Strafrecht.

Polinsky, A.M. and Shavell, S. (1979), 'The optimal trade off between the probability and the magnitude of fines', *American Economic Review*, 880-891.

Polinsky, M. and Shavell, S. (1991), 'A note on optimal fines when wealth varies among individuals', *American Economic Review*, 81, 618.

Polinsky, A.M. and Shavell, S. (1993), 'Should employees be subject to fines and imprisonment given the existence of corporate liability?', *International Review of Law and Economics*, 13, 239-257.

Posner, R. (1980), 'Optimal sentences for white collar criminals', *American Criminal Law Review*, 400-418.

Posner, R.A. (1985), 'An economic theory of the criminal law', *Columbia Law Review*, 85, 1193-1209.

Posner, Richard (1992), *Economic analysis of law*, Boston: Little Brown, pp. 223-231.

Shavell, S. (1984), 'Liability for harm versus regulation of safety', *Journal of Legal Studies*, 357-374.

Shavell, S. (1985), 'Criminal law and the optimal use of non-monetary sanctions as a deterrent', *Columbia Law Review*, 1232-1262.

Skogh, G. (1973), 'A note on Gary Beckers' crime and punishment: an economic approach', *Swedish Journal of Economics*, 305-311.

Skogh, G. (1982), 'Public insurance and accident prevention', *International Review of Law and Economic*, 67-80.

Skogh, G. and Stuart, C. (1982), 'An economic analysis of crime rates, punishment and the social consequences of crime', *Public choice*, 171-179.

Stigler, G. (1970), 'The optimum enforcement of laws', *Journal of Political Economy*, 526-536.

Wheeler, N. (1984), 'The use of criminal statutes to regulate product safety', *Journal of Legal Studies*, 593-622.

¹ This refers to the corporate liability for criminal acts of senior officers and directors.

² See the survey book by Dewees, Don, David Duff and Michael Trebilcock who equally indicate that although the use of criminal sanctions for deterrence of environmental offenders is becoming an increasingly important part of environmental policy, the number of empirical studies into the deterrent effect of environmental criminal prosecutions remains modest.