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A Case on the Economic Effects of Legal
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The Environmental Enforcement in the Civil and the Common Law Systems. A Case on the Economic Effects of Legal Institutions

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ABSTRACT

This paper aims to give a comparative analysis on the different enforcement approaches in respect to both civil and common law systems (i.e. Europe vs. USA) by analyzing some crucial aspects of their underlying normative systems. Therefore, the role of the juridical institutions in these two diverse contexts is analyzed, in order to identify the economic efficiency implications based upon the theory of public enforcement of environmental laws.

JEL classification: K0, K42

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1. Introduction**

The general theory on the enforcement of laws, as it is well known, generally focuses on the adoption of the best instruments and methods to detect violators of legal rules and to impose sanctions. Enforcement activities consist, in fact, of all those mechanisms, such as detection, prosecution and punishment, designed to punish and to bring an individual or a firm to comply with formal regulations. This paper aims, first of all, to provide some insights on the economic effects related to the diverse enforcement strategies adopted by legal institutions in both Civil Law and Common Law countries and, secondly, to underline the crucial role that institutions play in the environmental enforcement throughout the development and the implementation of the environmental policies. In order to fully understand the reasons underlying these differences, it is necessary to make, in a comparative perspective, some considerations on the different legal systems, their structural modes of working in respect to the different juridical institutions.

As it is well known, the first analysis in the field of law enforcement, from an economic perspective, began with Beccaria and Bentham, but its renaissance in modern times dates only from 1968, with Gary Becker's article on the economics of crime and punishment, which has led to a huge literature; among all, the work by Polinsky and Shavell (2000) represents certainly the most comprehensive analysis on the public enforcement of law. As it is well known, the basic result of deterrence theory is that potential violators behave according to both the probability of detection and the severity of the sanction; thus, deterrence may be improved either by raising the sanction, or by increasing the expenditures on enforcement to raise the likelihood that the violator will be captured,¹ or again by changing the legal rules to increase the probability of detection (Cohen, 1998).

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¹ In Becker's model, the efficient level of crime is observable when the marginal cost of enforcement is equal to the marginal social benefit of crime reduced per unit of enforcement

Considering the enforcement mechanisms with respect to environmental regulations, some empirical studies (among others, Cohen, 2000) have showed that generally a high level of enforcement (mainly throughout increased inspections) implies a high level of environmental quality. It is crucial, then, that when a regulatory agency imposes a new, perhaps, stricter regulation, there will be also the right degree of enforcement. As McKean (1980) points out, high enforcement costs accompanied with imperfect compliance, make regulations less effective than desired; thus, monitoring and enforcement concerns “should influence choices about how to regulate, and in some instances, about whether to regulate at all”.

All these matters have definitely to be considered from legislators and policy makers in order to identify, among others objectives, a) how much of society’s resources should be spent on enforcement in order to capture violators; b) should the sanction be a fine, imprisonment or a combination of the two; c) how should enforcement policies be adjusted as enforcement cost change. These are, in fact, just some of the most critical issues that characterize the social welfare maximization problem from the side of the institutions. But also the legal systems characterizing the common law and the civil law countries have important effects on the development of environmental enforcement policies. So, in the following paragraphs, particular attention will be given to how the enforcement approaches chosen by the US and the EU institutions can deter firms from committing illegal activities.

2. Environmental Enforcement and Firms’ Compliance: the Economic Role of Institutions

In order to identify the economic efficiency implications based upon the theory of public enforcement of environmental laws, it is necessary to review the main theoretical contributions of the economic literature on enforcement and firms’ compliance. Providing some plausible explanations for the different environmental enforcement approaches between US and EU, will help us understanding how institutions and enforcement authorities can decide what kind of enforcement

(administrative, civil or criminal) to pursue and, consequently, what type and degree of sanction (monetary or non-monetary) can be imposed.

From a theoretical point of view, in the literature, as already said, since Becker's (1968) seminal article there has been a conspicuous amount of economic research and economists focused their attention mostly in studying the optimal allocation of resources in order to reduce illegal behaviors. According to Becker, the authorities have, primarily, to determine the amount of resources to prevent offenses and to apprehend offenders. In particular, Becker tries to find those expenditures on law enforcement and punishments that minimize the social loss (the sum of damages, costs of apprehension and conviction, and costs of carrying out the punishments). In the basic model of enforcement, the individual's decision on whether to carry out an illegal behavior or not is the rational outcome of comparing costs (expected sanctions, social costs, stigma, etc.) and benefits (illegal gains, psychological gain, etc.) deriving from the unlawful action.

One of the primary goals of environmental enforcement is deterrence; in any regulatory situations, some individuals will comply voluntarily, some will not comply, and some will comply only if they see that others receive a sanction for noncompliance. In fact, deterrence is just that phenomenon for which individuals will change their behaviors to avoid a sanction. In the vast economic literature on enforcement, many are the factors that have been identified as motivating compliance (such as, among others, the desire to avoid a penalty/future liability, desire to save money by using more cost-efficient and environmentally sound practices, moral and social values for environmental quality, desire to avoid jail, the stigma of enforcement, etc.), as well as many are the barriers to compliance (such as, for example, lack of social respect for the law, desire to achieve competitive advantages, ignorance about requirements, unavailable or unreliable technologies, etc.).

The notable and integrative article by Polinsky and Shavell (2000) represents one of the most comprehensive analyses of the public enforcement of law; this theory, exactly, starting from the

simple Becker's model, then, pass to analyze a variety of plausible scenarios with respect to the choice between fines and imprisonment as a form of socially desirable penalties.²

Many additional hypotheses can be introduced in order to extend the basic theory's results. Accidental harms,³ level of activity, enforcement error,⁴ marginal deterrence,⁵ repeat offenders,⁶ self-reporting,⁷ plea bargaining,⁸ corruption,⁹ principal-agent relationship,¹⁰ incapacitation,¹¹ are just some of the extensions that can change the determination of the expected utility calculation, changing, therefore, the probability, form and level of sanctions that individual would then face.

