

Environmental Crimes

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Environmental Crimes

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13 Environmental crimes¹

Michael Faure

1. Introduction

Economic analysis of law has long been applied also to the area of environmental law. Whereas traditional lawyers sometimes have difficulty applying economic notions to criminal behaviour, this is less so with respect to the area of environmental crime. The basic assumption of the economic model, that the behaviour of rational man will be influenced by specific costs and benefits, seems easier to accept when it concerns criminality by corporate actors, which is often the case with environmental crime. Many have therefore tried to apply the classic models of Gary Becker and George Stigler (Becker, 1962, 1968; Stigler, 1970) and further refinements thereof to environmental crime.

Applying these classic economic models to the area of environmental pollution does not provide specific difficulties. However, there are a few characteristics of environmental crime which make it worthwhile devoting a separate chapter to it. The field of environmental crime is different from traditional criminal law since in many legal systems the major part of environmental criminal law cannot be found in penal codes containing the principal offences;² the major part of environmental criminal law simply consists of provisions incorporated in environmental statutes of an administrative nature (for example, a Clean Water Act) and have as their main function the enforcement of compliance with administrative obligations. A great deal of environmental criminal law is therefore not formulated in an independent manner³ but is rather formulated as accessory to regulation. In legal practice, an important part of environmental criminal law will therefore consist of violations of a regulatory nature. For example, the polluter will be prosecuted for discharging certain substances into the environment without a permit or for violating permit conditions. This so-

¹ I am grateful to Nuno Garoupa and Anthony Ogus for useful comments on an earlier version of this chapter.

² There are a few exceptions: some countries (for example Germany, the Netherlands) have incorporated environmental criminal law in their Penal codes. However, in legal practice the importance of those provisions is often limited.

³ Such an independent crime would for example be: 'He who pollutes the surface waters will be punished with . . . '.

called 'administrative dependence of environmental criminal law' has been extensively studied in legal doctrine (Faure and De Visser, 1995; Heine, 1994), but is of importance in the economic approach to environmental crime as well. A consequence of this 'administrative dependence' is that administrative authorities have an important influence on the formulation of the contents of environmental criminal law and are also strongly involved in its enforcement and (dependent upon the legal system) in sanctions. This is therefore an area where the criminal law is strongly linked with regulation⁴ and in this particular area of criminal law, the influence of administrative authorities will be far more important than in the traditional areas covered by the criminal law.

Given this background, we will of course not attempt within the scope of this chapter to repeat the application of the Becker/Stigler model to environmental crime, but rather we focus on the specific features of environmental criminal law which more particularly have to do with the important influence of the regulatory authorities in the phase of the formulation of the crime, monitoring and sanctioning. In that respect, we will focus on the main literature without attempting to be comprehensive.⁵ The question of enforcement of environmental regulation (and thus environmental criminal law) was briefly discussed in a chapter on environmental regulation in the previous version of the Encyclopedia (Faure, 2000) and the classic references were (until 1992) provided in the contribution on criminal law in the *Bibliography of Law and Economics* (Faure, 1992). At the end of this chapter, a list of references is provided for the interested reader.

As indicated in this contribution, we will mainly focus on those areas where environmental criminal law differs from traditional criminal law from an economic perspective and which are thus addressed in the economic literature. We consider the question why environmental pollution needs to be enforced through the criminal law at all (Section 2), whether one could in certain circumstances use administrative rather than criminal law to enforce environmental regulation (Section 3) and the specific structure of environmental criminal law (Section 4). Next, we will discuss optimal sanctions for environmental crime (Section 5), specific problems arising in the case of corporate environmental crime (Section 6) and the effectiveness of environmental criminal law generally (Section 7), also

⁴ The reader can therefore read this chapter in conjunction with Chapter 3 of this volume.

⁵ The reader interested in further literature on compliance studies with respect to environmental regulation should consult a highly useful survey conducted by the US Environmental Protection Agency (2007).

taking into account the various possible enforcement strategies (Section 8).

This chapter merely focuses on the economic analysis of environmental crime and environmental criminal law. Other aspects of the economic analysis of environmental pollution are discussed in other volumes of the Encyclopedia. For example, environmental liability is discussed within the volume on tort law and economics, whereas environmental regulation generally is discussed within the volume on regulation. The reader who wishes for a more comprehensive insight into the general literature on the economics of environmental law can therefore refer to these other volumes.

2. Why environmental criminal law?

Of course, within the scope of this chapter, it is not useful to summarize the broad literature on criminalization, an issue which has been extensively discussed both from a legal (see, for example, Ashworth, 2000) as well as from a law and economics (Bowles et al., 2008; Faure and Visser, 2004; Ogus, 2004) perspective. For the sake of this contribution, it can just be argued that some of the arguments made in that literature in favour of criminal law do apply to the case of environmental pollution as well. However, one has to stress that much of the literature in fact provides arguments in favour of public enforcement or regulation rather than in favour of the criminal law.

