UC Berkeley

Berkeley Program in Law and Economics, Working Paper Series

Title

Criminal Law and Behavioral Law and Economics: Observations on the Neglected Role of Uncertainty in Deterring Crime

Permalink

https://escholarship.org/uc/item/2gx715nd

Authors

Harel, Alon
Segal, Uzi

Publication Date

1999-09-01

CRIMINAL LAW AND BEHAVIORAL LAW AND ECONOMICS: OBSERVATIONS ON THE NEGLECTED ROLE OF UNCERTAINTY IN DETERRING CRIME

Alon Harel[*] *and Uzi Segal*[**]

(Forthcoming in American Law and Economics Review)

ABSTRACT

Criminal sanctions are usually public, stable and predictable. In contrast, the practices governing the determination of the probability of detection and conviction reinforce uncertainty. We invoke psychological insights to illustrate that criminals prefer a scheme in which the size of the sentence is uncertain while the probability of detection and conviction is certain. Consequently, the choice to increase certainty with respect to the size of the sentence and to decrease certainty with respect to the probability of detection and conviction can be justified on the grounds that such a scheme is disfavored by criminals and consequently has better deterrent effects.

CONTENTS

Some theologians described in great detail the precise nature of the sanctions meted out to sinners in Hell. However, theologians often left unspecified the question of who is likely to end up in Hell, or how likely it is that a particular person will find herself in Hell. Any person knew well that her behavior influences her probability of going to Hell, but this probability always remained vague and indeterminate.

This paper argues that theologians operated in an efficient manner in the Middle Ages and that contemporary law enforcement mechanisms work in a similar fashion. More particularly, it shows that the legal system aims to determine as clearly and unambiguously as possible the size of the sanctions imposed on criminals, but, at the same time, it leaves the probability that the sanction will be imposed vague and indeterminate. This combination of certainty with respect to the size of the sanction and uncertainty with respect to the probability of detection and conviction is optimal from the perspective of deterrence. Our investigation is therefore both descriptive and normative. The descriptive claim developed in Part I is that, subject to certain qualifications, the legal system aims at providing greater certainty with respect to the size of the sanction and, at the same time, it is indifferent to the certainty with respect to the probability of detection and conviction. The normative claim argued for in Part II is that such a system is desirable on the basis of efficiency-based considerations.

Consider the following two hypotheticals. Two individuals commit identical crimes. The first is sentenced to ten years in prison while the second is sentenced to five years. The disparity between the sanctions imposed on these criminals is not based on racial hatred, sexism, or other discriminatory practices. One can assume that a sentencing lottery was used

to determine who is subject to the harsher sanction.[1] Yet, it still seems that the disparity between the two criminals is a reason for concern. The person who is sentenced to ten years has a legitimate moral complaint: why was I sentenced more harshly than she was? A legal system that is indifferent to this complaint and systematically tolerates such a disparity is arbitrary and therefore unjust (Von Hirsch, 1976, 72-73; Von Hirsch, Andrew, 1993, 18). In contrast, let us assume that two individuals who commit similar crimes face different probabilities of detection. When the first criminal commits her crime, the police are investing little resources in detecting criminals of this particular sort and consequently the probability that the criminal will be detected is merely ten percent. When the second criminal commits the crime, the police are conducting a campaign against crimes of this sort and consequently the probability facing the second criminal is twenty percent. One can assume that a detection lottery was used to determine which crime would be investigated diligently. The latter type of disparity, namely the disparity with respect to the probability of detection, does not raise the same type of moral resentment raised by the first type of disparity, namely the disparity with respect to the size of the sanction. The moral concern of the person who asks "why me?" is compelling in the case of the sentencing lottery, but has no moral force in the case of a detection lottery.