Several other authors have extended Becker's ideas in different ways. In a model of optimal enforcement by Malik (1990) offenders can engage in activities that reduce the probability of being caught and fined. As in other extensions - such as the one by Polinsky and Shavell (1991) where wealth varies among individuals, or the model by Bebchuk and Kaplow (1993) who consider the possibility that individuals are not all equally easy to apprehend - the optimal fines turn out to be less than those proposed by Becker. Polinsky and Shavell (1992) find that the optimal fine equals the harm, properly inflated for the chance of not being detected, plus the variable enforcement cost of imposing the fine. In a previous work, Shavell (1985) emphasized that it is not difficult to give examples of conflict between the real use of monetary and non-monetary sanctions and their theoretically optimal use as deterrents; in practice, in fact, can be found many occasions where a person with substantial assets is sentenced to prison but pays no fine or only a modest one. If so, a saving in social resources could be achieved by reducing prison sentences and making greater use of fine. An example of plausibly insufficient use of imprisonment may also be given. Where firms

² For a complete analysis of a model in which two types of enforcement efforts, specific and general, are distinguished, see S. Shavell, "*Specific versus General Enforcement of Law*," *Journal of Political Economy*, vol. 99, no.5, 1991.

³ See Shavell, 1993.

⁴ See Kaplow and Shavell, 1994a; Block and Sidak (1980).

⁵ See Friedman and Sjoström (1993), Mookherjee and Png (1994), Shavell (1992), and Wilde (1992).

⁶ See Landsberger and Meilijson (1982), Polinsky and Rubinfeld (1991), Polinsky and Shavell (1998).

⁷ See Innes (2000), Kaplow and Shavell (1994b), Malik (1993).

⁸ See for example Froeb (1993), Reinganum (1988) and Miceli (1996).

⁹ See Becker and Stigler (1974), Klitgaard (1988), Shleifer and Vishny (1993), Bowles and Garoupa (1997), Mookherjee and Png (1995), Polinsky and Shavell (1999).

¹⁰ See Newman and Wright (1990), Tirole (1986), Kornhauser (1982), Polinsky and Shavell (1993).

¹¹ See Shavell (1987b).

might cause harms much greater than their worth or where the harms would be difficult to investigate, tort liability may not create an adequate level of deterrence. These examples represent the possibilities for the courts and the legislature to achieve social gains through an altered use of fines and imprisonment.

Standard theory predicts that a firm will comply with a regulation when its compliance costs are less than the expected penalty associated with violation. Frequent monitoring and relatively high fines will be necessary to deter firms from violating regulations. An evident economic reason for compliance is that firms respond to both positive and negative incentives; if expected penalties are sufficiently high, the threat of being punished for noncompliance should be an adequate reason. However, as Russell, Harrington and Vaughn (1986) and Harrington (1988) note, government-monitoring activities are often quite limited. Moreover, even if discovered to be in noncompliance, fines are low and too often inadequate to deter firm to pollute. Despite these facts - low inspection probabilities and small fines being imposed - however, compliance is generally considered to be high. Winston Harrington (1988) has noted the following paradox: firms' rate of compliance is high even though the EPA's enforcement activity is carried on at still low levels and often violations are not punished even if discovered.¹²

To explain the phenomenon of high compliance in the absence of strict enforcement, Harrington (1988), Harford and Harrington (1991), and Harford (1991) adapted existing models of income tax enforcement to study enforcement strategies when government policies depend on the firm's previous compliance status.¹³ It has been shown that it is possible to achieve a very high compliance level with almost no social cost. Consistently with the Harrington paradox, Heyes and Rickman (1999) show, in a static model consistent with the same set of stylized facts, that the

¹² Harrington shows evidence of these and other stylized facts on pages 29-32. "The reticence to use penalties is exhibited in table 1, which reports the results of an RFF survey of state-level enforcement activity conducted in 1984. As shown, most states levied penalties for less than 5 percent of the notices of violation (NOVs) issued each year. Also, the size of the penalties is generally very small" (Harrington, 1988: 30-31).

¹³ In the Harrington model, the basic idea is that firms are assigned to groups based upon their compliance history. Ignoring firms that are never monitored, a simple two-group scheme would involve firms found to be in compliance at their last inspection (group 1) and those found to be out of compliance at their last inspection (group 2). Group 2 firms would be subject to a higher monitoring probability, to stricter regulatory standards, or to higher fines than would firms in group 1.

introduction of regulatory dealing¹⁴ will enhance compliance and will improve the environmental performance of the industry. In other words, the enforcement agency uses of tolerance in some context and for some violations can increase compliance in other contexts and for other violations, with the main objective of maximizing the overall environmental protection.

Another significant work on the role of institutions (i.e. enforcement authority) is the one provided by Helland (1998) in which he demonstrates that targeting¹⁵ produces more cooperation in the form of self-reporting and, thus, encourages firms to report violations they detect. The optimal targeting scheme is also studied by Friesen (2003) who shows that adopting the optimal two-group targeting scheme can provide additional cost savings for an enforcement agency even over the scheme suggested by Harrington. Recently, Lando and Shavell (2004) have also demonstrated that there is an intrinsic advantage in focusing law enforcement effort on a subgroup of possible violators, rather than applying law enforcement effort uniformly over the potential violators.

But the threat of being placed on the enforcement agency's target list is not the only reason for compliance. Downing and Kimball (1982) documented the low penalties for noncompliance and the relatively high compliance rates in the U.S., observing that firms receive some subsidies in the form of tax breaks and special financing. They also argue that industry might want severe regulation as an entry barrier to new firms. Finally, they remark that risk aversion might help to explain compliance as well as corporate image or reputation. Some surveys that provide this evidence can be found in Cahill and Kane (1994), Zerbe (1996), and Doonan, Lanoie and Laplante (1998).