One argument in favour of public enforcement is that private law remedies will not sufficiently deter (see, for example, Wilde, 2002, pp. 307–10). The arguments are well known: environmental pollution often has no individual victim that could file a liability suit; causation may be difficult to prove and the long time lapse may make it impossible to recognize that, for example, health damage has been caused through environmental pollution, let alone that a tort claim could still successfully be brought. These are arguments that are traditionally advanced in favour of regulation (see Shavell, 1984a, 1984b; and Chapter 3, this volume). This at least explains why public regulation and enforcement may be necessary from an economic perspective to cure the externalities caused by environmental pollution.

A second reason traditionally advanced in economic theory in favour of public regulation, but also to explain the use of the criminal law, is the low probability of detection (Posner, 1985; Shavell, 1985). In many cases of environmental pollution, the probability of being caught may not be 100 per cent, but may in fact be much lower. The result is that, according to the Becker model, 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 for the amount of damage suffered and no more. This again shows the inappropriateness of civil law in cases where the probability of detection is less than 100 per cent. For optimal deterrence, a higher sanction has to be imposed in order to compensate for this low detection rate. This cannot be provided through private law, and hence explains the need for public sanctions which permit compensation for the lower detection rate (see also Skogh and Stuart, 1982; Skogh, 1973).

The low detection rate alone does not explain the need to use the criminal law to deter environmental pollution, but merely the need to use public sanctions. As we shall explain in the next section, it is, however, an important argument in favour of the criminal law in combination with the insolvency risk. Before discussing that aspect, it should be stressed that these traditional economic arguments in favour of criminal law or at least in favour of public enforcement may equally provide arguments in favour of decriminalization. It may be recalled that in the 1970s many criminal law scholars were sceptical about the effectiveness of criminal law and argued that it ought to be used more moderately or not at all. Although that radical view (sometimes referred to as abolitionism) has now been abandoned, it is still believed that the very costly institution of criminal law should be reserved for those cases where deterrence cannot otherwise be achieved. This also implies that the best way towards decriminalization is to improve the effectiveness of civil law. Hence, if the main problem with tort law is that it limits compensation to the amount of harm done to the victim, one way of counterbalancing the low detection rate is to increase the amount of compensation payable by the injurer under tort law. That is precisely the idea behind the concept of 'punitive damages' (see Cooter, 1982; Landes and Posner, 1981a).⁶

Another example, more specifically related to the issue at hand, refers to the argument that civil law will often not be useful as a deterrent against environmental pollution since damage may be widespread, the whole community victimized or the damage caused to collective goods that are not owned by one individual. In such cases, no one will bring a suit in tort. If, in these cases, one wishes to increase the effectiveness of the civil law, one way of doing so is to allow the use of civil law also when no individual victim is harmed, but where a (high) level of social harm is caused

⁶ Nevertheless, punitive damages also seem to be applied, especially when the environmental harm is large (for example, with oil pollution) and where the probability of detection and conviction may in fact not be low at all. Punitive damages may therefore arguably be more necessary in the US than in Europe, possibly also due to different patterns of criminalization of environmental wrongdoing.

by the tortious act. One way of doing so is by allowing the state or other public authorities to act on behalf of the environment and to let them use tort law; another way is to grant non-governmental organizations or individuals the right to institute actions in tort, for example, to ask for an injunction to stop environmental pollution from occurring. Also class actions brought on behalf of a group of victims could be considered as a way to improve the functioning of private law, thus reducing the need for criminalization.

3. Administrative or criminal law?

So far, we have presented the traditional economic arguments to explain why environmental pollution cannot merely be remedied via private law and why public enforcement is indicated. The main reason is the low probability of detecting environmental crime. However, this does not necessarily explain why one should have to use the criminal law. Indeed, the low probability of detection could well be compensated by imposing a high fine on the polluter. Fines have always been considered the preferred sanction in economic theory, for the simple reason that the costs of imposition are low and fines in fact only generate money for the public budget (see, for example, Shavell, 1985; Posner, 1980). Monetary sanctions can, in principle, have both a criminal and an administrative nature. All things being equal, the administrative procedure has the major advantage that it is far less costly than the criminal procedure. Administrative fines can, within what is sometimes referred to as ‘administrative penal law’,⁷ be imposed by administrative authorities after a relatively simple procedure and usually require a relatively low threshold of proof. Compared with the criminal law, the costs of the administrative procedure are substantially lower (see equally Chapter 3 of this volume). All things being equal, it can therefore be argued that if optimal deterrence can be achieved through fines, it seems desirable to use the less costly administrative law instead of the relatively more costly criminal procedure. This has led many scholars to argue that the imposition of relatively modest fines through the criminal procedure is inefficient, since a similar result could be achieved at lower cost through administrative law. More particularly, Ogus and Abbot have argued that in the UK more use should be made of administrative fines (and other administrative sanctions for that matter) to enforce violations of environmental regulations (see Ogus and Abbot, 2002a, 2002b). A clear

⁷ The expression ‘administrative penal law’ may be confusing to some who consider ‘penal’ synonymous with ‘criminal’. In the literature, this notion is used to refer to a system whereby administrative authorities impose penalties.

normative conclusion from this literature is therefore that in many more instances than is the case today, administrative law could be used to deter environmental pollution, especially when the penalties consist of relatively low fines or other (not too infringing) administrative sanctions.