Various established doctrines and practices reflect the difference in our moral intuitions between disparity with respect to the size of the sanction and disparity with respect to the probability of detection and conviction. Let us label the combined probability of detection and conviction "the probability of sentencing" and expose the different ways in which the legal system treats certainty with respect to the size of the sanction and certainty with respect to the probability of sentencing. Sentences are public; they constitute part of our criminal law. But no

criminal code provides any information about the probability of sentencing. Moreover, a criminal sanction cannot be imposed retroactively in our system. On the other hand, a person who committed a crime while the probability of detection was low cannot justifiably complain that she was caught simply because the probability of detection increased after she had committed the crime. Similarly, she is not entitled to benefit from the fact that a lower probability of conviction was in force when she committed the crime. An increase in the probability of conviction due to changes in evidence law or procedural law affects persons who committed crimes prior to the change.[2] Lastly, the probability of detection often changes due to temporary enforcement campaigns initiated by the police. No analogous "sentencing campaigns" exist in our legal system; judges do not conduct temporary "sentencing campaigns" during which they impose heavier sanctions on criminals relative to the sanctions imposed on criminals who are tried at other times.[3]

The practices governing the determination of sentences and the practices governing the probability of sentencing are regulated by different sets of rules and principles. Beneath these different principles, there is a different ethos that governs each one of these practices. Sentences are determined in a principled way by the legislature and are perceived as reflecting the moral severity of the criminal's behavior. The condemnation of arbitrariness in the context of sentencing is indicative of the public yearning for consistency and certainty in the sentencing practices. This is often justified on the grounds that individuals should be provided with "fair warning" with respect to the size of the criminal sanction (Model Penal Code sections 1.02(1)(d) & 1.02(2)(d)). In contrast, the policies governing the probability of sentencing are grounded in pragmatic considerations: budget limitations, availability of police forces, and so forth. This difference in the underlying ethos generates a variety of different doctrines and

principles which govern the determination of sentences, on the one hand, and the determination of the probability of sentencing, on the other.

Can these different practices be justified on efficiency-based grounds? Efficiency considerations suggest that deterrence should be maximized for a given level of expenses. Since the costs of sentencing depend on the average sentence,[4] the first question is what is worse from the potential criminal's point of view: a scheme that reinforces certainty or a scheme that reinforces uncertainty, e.g., a sentencing lottery. If both schemes involve the same average sentence, both schemes are equally costly and yet they may have different deterrence effects. The scheme that should be preferred by the policy-maker is precisely the scheme that is disfavored by the potential criminal. Similar considerations apply to the rules governing the probability of sentencing. Uncertainty with respect to the probability of sentencing is desirable if criminals disfavor it and prefer certainty. An efficiency-based justification of the contemporary practices of the legal system requires showing that potential criminals prefer uncertainty with respect to the size of the sanction and, at the same time, prefer certainty with respect to the probability of sentencing. Hence, inevitably this paper uses the methodology favored by the school of "behavioral law and economics" under which traditional economic reasoning should be supplemented by insights from psychology and the behavioral sciences (Jolls,1998; Sunstein, 1997).[5] The preferences and choices of individuals with respect to certainty as revealed by the behavioral sciences are used to determine the optimal law enforcement policies.

The practice of reinforcing certainty with respect to the sanction while maintaining uncertainty with respect to the probability of sentencing is so pervasive and consequently seems so natural that it is rarely investigated. Our claim is that this dichotomy within our

institutional practices between the processes governing the determination of the size of the sanctions and the processes governing the determination of the probability of sentencing is not an inevitable dichotomy. The different practices and values governing these two spheres need to be explained, yet the dichotomy is so entrenched in our practices that this need is hardly acknowledged. Thus, even if our attempt to provide rationales for the dichotomy ultimately fails, raising questions with respect to it, highlighting its importance, and sketching criteria to evaluate the adequacy of possible rationales may pave the way towards better criminal justice solutions.

I. THE INSTITUTIONAL MECHANISMS FOR MANIPULATING CERTAINTY

This Part explores some of the institutional devices used to manipulate certainty with respect to sentencing and with respect to the probability of sentencing. This investigation demonstrates that there is a deliberate effort in the criminal law to promote certainty with respect to the size of the sanctions, while no equivalent effort is invested in promoting certainty with respect to the probability of sentencing.