It is also possible, for example, that managers who make the decisions about compliance simply believe that compliance is the right thing to do. In other words, social norms might operate to generate significant compliance rates, even without the threat of penalties. The role of society

¹⁴ A regulatory deal involves the agency agreeing to tolerate non-compliance in some sub-set of domains in "exchange" for compliance in others.

¹⁵ In targeting models, a regulatory industry is divided into two groups: good firms and bad firms. Bad firms have a history of violations and they are inspected more frequently. Because inspections are costly, firms attempt to move into the good firm category by cooperating with the regulator. The alternative to targeting is to raise the probability of inspection for all firms. In the absence of perfect information, targeting strategies are superior in achieving the highest possible compliance rate for a given regulatory budget constraint.

pressure and other forms of informal sanctions are explored, among others, in Arora and Cason (1996), and Konar and Cohen (1998). These works and the non-economic environmental compliance literature find support for informal society pressure and social norms as playing an important role in compliance.

An interesting question that has not often been discussed in the literature is the extent to which enforcement and compliance differs with the level of government in a federal system. Should monitoring and enforcement be delegated to a state or local jurisdiction, or remain with the Federal enforcement agency? Burby and Paterson (1993), in their analysis, study compliance under two different enforcement agencies, a state-level enforcer and a local enforcement authority, with the objective of investigating whether delegating enforcement authority to the local level will result in more or less compliance. The theory is ambiguous on this issue: a decentralized enforcement agency might be overly concerned with local and specific problem (job losses, for example) and could be characterized, therefore, by a less stringent enforcement, but at the same time, it has the advantage to know the facilities and individuals within the firm, and has more chances to gain the cooperation of local managers.

Enforcement of laws and enforcer institutions represent, undoubtedly, a crucial element of any regulatory policy design and are matters of fundamental importance for promoting social welfare. Arruñada and Casari [2007] in their recent experimental paper, analyze how different political and judicial institutions may fail to produce enforcement and thus may determine market failures. They show, in fact, that some alternative institutional arrangements may 1) produce different enforcement results and 2) provide decision makers with different incentive functions, by encouraging or discouraging enforcement actions. It is important to remember the influential Backhaus' perspective (1997), which has tried to overcome the hiatus between common law and statute law and has provided a really fertile scientific floor by showing that, from an institutional comparison of the two systems, not only the common law but also the statute law can be expected to develop towards economic efficiency.

The enforcement process can be subdivided, from a theoretical point of view, in different sub-processes, such as detection, prosecution and punishment. Obviously, each of these stages has direct implications not only for the determination of the severity of sanctions and for the choice, for example, between fines and imprisonment, but also for the choice between administrative/civil and criminal enforcement, and in general for formulating effective policy toward illegal behaviors.

Besides reviewing the basic predictions suggested by the economic theory of enforcement, as we said, there is the ambition of comparing some peculiar aspects, both legal and institutional, that characterize the common law and the civil law systems. As also Posner (2004) recently noted, the institutional differences between the common and the civil law systems are profound and they have mainly to do with the different structures of the two legal systems. In recent years, the United States have become increasingly vulnerable to criminal liability for violations of environmental laws and this tendency, proved by the recent stiffening of criminal environmental sanctions, suggests that tougher enforcement is likely to continue. In Europe, instead, it is possible to observe a different approach characterized by a certain degree of reluctance to pursue a firm under criminal law. Explaining the reasons of these two different behaviors is not an easy task, but we can probably say that they are, at least partially related, to the historical, legal and cultural roots of the two systems. In the following paragraphs, some considerations on these issues are given in order to raise the necessary distinctions between these different behaviors on the enforcement of environmental laws.

3. E.U. versus U.S.: some Issues at Stake

In the previous paragraph, we have seen that from an economic point of view, the most important and well-known result is that the enforcement authority's problem is to maximize social welfare by choosing, among others, enforcement expenditures, the probability of detection, the type of sanction, and, consequently, the level of fine and the length of imprisonment term. However, it is a little bit *naïve* to think of simply applying the prescriptions suggested from the economic theory; it is, instead, necessary to get into the single socio-institutional realities and account for the

structural differences between the U.S. and the E.U. legal and economic systems.

The first relevant difference is a structural one (common law versus civil law) and the second substantial difference is in the way of spurring enforcement strategies (criminal enforcement vs. civil enforcement). Then, there are considerable differences regarding the organizational and operational structure of the environmental authorities/institutions. These strong differences between the two systems generate very different results and it is definitely in light of these differences that the related literature has to be interpreted. Multifold are, therefore, the aspects that we should bear in mind; however, we could consider the US and EU legal systems and their environmental enforcement authorities/institutions in a representative manner.

Keeping in consideration the basic theory of public enforcement of law, let us comment now on the different enforcement's approaches and strategies in Europe and in the United States. The European authorities have generally adopted both administrative, where possible, and civil judicial mechanisms to carry out enforcement programs. Criminal enforcement (which may include monetary penalties and imprisonment), instead, has substantial public support in the United States, even though it can be significantly costly and involve complex procedures; the deterrent effects of criminal sanctions has been so great that even a relatively small number of successful cases has caused other firms to change their business ethics.¹⁶ It is clear that the potential for applying criminal enforcement in environmental cases depends on a country's legal system and on whether appropriate authorities are provided.

We said that probably the reasons for the more or less lenient standards, for the more or less severe enforcement, for the more or less stringent environmental policy, have to be found in the historical, legal and cultural roots of the two systems, which in turn affect also their attitude toward sanctions. In the U.S., the criminalization of environmental law is the latest battleground over the definition and the implementation of the enforcement policy. In this respect, a very interesting and, at the same time, a very criticized issue (which represents also a fruitful area of study) is the

¹⁶ Under U.S. Sentencing Guidelines, sentences for environmental crimes can be reduced if the corporate official can demonstrate a comprehensive corporate compliance program.

efficiency of common law. Meiners and Yandle in their study (1992) make the case that common law in the United States would provide more environmental protection for water and the rest of the environment than the whole regulatory process. The nature of the common law lies in the fact that the decisions are made by independent judges, responding to independent cases filed by private parties. A legal system characterized by these elements, for Meiners and Yandle, is more likely to produce sensible principles than legislative bodies that produce rules greatly influenced by special interests.¹⁷ They argue that the weakness of federal statutes is in their being influenced by special interests and in their intrinsic lack of competitiveness.