However, there are two important reasons why not all efficient penalties necessary to deter environmental pollution can be imposed through administrative law and why criminal law therefore remains necessary. The first reason is that since the probability of detection of environmental pollution is in practice often very low, the optimal sanction to deter pollution may become very high as well. The likelihood that this optimal fine might outweigh the individual wealth of an offender is relatively high. Environmental polluters are often organized as corporate entities that benefit from limited liability (see Hansmann and Kraakman, 1991; 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 also be recalled that the probability of an administrative fine being imposed will be much higher (given a lower procedural threshold) than that of a criminal fine. As a result, the administrative fine should not necessarily be nearly so large as the criminal fine. This can again reduce the insolvency problem.

It should be recalled that the fact that the detection rate of environmental pollution is often less than 100 per cent was one of the reasons for introducing criminal law in the first place. This insolvency problem explains why increasing the amount of compensation due from 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.

There is a clear economic reason why society does not want to impose very stringent sanctions, such as imprisonment (but also high fines) through an administrative proceeding. The reason is that the costs of administrative proceedings may be lower than the costs of criminal proceedings, but the accuracy of the latter (where the investigations are often undertaken by professional lawyers) may be a lot higher as well.

This aspect is also important because a 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 (see Miceli, 1990; and Chapter 3, this volume). The error cost is obviously a lot higher when very serious sanctions, like imprisonment, can 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 in the event of a wrongful conviction. Arguably, another goal of the administrative procedure is to avoid punishing the innocent (and thus reducing error costs), although they operate at a lower standard. That explains why administrative law (and the corresponding administrative procedure) will be reserved for cases where relatively low penalties can suffice to provide deterrence.

The policy lesson from this economic literature is therefore rather straightforward: in cases where optimal deterrence of environmental polluters can be achieved through relatively modest sanctions (like not excessively high administrative fines or other administrative sanctions), the use of less costly administrative penal law may be warranted. However, in cases where the probability of detection is relatively low, social harm and the potential gain to the polluter is high and thus a more severe sanction is needed, it may be warranted to use the more costly criminal procedure in order to reduce error costs. This is certainly the case when the optimal fine would reach the insolvency limit and non-monetary sanctions are thus needed for deterrence, but equally where for the same reason very high administrative fines would have to be imposed. In reality, in many legal systems it is now possible to use either the criminal law or administrative penal law for particular environmental offences or in some cases even a combination of these. For a discussion of the optimal use of criminal sanction in addition to administrative penalties, see Garoupa and Gomez-Pomar (2004).

4. Structure of environmental criminal law

There is a great difference in the way criminal law is used to protect classical interests such as life, health or property and the way in which the environment is protected through the criminal law. Traditional interests enjoy far-reaching protection and every infringement is penalized as manslaughter, assault or theft. The environment does not enjoy such far-reaching protection as these traditional interests. The economic reason behind this is that many 'polluters' equally produce socially beneficial activities. An environmental criminal law which simply prohibited all pollution would therefore be socially wasteful. This explains the interweaving of criminal law with administrative law, which was mentioned in the introduction. Most environmental statutes provide administrative agencies with powers to decide upon the permitted degree of pollution. Thereby, it is these

administrative authorities that determine the scope of environmental crime provisions.

Additionally, no general rule of criminal law prohibits polluting. Polluting only constitutes a crime when it violates an administrative norm, and even if a general prohibition exists, compliance with a permit is usually a sufficient justification. Because most environmental crimes consist of a violation of these administrative norms, the administrative agency that sets the (emission) standards determines what kind of behaviour is criminal.

This type of structure may be economically sound because the administrative authorities have an informational advantage over a judge in an individual criminal case. The alternative would be to consider all pollution a crime, leaving the judge to decide which acts warrant punishment. In most cases, a regulatory agency has either superior knowledge of, or far better access to, the relevant ecological and technological information than a judge does. Requiring a judge to acquire expert knowledge of chemical and toxic substances, and to keep up to date with recent developments in the field of environmental science, would be very inefficient, if not impossible. Moreover, administrative agencies acquire information that benefits a large number of people and therefore diminishes the costs of research for society.

Thus, the current structure of criminal environmental law, relying primarily on administrative agencies to determine environmental crimes, appears economically sound. Administrative law, however, cannot be the sole source of environmental criminal law since some serious cases of environmental pollution should be directly punishable, even if no violation of administrative provisions is at hand. This obviously raises a lot of questions as to how to formulate environmental criminal law from a legal perspective. To discuss this in detail would of course go beyond the scope of this contribution (see Faure and Visser, 1995). It should, however, be stressed that most environmental criminal law is merely an addition to a prior system of administrative decisions concerning the amount and quality of emissions into the environment. Traditionally, criminal law applied as soon as prior administrative decisions (like permit conditions) were violated, irrespective of whether this caused harm to the environment. Increasingly, one now notices that these mere administrative violations (for example, of permit conditions) are sanctioned with fines under administrative penal law. This corresponds with the economic reasoning explained above. Most offences are also strict liability offences, which require no specific intent or *mens rea*. This corresponds with a general trend to apply strict liability to regulatory offences (see Chapter 3 this volume). However, some legal systems make a distinction between these