A. Retroactive Sentencing and Retroactive Detection and Conviction

One of the most fundamental principles of the rule of law is the prohibition on retroactive sanctions. Modern political theorists endorse this principle (Fuller, 1964 51-62; Rawls, 1972, 235-243) and so do various international treaties (Universal Declaration of Human Rights art. 11(2); European Convention on Human Rights art. 7(1)) and the American

Constitution (U.S. Const. art. I, sections 9, 10).[6] This prohibition applies both to the case in which a retroactive criminal prohibition is enforced as well as to the case in which a sanction is increased retroactively. It is worthwhile to compare the strict prohibition on retroactive sentencing prevailing in criminal law with the absence of a similar prohibition in the context of the probability of detection and the probability of conviction of criminals.

Assume that a person committed a crime when enforcement was relatively lax and consequently the probability of detection was relatively low. The law enforcement policy then changed and, as a byproduct of this change, the person who committed the crime was detected and convicted. The person's complaint is that the logic underlying the prohibition on ex post facto laws increasing the sanction should apply in this case and that she should not suffer as a result of "retroactive detection."

Under the current legal system, criminals cannot successfully claim that retroactive detection violates any of their rights. While retroactive sentencing is considered a major vice and is prohibited in most legal systems, "retroactive detection" is an unrecognized concept that had to be invented for the sake of illustrating our argument.[7] Thus, when new technological devices such as fingerprinting or DNA testing are used, nobody argues that criminals have a right to be fairly notified of them. A similar indifference is expressed by the legal system towards retroactive changes in the probability of conviction caused by changes in criminal procedure or in the law of evidence.[8] A person who commits a crime is subject, therefore, to the risk that later changes in criminal procedure or in the rules of evidence will increase the probability that she is convicted.

B. The Principle of Lenity

It is required under common law that a criminal statute be strictly construed and that any doubt with respect to the content of the law be resolved in favor of the defendant.[9] The principle applies to the definition of the offense and the size of the sentence but not to the rules of procedure or evidence.[10] Consequently, the rule of lenity eliminates ambiguities with respect to the scope of the criminal prohibition as well as the size of the sanction but not with respect to the probability of conviction.[11] The elimination of ambiguities with respect to the size of the sentence decreases the uncertainty with respect to the size of the sentence while the failure to eliminate ambiguities with respect to the rule of procedure or evidence creates uncertainty with respect to the probability of conviction. The differential application of the rule of lenity provides, therefore, an additional illustration of the differential treatment of uncertainty in these two contexts.

C. Constancy of Sanctions and Inconstancy in Detection

Criminal sanctions are relatively stable. Their stability is regarded as crucial for the protection of the rule of law (Fuller, 1969 79-81; The Federalist No. 44 (J. Madison)). One can appreciate the contrast between the importance attributed to stability with respect to the sanction and the indifference towards stability with respect to the probability of sentencing by comparing the attitudes towards "sentencing campaigns" and enforcement campaigns. In order to generate a specific average sanction, one can either impose the same sanction on all criminals, or one can conduct "sentencing campaigns". Under the former system, all criminals

would be exposed to the same sanctions if they commit the same crime. Under the latter system, if a person were sentenced during a sentencing campaign, she would be subject to more severe sanctions than if she were sentenced during a period in which there was no sentencing campaign. Similarly, in order to generate a certain probability of detection, one can either maintain a uniform probability of detection, or one can maintain a scheme in which the probability of detection changes by engaging in enforcement campaigns designed to increase the probability of detection during limited periods of time.

The legal system distinguishes sharply between sentencing campaigns and enforcement campaigns. A sentencing campaign is perceived as immoral and unjust because it compromises the conviction that sentences are grounded in moral principles rather than in pragmatic needs. On the other hand, enforcement campaigns are used regularly by law enforcement institutions.