One of the most acknowledged arguments, in the sphere of the traditional law and economic theory, is the one that considers the common law system intrinsically more efficient than the civil law system, even though recently this issue has been object of strong critiques (i.e, Deffains, 2005). The roots for the superiority of the common law system over the civil law have been found basically in two issues (Cabrillo, 2007). The first one looks at the common law as a better instrument for the defense of individual liberty and democracy (Hayek, 1973); the second argument emphasizes the superior capacity of common law in achieving economic efficiency (Posner, 2003).

Hayek believes in the superiority of common law since the English institutional system was administered by judges and courts highly independent from government, in contrast to civil law system which is thought to be influenced by the interests of special groups.¹⁸ In his opinion, also, common law since consists of a collection of general principles can be better explained and developed by judges in their discretionary decisions.

Posner's asserted superiority of common law is different from Hayek's argument given that it is based on the idea of efficiency. Landes and Posner (1987) explain why common law tends to be efficient, in terms of the well known Hand formula. Accordingly, a person or company should be held liable for an accident if the cost of preventing it is less than the expected cost of the accident, that is the product of the damage and the probability that an accident would result. So this rule

¹⁷ See also Pasour (1996).

¹⁸ See Cooter and Kornhauser (1980), Priest (1977), Rubin (1977).

places liability on the party better able to prevent or minimize the damage. The superiority of common law is based, therefore, on its assumed better capacity in finding efficient solutions. The contended efficiency of common law is also explained by the fact that courts have their own utility-functions which lead them to choose efficient rules.

The civil law tradition, instead, has its roots in the Roman law and was adopted by several states.¹⁹ The main distinctive feature of the civil law is the embodiment of general principles of law in a code, while the most important sources of law in common law jurisdictions are judicial case decisions. However, as numerous authors (i.e., Backhaus, 1997; Funken,...; Glaeser and Shleifer, 2002) in the literature have noted, many common law countries are moving toward codification and there is a trend toward convergence of both systems. Furthermore, to the extent that legal rules in common law and civil law systems differ, it is hardly clear that the typical civil law rules are less efficient (Shavell, 1987a).

Several political and economic conditions are the starting points to explore the significant differences between common law and civil law countries. In literature, it has been argued by some authors (La Porta et al. 1999, 2002, Djankov et al. 2002) that although civil law countries are characterized by heavier regulations, they show less secure property right, more corrupt and less efficient governments, and even less political freedom than do the common law countries.

Some legal historians (Dawson 1996, Berman 1983, and Damaska 1986) show that the two systems have very different strategies for law enforcement and adjudication. Glaeser and Shleifer (2002) emphasize the fact that it is important to distinguish between countries that have chosen their legal rules and regulations, and countries into which such rules were transplanted. For the countries that choose their legal rules, their model suggests that a more extensive regulation facilitates the enforcement of laws. The transplantation of a civil law system may lead to less secure property rights, heavier intervention and regulation, and more corruption. The transplantation of common

¹⁹ The civil law tradition was adopted by several states, including France. Napoleon exported French civil law to the other European states; French civil law was later transplanted to Latin America and parts of Africa and Asia.

law does not involve these kinds of problems since law enforcement is relatively depoliticized in view of the fact that juries and judges are independent.

As we said, many are the structural differences between common law and civil law that can help us to understand the diverse enforcement mechanisms and dynamics. The systematization of law is proper of civil law system, while common law consists of case law derived from hundreds of thousands of cases. The second argument of difference is the method of judicial construction and the role of precedents: the common law would work from case to case, while the civil law would reason syllogistically, subsuming a concrete case under a general rule. Another issue in the relation between judge made law and statute law is flexibility of law. On the one hand, judge made law is more flexible than statute law, especially if courts have the task of filling in open norms and if statute law is the result of a process of codification. On the other hand, flexibility of judge made law can be weakened by the commitment to precedents; as it has been observed (Kerkmeester and Visscher, 2003), it is not possible to give a general opinion regarding the superiority in terms of efficiency of one system to the other.

Some authors argue that there has been a great deal of convergence between common and civil law systems in the last decades (Coffee 2000), which means that the two systems have become closer and have lead to similar decisions. Although the many differences are still valid, a trend towards codification in many common law countries can be observed. For example, Australia, England and the United States now have an extensive body of codes in the fields of bankruptcy, intellectual property, antitrust, banking regulation, securities and tax law.²⁰ The reason for the increasing codification in Common Law jurisdictions, in the words of Guido Calabresi, is that “the courts are not capable of writing speedily enough most of the rules that a modern society apparently needs” (Calabresi, 1985).

One of the main differences between the United States and the European Union regarding the enforcement of environmental laws has to be found not only in the structural mode of operating

²⁰ See Mattei U, *Comparative Law and Economics*, University of Michigan Press, Michigan, 1997 at 101-21.

of the two legal systems but also in the institutional context. In Europe it is possible to observe a certain degree of reluctance to pursue a firm or individual under criminal law. There are few cases brought, particularly in relation to the population and number of firms. The ratio is higher in the U.S., where after two warnings, and if there is insufficient compliance, automatically a civil case is initiated; if some knowing intent or fraud is found, then, the individual or company is pursued under criminal law. Instead of employing criminal sanctions, Europe has traditionally preferred to use administrative and civil enforcement, more flexible than a lengthy criminal trial, to ensure regulatory compliance by its industries. In fact, the European legal practice shows that imprisonment is rarely used or only used in cases in which fines are not paid; even when prison sanctions are imposed, they are relatively low on average and often suspended on probation (IMPEL, 2000).²¹ In the IMPEL (European Union Network for the Implementation and Enforcement of Environmental Law) Report (2000), it is argued that one main reason for the preferences for fines and the relatively low average of the criminal penalties is the fact that most offences are of a minor nature and the offenders are often first time offenders.