mere administrative violations on the one hand and situations where there is also an unlawful emission or even situations where there are serious consequences (like endangering of human health) resulting from environmental pollution. In those more serious cases, often criminal law applies and specific conditions apply with respect to *mens rea*. However, in a recent study, Babbitt, Cory and Kruchek hold that although the requisite criminal intent in case of environmental violations may have been modified (in the sense that it may to some extent have diminished), substantial defences and procedural safeguards still exist. Hence, they conclude that the danger of wrongful conviction is no greater in the area of environmental crime than in many other areas of criminal law (Babbitt et al. 2004, p. 61).

5. Optimal sanctions for environmental crime

Since it is not the purpose of this chapter to repeat the basic economic theory of crime, we can simply take the main conclusions from this literature and apply it to environmental crime:

When optimal deterrence can be achieved equally through fines and prison sanctions, fines are preferred since they are less costly to impose than prison sanctions (see, among many others, Polinsky and Shavell, 1991, 1979; and for a summary, Bowles, 1982). As was indicated above, many economists have for that reason shown themselves to be opponents of prison sanctions, simply because the costs of implementation of those sanctions are much higher than the costs of imposing fines. That is why the fine has been advanced as the ideal sanction in case of corporate crimes like environmental crime (Posner, 1980). This has, however, been criticized by Coffee (1980) as well as by Shavell (1985), who argued that fines can only work as an effective deterrent if there is no insolvency problem. As we have argued above, in the case of a low probability of detection and an insolvency risk, non-monetary sanctions will have to be applied (Polinsky and Shavell, 1979; Segerson and Tietenberg, 1992). This lesson from economic theory seems to be followed in legal practice as well: the available criminological studies report that the fine is the most commonly used sanction; the application of prison sanctions for environmental crime would be rare and would be limited to cases of fraud or serious environmental harm (see, for the situation in Europe generally, Heine and Meinberg, 1988; Meinberg, 1988; and for the situation of Belgium, Billiet and Rousseau, 2003).

A result of economic theory is that optimal sanctions in the case of environmental crimes depend upon a variety of elements, such as the probability of detection, the harm caused, the available assets of the polluter, the corresponding insolvency risk and the costs of the sanctions to be imposed. Optimal sentencing policy would consist of applying fines as long as possible (in the light of the insolvency risk) and to combine them in

a differentiated manner with non-monetary sanctions where necessary (see Cooter and Ulen, 2004, p. 477). In reality, sentencing practice can be very different. This is more particularly the case in the US where strict sentencing guidelines apply, to which the judge in principle should adhere. In contrast to the economic model, the sentencing guidelines also provide quite often for incarceration as the main penalty in case of violation of environmental regulations. Frank Easterbrook has strongly opposed this idea of strict sentencing guidelines, arguing that 'there is no correct price for crime in the same way that there is no correct price for apples'. He holds that the price of (environmental) crime depends upon a variety of elements, indicated above, which enable the judge to determine the optimal penalty in a differentiated way (Easterbrook, 1983, pp. 295 and 325). Easterbrook therefore supports discretionary sanctioning powers for the judge, arguing that this will allow the judge to differentiate the sanctions in a more precise manner, taking into account the relevant economic criteria.

The economic lessons as formulated by Easterbrook seem to be followed in Europe where, if sentencing guidelines exist at all, they seem to provide sufficient flexibility for the judge to differentiate sanctions according to the economic criteria. Recently, the Department for the Environment, Food and Rural Affairs (DEFRA) in the UK published a *Review of Enforcement in Environmental Regulation* which provides for sentencing guidelines, but at the same time holds that this should not impose a rigid tariff but should merely provide a more systematic framework for more effective and consistent sentencing decisions (Parpworth, 2007, p. 21). Also, recent empirical evidence seems to support Easterbrook's criticism on the sentencing guidelines in the US. Barrett concluded in a study on the application of sentencing guidelines for environmental crime that 'the sentences imposed in the majority of cases reflected the reluctance of judges to impose significant incarceration for violations of environmental laws' (Barrett, 1992, p. 1421). Also, others have recently held that the sentencing guidelines lead to negative outcomes as far as enforcement and deterrence are concerned. Recent research by Babbitt et al. showed that the practice of lenient sentencing of environmental criminals, as a refusal to apply the guidelines, was well documented. Since the judiciary feels that the guidelines 'over criminalize' environmental violations, they may systematically sentence (even significant) violations too leniently, which may undermine the deterrent value of environmental enforcement and may trivialize environmental law itself (Babbitt et al., 2004, p. 63).