D. Sentencing Guidelines

Despite the legislative constraints on the imposition of sanctions, it was felt by many that criminal sanctions are too erratic and unprincipled (Frankel, 1972). The dissatisfaction with the system of indeterminate sentencing led to the rapid drafting of sentencing guidelines that aim at guaranteeing greater predictability and certainty (Tonry, 1996, 6-13; Stith & Cabranes, 1998). The arguments in favor of the guidelines clearly reflect the quest for certainty, predictability, objectivity,[12] and, most importantly, the aim of reducing disparities in sentencing.[13] No such concern has been devoted to guaranteeing uniformity in the enforcement efforts.[14]

There are numerous disputes in the literature as to whether sentencing guidelines indeed achieve the goals they aim at achieving as well as whether these goals are worth achieving.[15] Many

11

scholars have shown persuasively that the sentencing guidelines do not reduce sentencing disparity (Tonry, 1996, 40-49). More specifically, scholars have pointed out the conceptual difficulties in measuring disparity (Schulhofer, 1992, 835-37), the great degree of prosecutorial discretion (Heaney, 1992, 776-78), the inevitable effects of plea bargaining on disparity in sentencing (Tonry, 1996 67-68, 75-76; Nagel & Schulhofer), and the intentional evasion and manipulation of the Guidelines in order to avoid the harsh sanctions which are often dictated by them (Tonry, 1996, 32; Freed, 1992, 1686, 1720-1727). Our interest, however, is not with the question of whether the Guidelines succeed in bringing about a reduction in the disparity of sentences but, rather, in using them to illustrate the powerful sentiments towards certainty with respect to the size of the sentence.

E. Objections

Four phenomena have illustrated the different ways in which uncertainty is treated in criminal law. It was shown that many doctrines and principles which aim to minimize the degree of uncertainty with respect to the size of the sentence do not operate in the context of determining the probability of sentencing. Thus, while the legal system is hostile to sentencing lotteries, it is much more tolerant of detection lotteries. Before examining the normative justifications for this differential treatment of uncertainty, let us evaluate two major objections to this analysis. Under the first objection, it is simply false that the legal system shows greater concern for uncertainty with respect to the size of the sanction than it shows towards certainty with respect to the probability of sentencing. Under the second, there is a much simpler explanation for the differential treatment of uncertainty in these two contexts.

Under the first objection, many practices prevalent in the legal system do not reflect concern for certainty with respect to the size of the sentence; neither do they reflect a lack of concern towards uncertainty with respect to the probability of sentencing. Instead, the criminal system treats uncertainty in different and contradictory ways in both contexts.[16]

It is clear, for instance, that many legal systems reject the concept of sentencing guidelines. Many states follow the traditional approach of giving trial judges unreviewable discretion within wide sentencing ranges to select punishments. Even in the federal system, the trend is toward more discretion not less.[17] More subtle mechanisms in the legal system also operate to increase uncertainty with respect to the size of the sentence.[18] Moreover, it is not clear that the probability of sentencing is indeed as uncertain as one may expect. The absence of legal mechanisms to constrain the probability of sentencing does not necessarily imply that the probability of sentencing is, in fact, uncertain. Arguably, conviction rates and detection rates of previous years are available and those can be used by potential criminals to reliably predict the future probability of detection and conviction. Even if they are not available, criminals may infer the probability of sentencing from previous encounters they, or their acquaintances, have had with the police.

This objection is based on a misunderstanding. Our claim is not that the legal system guarantees more certainty with respect to the size of the sentencing than with respect to the probability of sentencing. Our claim is that the system has powerful mechanisms which increase certainty with respect to the size of the sentence while it lacks analogous mechanisms with respect to the probability of sentencing. It is the greater effort (and not the greater success) on the part of the legal system to reinforce certainty with respect to the sentence which is contrasted to the absence of an analogous effort to reinforce certainty with respect to

13

the probability of sentencing.

But, if certainty with respect to the size of the sanction is indeed such a desirable feature of the legal system, why does the legal system fail to provide it? Why does the common law system adhere to the system of indeterminate sentencing? This paper does not purport to provide an answer to this question. It only suggests that indeterminate sentencing is undesirable on efficiency-based grounds. One can acknowledge this fact and yet support a system of indeterminate sentencing on the grounds that other considerations, such as the costs of reinforcing certainty[19] or the importance of taking into account individual characteristics of defendants (Stith & Cabranes, 1998, 5), justify such a system. Moreover, while certainty with respect to the size of the sentence is not completely achieved, it is not certainty which matters but rather the perception of certainty. Thus, while there may be adequate information with respect to the probability of sentencing, this information is much less salient as a cultural matter than is the information with respect to penalty size.[20] The public record documenting the size of the penalty is accessible to everybody and is documented in a relatively clear manner. Access to information concerning the probability of sentencing often requires expertise and diligence and, consequently, this information is more accessible to decision-makers and policy designers than to ordinary citizens or potential criminals.