Thus, criminal enforcement has not been as necessary in Europe where the principal methods of inducing compliance with environmental regulations have been civil remedies. Civil enforcement, however, generally has focused on achieving compliance with emission standards and criminal enforcement is still needed to deter violations by companies that handle environmentally harmful substances.

There is still a tendency in European countries for enforcement authorities and firms to work together to resolve the compliance problems without formal enforcement actions, but the behavior line is slowly changing toward the use of stronger mechanism, in large part because of the recognition that many EU environmental laws are not being enforced (Kubasek, Browne and Williamson, 2000). The European Commission is strengthening the implementation and enforcement of environmental laws in all the member states

²¹ IMPEL Network, *Criminal Enforcement of Environmental Law in the European Union*, Report 2000.

In understanding why criminal prosecutions in Europe are less frequent and in analyzing the differences in enforcement strategies in the U.S. and Europe, several considerations have to be made. First of all, I shall maintain the public opinion regarding the criminalization of pollution and the public desire for prosecutions is different in the two countries. A variety of others factors, moreover, can contribute to explain this divergence in enforcement strategy,²² including cultural differences, different organizational structures, the timing of major pollution accidents, and different regulatory approaches related to the essence of common law and civil law systems.

4. An Efficiency Comparison

For better evaluating the fundamental features of common law and civil law systems is necessary analyzing them in the light of efficiency.

The theory of optimal enforcement of laws is based on a particular concept of justice: justice as efficiency (maximization of the social planner's objective function resulting from individuals' decision of committing a crime).²³ Most models of optimal enforcement of laws focus on the maximization of social welfare as the objective of public policy. In order to achieve the socially optimum level of deterrence, a fundamental result is implied by the fact that the fine should be maximal since it is supposed to be a costless transfer whereas imprisonment is costly.

In application, however, the problem is very complex. Polinsky and Shavell (2000) use a series of simplifying assumptions to show that the optimal fine is the maximal fine and that it is optimal to supplement a fine with an imprisonment term if the maximal fine is not very large and the marginal cost of imprisonment is sufficiently small.²⁴ Under the assumption of perfect information on behalf of the social planner concerning each individual's wealth, and of costless means of enforcing fines, the optimal fine is the maximal fine.²⁵ Frequently, fines cannot be

²² Demougin and Schwager (2003) find two peculiar observations. Comparing crime statistics and the general law enforcement expenditures between the United States and the member states of the European Union, it emerges that even though law enforcement in the U.S. is much higher than in Europe, crime rates are generally higher in the U.S. The different pattern for these behaviors is a challenge to understand; the arguments range from the analysis of the formal justice system to less informal institutions like, community etc.

imposed costlessly and in some cases cannot be imposed at all. For example, when fines cannot be used to deter, because the appropriate fine exceeds the assets of violators, imprisonment should frequently be employed as the form of penalty.

Some common arguments that are considered against the use of fines are the following. Fines could be “unjust” because the wealthy individuals are able to pay fines, whereas the poor serve jail sentences. A second argument is that the typical criminal has extremely low wealth. Fines are more useful for crimes that are committed by the rich, since they have more resources to pay fines. As a result, feasible fines might be so small as to be inefficient as deterrents. Another argument for the use of prisons rather than fines is the value of incapacitation of repeat offenders. The practice of punishing repeat offenders more severely than first offenders demonstrates that by imprisoning individuals for a longer time, society can expect to prevent more crimes during their period of imprisonment than it would do if it imprisoned first offenders, whose propensities are harder to predict, for the same period. The same prison resources attain a greater reduction in crime.²⁶ The fact that an individual has committed previous crimes makes society more confident that he is really guilty of the crime with which is charged. A final argument for the explanation of the limited use of fines is that the government cannot enforce fines except under the threat of prison sentences.

Fines are useful when the social externality of the crime is small relative to the enforcement and incarceration costs. Polinsky and Shavell have incorporated notions of the fairness of sanctions into the standard theory of enforcement: a concern for fairness not only has a direct effect on the choice of sanctions but also influences the optimal probability of enforcement.²⁷

Combination of fine and imprisonment can be useful, because they allow the social planner to substitute a fine for some portion of the socially costly jail sentence, in order to minimize the

²³ See Garoupa Nuno, “The Theory of Optimal Law Enforcement”, *Journal of Economic Survey*, 11, pp.267-295, 1997.

²⁴ See Polinsky Mitchell A., Shavell Steven, “The optimal use of fine and imprisonment”, *Journal of Public Economics*, 24, pp. 880-891, 1984.

²⁵ Klein Alexander, “Jail or Fine –Let Them Choose”, Paper, University of Munich, January 19, 2000.

²⁶ See Posner Richard A., “An Economic Theory of the Criminal Law”, *Columbia Law Review*, 85, pp. 1193-1231, 1985.

²⁷ See Polinsky Mitchell A., Shavell Steven, “The Fairness of Sanctions: Some Implications For Optimal Enforcement Policy”, *American Law and Economics Review*, 2, pp. 223-237, 2000.

enforcement expenditures. In this context, the federal sentencing guidelines represent a strong limitation in judicial discretion use. One negative consequence is that judges cannot tailor punishments to the specific situation of individual criminals.²⁸

On efficiency grounds, criminal enforcement strategies can control pollution risks and deter violators as well as administrative and civil enforcement actions even though the latter tend to involve more frequent but more flexible litigations.²⁹ Another element of the analysis concerns the issue whether the number of cases could be socially excessive (there will be a litigation explosion?) or perhaps socially inadequate.