As far as non-monetary sanctions are concerned, there are, especially in modern environmental statutes, a variety of measures that can be imposed upon the convicted polluter, such as a duty to restore the harm committed, for example, by cleaning up a polluted soil or an order compensating

pollution victims (independently of the latter's private law rights). Even though these measures are usually treated as non-monetary sanctions in legal doctrine (because they are different from a fine), many of these arguably have a monetary implication as well. In some cases, these measures can even go so far as an order to shut down a plant or to restore the damage that has been caused. In some cases, the legislator also provides the judge with the power to order the publication of the judgment in the mass media.

Even though the application of these special sanctions still varies between different legal systems, one can certainly note their increasing use. For example, if a polluter is prosecuted for illegally depositing waste, he will often be required also to clean up the waste he has discharged. In some legal systems, these orders can be enforced by means of a so-called penalty payment that will be due if the duties are not fulfilled within the time limit laid down in the judgment.

These specific duties seem to be effective penalties and lead to deterrence. The costs of soil clean-up can be substantial and thus provide additional deterrence. The publication of a judgment can lead to serious reputational loss.

One particular sanction which is increasingly gaining popularity in the fight against white-collar crime generally, but also in the area of environmental crime, is the forfeiture of illegal gains. From a legal perspective, this forfeiture of illegal gains rests on the notion that 'crime should not pay'. The gains obtained by the crime should be removed from the criminal in order to put him back in the *status quo ante* (for an overview of these legal foundations, see Faure, 2005, and for a comparative overview see Kilchling, 2002 and 1997). Recently, Bowles, Faure and Garoupa showed that the forfeiture of illegal gain can be efficient at providing additional deterrence in case of a low detection rate and low effective fines (Bowles et al., 2000, 2005). However, early empirical studies by German criminologists showed that the risk of removal of illegal gain had hardly any effect on potential criminals in their decision whether or not to commit the crime (see Smettan, 1992; Perron, 1993). Meanwhile, the possibilities of removing illegal gain as well as the practical application in the environmental area has spectacularly increased since these early studies of 1992–3 (for an overview of the practice in Belgium and the Netherlands, see Faure and De Roos, 1998). The additional deterrent effect, and therewith the effectiveness of the removal of illegal gains, in the case of environmental crime may well have substantially increased.

6. Corporate environmental crime

In case of environmental pollution, the crime is often committed, not by an individual actor, but by persons acting on behalf of a company. Many of

the serious cases of environmental pollution have been committed within corporate entities. Therefore, unavoidably, the question arises whether the corporation, the employee or both should be held liable. At this point, we will not discuss the issue of corporate criminal liability in much detail, since one chapter in this volume deals specifically with the economics of corporate crime. We will merely briefly address the issue from the perspective of environmental crime.

From an economic point of view, designating the liable party is unimportant so long as sanctions are freely transferable and the parties are fully informed. With transferable sanctions, either the corporation charges the liable employee for 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).

However, this Coasian solution to penalties within corporate entities may not always work in practice. One problem is that monetary sanctions are not always freely transferable between the employer (the corporation) and the employee, sometimes because the law prohibits paying someone else's fine. This is, for example, the case in Germany (see Faure and Heine, 1991, pp. 43–4). A contractual transfer of the fine may thus not always be possible. Therefore, in practice, it does matter at whom the penalty is directed (Segerson and Tietenberg, 1992, pp. 61–3). The argument for holding the employer liable is related to the insolvency problem mentioned above: when the corporation is held liable, the less costly fines can longer be applied in reaction to environmental crime; the corporation (employer) can in turn apply sanctions to the employee, such as refusing promotion or termination of the contract (compare with the principle of *respondeat superior* in tort law, Landes and Posner, 1981b, p. 914). Also, in the area of environmental crime, it is held that when the employee cannot bear the full burden of the optimal penalty, the government might still be able to impose the optimal penalty on the company (Cohen, 2001, pp. 208–9).

However, the literature equally indicates that even though there are strong arguments for corporate criminal liability (Friedman, 2000; Kahan, 1998), there are reasons to apply criminal liability to individuals within the corporation as well. We have shown that non-monetary sanctions may have to be applied to environmental crime 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 corporations (Polinsky and Shavell, 1993; Kornhauser, 1982).

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). His arguments against criminal law are mainly arguments against punishing the corporation and are, to a certain extent, of interest for environmental crime as well. One of his points is that a civil lawsuit may be as much of a deterrent as criminal sanctions⁸. 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 crime, 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 liability 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

⁸ Powerful counter-arguments have been produced by Shavell (1984a, 1984b), who showed that in specific circumstances, tort law may lack a deterrent effect.

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).

7. Effectiveness of environmental criminal law?

The sparse empirical evidence that is available with respect to the probability of detection and the probability of being prosecuted and convicted shows, at least as far as Europe is concerned, that these are relatively modest, to say the least. Recent Belgian criminological research showed that around 74 per cent of all reports of violation of environmental laws are not prosecuted (Ponsaers and de Keulenaer, 2003). Moreover, there is of course a substantial part of violations that are not detected at all, which leads to a substantial dark number. Similar Belgian research also shows that when eventually a violation is detected, prosecuted and a sanction is imposed, average fines are relatively low. Research concerning the fines imposed by criminal courts in the region of Gent (Belgium) showed an average fine of 200,000 Belgian francs (Euro 5,000) (Billiet and Rousseau, 2003, p. 131). Similar research performed by German criminologists in the 1990s reveals a similar picture: many environmental crimes are, if detected and reported at all, not prosecuted and the penalties are generally relatively low fines (see, for example, Meinberg, 1988). Similar data are provided by Ogus and Abbot concerning the situation in the UK: prosecutions are conducted for less than a quarter of the worst environmental incidents and the amounts of the fines imposed are low relative to the profitability of the contravening activity (Ogus and Abbot, 2002a, pp. 497–8).