Before giving some opinion in deciding between most efficient enforcement systems, it is worthwhile to consider the relative economics merits of enforcement strategies respectively in common law and in civil law jurisdictions. The following table can be helpful in understanding the different aspects that can play an important role in deciding the most desirable system.

5. Some Concluding Remarks

The choice of the right combination of a regulatory framework and a legal framework to implement an environmental policy is surely a difficult task, which requires structured analysis in order to model the interactions between different decision makers, such as governments, firms and regulators. Moreover, the efficiency of a legal system with its rules and its normative behaviors is another crucial aspect of the overall optimal enforcement problem. These issues and the profound historical differences between the regulatory systems of the United States and Europe have played an important role in the different patterns of environmental enforcement; it is essential, then, to conquest the right consciousness to understand these differences and to consider that public consensus is, above all, what makes tendency.

²⁸ See Levitt Steven D., "Incentive Compatibility Constraints as an Explanation for the Use of Prison Sentences Instead of Fines", *International Review of Law and Economics*, 17, 179-192, 1997.

²⁹ See Cory Dennis, Livingston M., Northrop H., "Agricultural Contamination of Arizona Groundwater: The Case against Liability without Fault", paper presented at the Southwestern Economic Association Annual Conference, Texas, March 2000.

Probably the more aggressive enforcement adopted by the U.S. Environmental Protection Agency compared to the European Union institutions, derives from the fact that American industries are philosophically opposed, as Lofton (2001) says, to environmental regulation and only coercion or the threat of coercion works to assure compliance with environmental laws. The relative willingness of the Europeans to cooperate with regulatory authorities has been indicative of a much broader acceptance of public authority. Europe and the United States have developed regulatory and enforcement approaches best suited to the culture and values in each country: the cooperative approach works in Europe because there is not a provoking attitude toward public authority, a stronger deterrence approach is more suitable to U.S. where industry is highly competitive and less inclined to accept the guidance of government or public authorities.

In Europe, in fact, the general tendency of less criminal enforcement is due, also, to several other reasons, such as for example, to the fact that, in many European countries there is still a substantial degree of unfamiliarity of judges in this relatively new field of environmental law, and that the moral blame on the environmental offences is not felt, perhaps, as being very high.

It is clear that the role of enforcer's authorities and legal institutions in promoting compliance becomes extremely important since their approaches indicate and influence economic and social values; enforcing a law criminally tends undoubtedly to send a stronger message, compared to the administrative and civil enforcement, on the fact that compliance is important and drives toward the development of more robust social norms of compliance. However, criminal penalties may not be appropriate for violations that are too minor to focus government resources on the legal process necessary to impose those sanctions.

These structural differences in law enforcement and substantive law are critical in order for the environmental policies to be effective, since so much is at stake environmentally and economically. The economic effects of the different enforcement approaches, therefore, deserve particular consideration in terms of cost and benefits to be balanced in order to maximize social welfare and the implications that the legal institutions can play in this sense are enormous,

depending on how they decide to enforce environmental wrongdoers and what types of sanctions they may impose for violations.

REFERENCES

- Arora, S. and T. Cason (1996). Why do Firms Volunteer to Exceed Environmental Regulations? Understanding Participation in EPA's 33/50 Program, *Land Economics* 72(4), 413-32.
- Arruñada and Casari (2007). How Enforcement Institutions Affect Markets, ISNIE, April, Reykjavik.
- Backhaus, J. (1997). Efficient Statute Law, in *New Palgrave Dictionary of Economics and Law*.
- Bebchuk, L.A. and L. Kaplow (1993). Optimal sanctions and differences in individuals' likelihood of avoiding detection, *International Review of Law and Economics* 13, 217-224.
- Becker, G.S. (1968). Crime and Punishment: an Economic Approach, *Journal of Political Economy* 76:169-217.
- Becker, G.S. and G.J. Stigler (1974). Law Enforcement, malfeasance, and compensation of enforcers, *Journal of Legal Studies*, 3:1-18.
- Bentham, J. (1789). An Introduction to the Principles of Morals and Legislation, in *The Utilitarians*, 1973 ed. (Anchor Books, Garden City).
- Berman, H.J. (1983). *Law and Revolution*, Cambridge, Harvard University Press.
- Block, M.K. and J.G. Sidak (1980). The Cost of Antitrust Deterrence: Why not Hang a Price Fixer now and then?, *Georgetown Law Journal*, 68:1131-1139.
- Bowles, R. and N. Garoupa, (1997). Casual Police Corruption and the Economics of Crime, *International Review of Law and Economics*, 17:75-87.
- Burby, R.J. and R.G. Paterson, (1993). Improving Compliance with State Environmental Regulations, *Journal of Policy Analysis and Management* 12(4):753-772.
- Cabrillo, F. (2007). Law and Economic Development: Common Law versus Civil Law, ISNIE, April, Reykjavik.
- Cahill, L.B. and R.W. Kane (1994). Corporate Environmental Performance Expectations in the 1990s: More than Just Compliance, *Total Quality Environmental Management* 3, 409-20.
- Calabresi, G. (1985). *A Common Law for the Age of Statutes*, Harvard University Press, Cambridge/Mass.
- Clifford M. (1998). *Environmental Crime – Enforcement, Policy and Social Responsibility*, Aspen Law Publishers.
- Cohen, M.A. (1998). Monitoring and Enforcement of Environmental Policy, Vanderbilt University, <http://www.vanderbilt.edu/VCEMS>
- Cohen, M.A. (2000). Empirical research on the deterrent effect of environmental monitoring and enforcement, *Environmental Law Reporter* 30:10245-52.
- Cooter, R.D. and L. Kornhauser (1980). Can Litigation Improve the Law without the Help of Judges?, *Journal of Legal Studies*, 9:139-163.
- Cooter R., Ulen T. (1988). *Law and Economics*, Addison Wesley.
- Cory C. D. and A.R. Germani (2002). Criminal Sanctions for Agricultural Violations of the Clean Water Act, *Water Policy*, vol. 4 (6).
- Damaška, M. R. (1986). *The Faces of Justice and State Authority*, New Haven: Yale University Press.
- Dawson, J.P. (1960). *A History of Lay Judges*, Cambridge: Harvard University Press.
- Deffains, Bruno (2005). Efficiency of Civil Law, in *Economic Analysis of Law: A European Perspective*, Aristides N. Hatzis, ed., Cheltenham, UK: Edward Elgar.
- Demougin D., R. Schwager (2003). Law Enforcement and Criminality: Europe vs. USA, *International Review of Law and Economics*, 23:217-225.

- Djankov, S., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer (2002). The Regulation of Entry, *Quarterly Journal of Economics* 117:1-37.
- Doonan, J., P. Lanoie, and B. Laplante (1998). Understanding the Environmental Performance of the Canadian Pulp and Paper Industry,” (mimeo) Ecole des Hautes Etudes Commerciales, Montreal.
- Friedman, D.D. (1995). Making sense of English Law Enforcement in the Eighteenth Century, The University of Chicago Law School Roundtable, 2:475-505.
- Friedman, D.D. and W. Sjoström (1993). Hanged for a Sheep – The Economics of Marginal Deterrence, *Journal of Legal Studies*, 22:345-366.
- Friesen L. (2003). Targeting Enforcement to Improve Compliance with Environmental Regulations, *Journal of Environmental Economics and Management*, 46:72-85.
- Funken, K. (...). The Best of Both Worlds – The Trend toward Convergence of the Civil Law and the Common Law System, LA 732 Comparative Legal Essay.
- Garoupa N. (1997). The Theory of Optimal Law Enforcement, *Journal of Economic Surveys*, 11: 267-295.
- Glaeser E.L. and A. Shleifer (2002). Legal Origins, *The Quarterly Journal of Economics*, 117(4):1193-1229.
- Glaeser, E., S. Johnson, and A. Shleifer (2001). Coase versus the Coasians, *Quarterly Journal of Economics* 116, 853-900.
- Harford J.D. (1991). Measurement Error and State-Dependent Pollution Control Enforcement, *Journal of Environmental Economics and Management* 21, 67-81.
- Harford, J.D. and W. Harrington (1991). A Reconsideration of Enforcement Leverage when Penalties are Restricted, *Journal of Public Economics* 45(3), 391-95.
- Harrington, W. (1988). Enforcement Leverage When Penalties Are Restricted, *Journal of Public Economics* 37, 29-53.
- Hayek, F. A. (1973). Law, Legislation and Liberty, vol. 1, *Rules and Order*, London: Routledge.
- Helland E. (1998). The Enforcement of Pollution Control Laws: Inspections, Violations, and Self-Reporting, *The Review of Economics and Statistics*, 80:141-153.
- Heyes A. and Rickman N. (1999). Regulatory Dealing – Revisiting the Harrington Paradox, *Journal of Public Economics*, 72:361-378.
- Imbriani, C. (2005). Le Relazioni tra Cultura Giuridica e Cultura Economica, in *La Formazione del Giurista*, Atti del Convegno - Roma 2 luglio 2004, Giuffrè ed.
- IMPEL Network. *Criminal Enforcement of Environmental Law in the European Union*, Report 2000.
- Innes, R. (2000). Remediation and Self-Reporting in Optimal Law Enforcement, *Journal of Public Economics*, 72:379-393.
- Kaplow, L., & Shavell, S. (1994a). Accuracy in the Determination of Liability, *Journal of Law and Economics*, 37:1-15.
- Kaplow, L., & Shavell, S. (1994b). Optimal Law Enforcement with Self-Reporting of Behavior, *Journal of Political Economy*, 102:583-606.
- Kaplow, L., & Shavell, S. (2000). Economic Analysis of Law, in A. Auerbach, & M. Feldstein (Eds.), *Handbook of Public Economics*.
- Kerkmeester, H. and L. Visscher (2003). Learned Hand in Europe: a Study in the Comparative Law and Economics of Negligence, *German Working Papers in Law and Economics*, 6.
- Klitgaard, R. (1988). *Controlling Corruption*, University of California Press.
- Konar, S. and M.A. Cohen (1998). Why Do Firms Pollute (and Reduce) Toxic Emission? Working Paper, Owen Graduate School of Management, Vanderbilt University.
- Kornhauser, L.A. (1982). An Economic Analysis of the Choice between Enterprise and Personal Liability for Accidents, *California Law Review*, 70:1345-1392.