If one takes into account the fact that the economic gain resulting from a violation of environmental statutes can be substantial, it is not difficult to argue that current practice constitutes a serious problem of underdeterrence. In order to outweigh the potential gain to be made (for example, by deciding not to invest in a water treatment plant), detection and prosecution rates as well as effective sanctions should be substantially higher. Many have therefore held that by delaying an investment in environmental prevention equipment enterprises can save substantially on interest payments without additional risks (Nentjes and Hommes, 1990). Also, Cohen concluded from a review of empirical literature that there is little evidence of any preventive effect of increasing monetary sanctions

and none on the role of criminal (non-monetary) sanctions (Cohen, 2000a, 2001a, p. 209). These results could lead to the depressing conclusion that environmental criminal law is apparently not able to provide any deterrence. One could even ask the question why many corporations comply relatively well with environmental law, given the fact that the benefits of violation are usually higher than the expected costs. A simple application of the Becker model teaches that there should in principle be much more environmental criminality than can be observed today. This has in the literature been referred to as the Harrington paradox, following a few papers by Winston Harrington, who identified this issue (Harrington, 1988; Harford and Harrington, 1991). The paradox is the following: the number of inspections (and hence detection) is low; even if violation is detected, sanctions are hardly ever imposed and yet, the level of compliance by firms seems to be relatively high. Apparently, firms may have an incentive to comply with environmental regulations, even if their costs of compliance exceed the expected penalty in case of violation. Some further literature which refines and tries to explain the Harrington paradox shows why firms may have these incentives. Heyes and Rickman (1999) show that enforcement agencies may use tolerance in some cases and for some types of violations in order to increase compliance in other contexts and for other violations. According to them, this type of regulatory dealing will improve both the rate of compliance and the individual performance of firms. Also others (for example, Nyborg and Telle, 2006) have held that the discovered pattern is less paradoxical than it seems. On the basis of enforcement data from Norway concerning compliance with environmental regulation, they show that enforcement of minor violations is indeed lax, but that serious violations on the other hand are subject to credible threats of harsh punishment and that as a result such violations are more uncommon. They therefore hold that these findings are actually consistent with standard theory.

In sum: these more recent studies show that even though in general the probability of detection for environmental offences may be low and on average the imposed penalties may also be low, that should not necessarily mean that firms would be better off with violation than with compliance. In order to analyse this behaviour by firms, not only should actual sentencing policy be addressed, but also enforcement strategy (which will be addressed below in Section 8). This corresponds with a review of empirical literature by Cohen, who showed that even though there is little evidence on the effect of increasing monetary sanctions, there is generally a deterrent effect from increased inspections and government enforcement actions (Cohen, 2000a; Cohen, 2001, p. 209). There are, moreover, other reasons why firms comply, notwithstanding the Harrington paradox.

First, the traditional Becker model assumes the risk neutrality of the potential polluter. Violating polluters may well be risk averse. Even though the actual probability of detection, prosecution and conviction in the case of environmental crime may well be low, in theory the expected penalty can still be high. For most violations of environmental regulations, prison sanctions may be imposed, even though these are (at least in Europe) rare in practice. Risk aversion on the part of the potential perpetrator can thus provide additional deterrence (for a mathematical example, see Bowles, 1982, p. 59).

Second, the economic model of crime is based on available information by the potential perpetrator of the probability of detection and the expected sanction. Even though criminological research shows that both are relatively low, the relevant question is of course whether these are also perceived as such by (risk-averse) potential polluters (see also Ogus and Abbot, 2002, p. 292). Also, the Harrington model discussed above assumes that the monitoring agency has information on the firm's compliance cost. In reality, this assumption may not hold and moreover, there may be of lack of information, and also errors both on the part of the agency and on the part of the potential polluter.

Third, in the case of a prosecution before the criminal court, the polluter may be confronted by other costs which are added to the formal penalty which is imposed. For example, members of a board of directors may in some legal systems 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 (for example, a fine) is relatively low. The time spent and the loss of reputation involved in having pictures of those directors on trial appear in the press may also constitute an additional cost to the perpetrator. Moreover, a conviction for an environmental crime may lead to other costs to the firm. It may, for example, be more difficult to obtain a new permit since the convicted polluter may have lost goodwill with the administrative agency. Recent empirical research by Decker has shown that this is a realistic fear: companies that have complied in the past with environmental regulation more easily receive a new permit (Decker, 2003). A conviction may even lead to an increase in the insurance premium, which equally may lead to additional deterrence.