- Kubasek N.K., M.N. Browne, C. Williamson (2000). The Role of Criminal Enforcement in Attaining Environmental Compliance in the United States and Abroad, *University of Baltimore Journal of Environmental Law* 7:122.
- Landes, W.M. and R.A. Posner (1987). *The Economic Structure of Tort Law*, Harvard University Press, Cambridge, MA.
- Landsberger, M. and I. Meilijson (1982). Incentive Generating State Dependent Penalty System: The Case of Income Tax Evasion, *Journal of Public Economics*, 19:333-352.
- Lando H, S. Shavell (2004). The Advantage of Focusing Law Enforcement Effort, *International Review of Law and Economics*, 24:209-218.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R.W. Vishny (1999). The Quality of Government, *Journal of Law, Economics, and Organization* 15:222-279.
- La Porta, R., F. Lopez-de-Silanes, and A. Shleifer (2002). Government Ownership of Banks, *Journal of Finance* 57:265-301.
- Lofton J.A. (2001). Environmental Enforcement: the Impact of Cultural Values and Attitudes on Social Regulation, *Environmental Law Reporter*, 31.
- Malik, A.S. (1990). Avoidance, Screening and Optimum Enforcement, *RAND Journal of Economics* 21(3), 341-353.
- Malik, A.S. (1993). Self-Reporting and the Design of Policies for Regulating Stochastic Pollution, *Journal of Environmental Economics and Management*, 24:241-257.
- Mandiberg S. F. & Smith S.L. (1999). Crimes Against the Environment, MICHIE Law Publishers.
- Mattei U, *Comparative Law and Economics*, University of Michigan Press, Michigan, 1997.
- Meiners, R.E., B. Yandle (1992). Constitutional Choice for the Control of Water Pollution, *Constitutional Political Economy*, 3:359-380.
- McKean, R.N. (1980). Enforcement Costs in Environmental and Safety Regulation, *Policy-Analysis* 6(3), 269-289.
- Miceli, T.J. (1996). Plea Bargaining and Deterrence: An Institutional Approach, *European Journal of Law and Economics*, 3:249-264.
- Mookherjee, D. and I.P.L. Png (1994). Marginal Deterrence in Enforcement of Law, *Journal of Political Economy*, 102:1039-1066.
- Mookherjee, D. and I.P.L. Png (1995). Corruptible Law Enforcers: How Should they be Compensated?, *Economic Journal*, 105:145-159.
- Newman, H.A. and D.W. Wright, (1990). Strict Liability in a Principal-Agent Model, *International Review of Law and Economics*, 10:219-231.
- Pasour E.C. (1996). Pigou, Coase, Common Law and Environmental Policy: Implications of the Calculation Debate, *Public Choice*, 87:243-258.
- Polinsky, A.M. (1980). Private versus public enforcement of fines, *Journal of Legal Studies*, 9: 105-127.
- Polinsky, A.M. and D.L. Rubinfeld (1991). A Model of Optimal Fines for Repeat Offenders, *Journal of Public Economics*, 46:291-306.
- Polinsky, A.M., S. Shavell (1984). The Optimal use of Fines and Imprisonment, *Journal of Public Economics*, 24:89-99.
- Polinsky, A.M., S. Shavell (1991). A Note on Optimal Fines when Wealth Varies among Individuals, *The American Economic Review* 81(3), 618-621.
- Polinsky, A.M., S. Shavell (1992). Enforcement Costs and the Optimal Magnitude and Probability of Fines, *Journal of Law & Economics* 35(1), 133-148.
- Polinsky, A.M., S. Shavell (1993). Should Employees be Subject to Fines and Imprisonment given Existence of Corporate Liability? *International Review of Law and Economics*, 13:239-257
- Polinsky, A.M., S. Shavell (1998). On Offense History and the Theory of Deterrence, *International Review of Law and Economics*, 18:305-324.
- Polinsky, A.M., S. Shavell (1999). Corruption and Optimal Law Enforcement (unpublished manuscript).

- Polinsky, A. M., Shavell, S. (2000). The Economic Theory of Public Enforcement of Law, *Journal of Economic Literature*, 38:45-74.
- Posner, R.A. (1975). The Economic Approach of Law, *Texas Law Review*, 53:757-782.
- Posner, R.A. (2003). *Economic Analysis of Law*, 6th ed. New York, N.Y.: Aspen.
- Posner, R. A. (2004). Law and Economics in Common-Law, Civil-Law, and Developing Nations, *Ratio Juris*, 17:66-79.
- Priest, G.L. (1977). The Common Law Process and the Selection of Efficient Rules, *Journal of Legal Studies*, 6:65-82.
- Reinganum, J.F. (1988), Plea Bargaining and Prosecutorial Discretion, *American Economic Review*, 78:713-728.
- Rubin, P.H. (1977). Why is the Common Law Efficient?, *Journal of Legal Studies*, 6:51-63.
- Russell, C.S., W. Harrington, and W.J. Vaughn (1986). Enforcing Pollution Control Laws, Resources for the Future.
- Segerson K., Tietenberg T. (1992). The Structure of Penalties in Environmental Enforcement: An Economic Analysis, *Journal of Environmental Economics and Management* 23.
- Shavell S. (1982), On Liability and Insurance, *Bell Journal Economics*, 13:120-132.
- Shavell S. (1985). Criminal Law and the Optimal Use of Nonmonetary Sanctions as a Deterrent, *Columbia Law Review*.
- Shavell, S. (1987a). *Economic Analysis of Accident Law*, Harvard University Press, Cambridge, MA.
- Shavell, S. (1987b). A model of Optimal Incapacitation, *American Economic Review*, 77:107-110.
- Shavell, S. (1987c). The Optimal Use of Nonmonetary Sanctions as a Deterrent, *The American Economic Review*, September.
- Shavell S. (1991). Specific versus General Enforcement of Law, *Journal of Political Economy*, vol. 99, no.5, 1991.
- Shavell, S. (1992). A Note on Marginal Deterrence, *International Review of Law and Economics*, 12:345-355.
- Shavell, S. (1993). The Optimal Structure of Law Enforcement, *Journal of Law and Economics*, 36:255-287.
- Shavell S. (2000). Economic Analysis of Law, Discussion Paper n. 283, Harvard Law School.
- Shleifer, A. and R.W. Vishny (1993). Corruption, *Quarterly Journal of Economics*, 108: 599-617.
- Stigler, G.J. (2002). The Optimum Enforcement of Laws, *The Journal of Political Economy*, 78(3):526-536.
- Tirole, J. (1986). Hierarchies and Bureaucracies: on the Role of Collusion in Organizations, *Journal of Law, Economics and Organization*, 2:181-214.
- U.S. EPA (1999). Office of Enforcement and Compliance Assurance, Accomplishments Report.
- Wilde, L.L. (1992). Criminal Choice, Nonmonetary Sanctions, and Marginal Deterrence: a Normative Analysis, *International Review of Law and Economics*, 12:333-344.
- Zerbe, P. (1996). Evaluation of Predominant Environmental Management Practices in the Canadian Pulp and Paper Industry, Working Paper, Department of Resource Management and Environmental Studies, University of British Columbia, Vancouver.