Fourth, a criminal prosecution and conviction may (of course depending upon the nature of the firm) lead to a significant loss of reputation. The reputational loss of being convicted as a polluter can lead to significant costs for a firm and thus constitute additional deterrence (Ogus and Abbot, 2002, p. 292). This corresponds to the well-known idea that a criminal conviction may have the benefit of 'naming and shaming' (see

generally on these notions, Braithwaite, 1989). The value of this ‘shaming’ approach to crime is debated. Posner does not believe that shaming would deter corporate crime since ‘a corporation can act only through individuals, and there is a constant turnover of these individuals’ (Posner, 1985, p. 1228). However, in a later publication with Rasmusen, Posner seems to recognize the value of shaming in enforcing specific norms (Posner and Rasmusen, 1999). Others are more optimistic and stress that a major advantage of ‘shaming’ is that it can achieve additional deterrence at relatively low costs (Morris and Tonry, 1990; Buell, 2006). The empirical evidence of the deterrent value of a reputational loss resulting from shaming is debated (X, 2003).

The issue has received some attention with respect to environmental crime: some hold that the mere fact of a criminal conviction can lead to a decrease of stock prices, which results in damage to the company which is substantially higher than the fine which was imposed (Karpoff and Lott, 1993). Cohen, however, comes to a different conclusion: he quotes various empirical studies that have demonstrated that the stock value of publicly traded firms is indeed reduced upon the announcement of a bad environmental outcome, such as an oil spill or criminal prosecution. However, quoting another study by Karpoff and Lott (1998), Cohen holds that the stock price effects are approximately equal to government-imposed penalties, clean-up costs and private settlements, so that there is no additional reputational loss (Cohen, 2001a, pp. 213–14). Moreover, the mere fact of being labelled a ‘criminal’ violation did not cause any additional reputation loss.

Of course, the latter two effects play a role in the case of a criminal conviction, not when an administrative fine is imposed. The additional costs of going to trial may thus be an argument in favour of criminalizing environmental offences; it is doubtful whether this criminalization can also be based on the premise that a criminal conviction would lead to an additional reputation loss. There seems to be no empirical evidence to support this statement.

8. Enforcement strategies

In enforcement literature, not necessarily restricted to economic theory, a lot of attention has been paid to the type of strategy which has to be followed to induce compliance by polluters. The literature makes a distinction between two enforcement styles: the economic approach is qualified as the deterrence style, based on the idea that the authorities should be hard on polluters and should prosecute in all cases, preferably resulting in severe sanctions. A deterrence model, therefore, does not rely on agency discretion. A cooperation enforcement style relies more heavily

on negotiations between the polluter and the agency, whereby the agency, through persuasion and by providing information, tries to bring the polluter to compliance. Within this cooperation model, punishment is not the appropriate instrument, but rather a method of last resort if other instruments (persuasion and information) have failed (Van Rooy, 2007b, pp. 228–233).

At first blush, the cooperation model does not fit into the economic approach to enforcement. The classic Becker model assumes that the application of strict and deterrent sanctions, in combination with enforcement efforts to increase the detection rate, will provide incentives for the polluter towards compliance. If a cooperation model merely results in the risk that the polluter would, after being detected, still have to invest in abatement technology which he already had to do on the basis of a permit, deterrence will fail. Some economists therefore hold that the cooperation model (which was followed in the Netherlands in the 1990s) stimulates violations of environmental regulation since companies who comply after a first warning do not encounter any negative consequences of their violation (Nentjes and Hommes, 1990, pp. 1–7). Another problem with the cooperation model is that when a cooperative strategy has failed and the administrative agency has to change its position to a deterrence style, the cooperation and strong links between polluter and the agency may have made it difficult or even impossible to change to a deterrence approach when necessary. The cooperation strategy has the inherent risk that powerful and knowledgeable companies will de facto be able to control and ‘capture’ the agency. See, for example, a study of environmental law enforcement in Denmark, which showed that cooperative enforcement was undermined by capturing (May and Winter, 1999). There is hence always the danger that the cooperation model will lead to situations of collusion and corruption (Garoupa and Klerman, 2004), as a result of which compliance will fail.

However, notwithstanding these limits of the cooperation model, many have also pointed to the limitations of the deterrence approach. It has been argued that a strict deterrence approach which does not take into account the fact that, as a result of practical difficulties compliance is impossible, may lead to a refusal to comply because the deterrence approach is felt to be unreasonable (Hawkins, 1984). Moreover, enforcement agents may be unwilling to act as ‘policeman’ in an adversarial relationship with the polluter (Aalders, 1997, 2003). The cooperative strategy even receives some support from economists. It would indeed be too simple to reject the cooperation style entirely because of the danger of capture. An advantage of the cooperation model is that through persuasion, education and information companies can be lead towards compliance (Fenn

and Veljanovski, 1988). One reason to follow the cooperation model can be related to the high costs for the enforcing agency in bringing a case to court (Ogus and Abbot, 2002, p. 293). Those high costs may also explain why, in some cases, there is a seemingly high tolerance of non-compliance by the enforcing agency; this can be a strategic response by the agency to a difficult enforcement environment (Heyes and Rickman, 1999). This may hence provide a rationalization of 'regulatory dealing' between the agency and the polluter. Especially in cases where administrative authorities are well informed and small and medium-sized enterprises are not, a cooperative strategy could lead to a situation where the controlling agency in fact assists the enterprise towards compliance with environmental regulation (see also Johnston, 2001). This is also confirmed in a recent experimental study which found that there are substantial learning effects in the sense that compliance with the desired pollution reduction is substantially higher in a second period when the firm was informed about the content of their obligations (Alpizar et al., 2004). These results indicate that firms can understand and adapt their behaviour to elaborate regulatory contracts after a suitable learning period. This seems also to correspond with criminological research in the Netherlands which has confirmed that many violations of environmental regulation do not take place wilfully, but rather as a result of a lack of information or knowledge. In these cases, more particularly where first offenders are concerned, a cooperative enforcement style could probably be effective (Huisman, 2001; Huisman and van de Bunt, 1997).

Summarizing, there may not be such a strict distinction between the deterrence and cooperation styles. Proponents of the cooperative approach realize that coercion is also necessary in a cooperation model. Braithwaite therefore proposes a successful enforcement strategy that starts with informal and less intrusive enforcement options (persuasion, warnings), moving to more punitive options (fines or criminal prosecution) when cooperation has failed (Braithwaite, 2002).

In a powerful study, Lofton attributes the difference in enforcement styles between the US (which has a strongly deterrence-based enforcement style) and the UK (which has followed a cooperative strategy) is due to differences in cultural values and attitudes on social regulation (Lofton, 2001). Given the strong opposition of American business to environmental regulation, Lofton argues that only coercion or the threat of coercion would have worked to ensure compliance with environmental regulation in the US. Introducing a cooperative approach (which has worked in the UK) in the US context would, according to Lofton, have had disastrous consequences for the environmental quality in the US. He therefore argues that varying enforcement styles are largely based upon cultural differences.

Hence, one can understand that, given the different cultural attitude of industry to environmental regulation in the US, the shift from traditional command and control to a more flexible system of industry self-regulation is described as a 'dangerous journey' by some American commentators (Steinzor, 1998).

In addition to this literature on enforcement styles, there is also some (partially empirical) related literature on the effectiveness of specific enforcement approaches. First, it can be recalled that an overview of the empirical literature shows that studies generally find a deterrent effect from increased inspections and government enforcement actions, but less so from increasing penalties (Cohen, 2000a; Cohen, 2001a, p. 209). However, a problem is of course that (as was already pointed out by Stigler) costs for increased monitoring can be high. Also, various empirical studies show that even in the absence of frequent prosecutions, inspections deter future violations (for an empirical study of the petroleum sector in Canada, see Eckert, 2004).

Several suggestions have been formulated and experiments executed to increase the effectiveness of monitoring and at the same time reduce monitoring costs. Arlen and Kraakman suggested a system whereby firms are required to self-report a violation of pollution standards; voluntary reporting would be rewarded with lenient treatment, whereas prosecutors would focus enforcement efforts on violations which are not self-reported. Thus, the most severe sanctions would be reserved for offenders who failed to report or who submit false reports (Arlen and Kraakman, 1997; Cohen, 2001a, p. 207). Innes has also shown that there may be substantial economic benefits from stronger incentives for environmental self-reporting, including saved avoidance costs, reduced enforcement costs and an increased frequency of appropriate remediation (Innes, 2001). One lesson from the work of Harrington, which we discussed earlier, is that it may be effective to divide firms into different classes on the basis of their compliance behaviour and to focus enforcement efforts correspondingly (Harrington, 1988; Harford and Harrington, 1991; Harrington and Heyes, 2001). This idea of targeted monitoring (whereby monitoring costs are mostly spent on those known to have a tendency to be in non-compliance) has been worked out, also empirically, by many. Friesen found that by targeting enforcement efforts on specific segments of the regulated community, greater compliance with environmental regulations could be achieved (Friesen, 2003). Also Heyes and Rickman showed that, given limited agency assets to spend on inspections, an enforcement agency may engage in 'regulatory dealing', using tolerance in some contexts and increasing compliance for other types of violations (Heyes and Rickman, 1999). They show that accepting a certain degree of tolerance with specific violations

does not at all mean that the enforcement agency (in the particular case, EPA) is 'going soft' on pollution; it may rather be the result of a strategic choice to maximize the available budget and thus enforcement efforts (see also Heyes, 2002).

Also Rousseau recently showed that the Flemish Environmental Inspection Agency uses targeting to select firms it will routinely inspect and bases this selection on past compliance behaviour and on firms' capacity. Firms are inspected more frequently as long as the environmental problem persists. Once it is solved, firms only receive routine inspections. Hence firms move relatively easily back to the 'good' group. Rousseau argues that higher deterrence could be achieved by lowering the probability of escaping from the 'bad' group, which is effectively equal to one in Flanders. Thus, the deterrence potential of targeting could even be better exploited (Rousseau, 2007).

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