The argument can still be challenged on the grounds that the legal system is not as oblivious to uncertainty with respect to the probability of sentencing as suggested earlier. This accusation may be based on the efforts sometimes made to more closely supervise the institutions responsible for detection and the claim that those efforts may often reduce the uncertainty with respect to the probability of detection and conviction. In his influential work, Davis argued that the discretionary powers granted to officials such as the police and

14

prosecutors are too broad and that they should be constrained (Davis, 1969). Davis believes

that excessive discretionary powers are damaging and argues that discretion should be

confined and restructured (Davis, 1969 chs. 4-5). Similar accusations and proposals were

made by other scholars (Vorenberg, 1981, 1521). Those proposals led to some guidelines

regulating the investigatory and charging practices in some jurisdictions – guidelines which

may decrease the uncertainty with respect to the probability of sentencing.[21]

But the attempts to regulate these processes have not succeeded in producing

meaningful restraints on either police or prosecutorial discretion (Pizzi, 1993, 1342-44). To

illustrate this, one need only compare the impact on the criminal law of Marvin Frankel---the

early advocate of the Sentencing Guidelines---and that of Davis – the advocates of

constraining the discretion of executive bodies. Such a comparison will inevitably lead one to

conclude that the concern of the current system to guarantee certainty with respect to the size

of the sanction is much greater than the concern to guarantee certainty with respect to the

probability of sentencing.

Moreover, although some of these reforms proposed by Davis and others may have the

effect of promoting certainty with respect to the probability of sentencing, this is not the

primary motivation underlying these reforms. The literature advocating these reforms is

interested primarily in equality and fairness rather than certainty (Davis, 1969; Vorenberg,

1981; Kane, 1993). It seems, therefore, that the limited reforms following the proposals to

regulate the police and the prosecutors cannot refute the claim that there is a fundamental

asymmetry in the way the legal system treats uncertainty in these two contexts.

Under the second objection, there is a much simpler explanation for the differential

treatment of certainty in these two contexts. Arguably, it is much easier to guarantee certainty

with respect to the sentencing scheme than certainty with respect to the probability of sentencing. It is easy to instruct judges that the sentence for a particular crime is ten years in prison. It is much more difficult to determine that the probability of sentencing for a particular offense should be two percent.[22] A judicial attempt to review and supervise the probability of sentencing in order to promote certainty would require the courts to interfere in matters which are within executive discretion, like when and whom to prosecute.

In our view, this argument underestimates the difficulties of guaranteeing certainty with respect to the sentence and overestimates the difficulties of maintaining certainty with respect to the probability of sentencing. Thus, despite the genuine attempt to create a uniform sentencing scheme, sentencing practices nevertheless fail to achieve the desired level of uniformity. Moreover, some of the doctrines used to reinforce certainty are difficult and costly to implement, and yet the legal system invests the resources necessary to maintain them.[23] At the same time, a system that would guarantee more certainty with respect to the probability of sentencing without disrupting the law enforcement activities is not inconceivable. The police could be obliged to provide information with respect to new technology that changes the probability of detection and thus provide a prior warning to potential criminals. Enforcement campaigns could be prohibited or regulated because of the uncertainty and inequality that they generate. The prohibition on retroactivity could be applied to evidence and procedural law. Lastly, more radical changes could be implemented without unreasonable costs. Resources for detecting criminals of different kinds could be shifted such that the probability of sentencing does not exceed predetermined limits. It seems, therefore, that the practical difficulties in reinforcing certainty with respect to the probability of sentencing are not insurmountable and perhaps are not greater than the difficulties in reinforcing certainty with respect to the size of

the sentence. Even if reinforcing certainty with respect to probability of sentencing is difficult, or impossible in certain contexts, there are contexts where such certainty could be achieved relatively easily. The probability of sentencing in the context of tax evasion depends largely on the size of the sample used by the IRS, and the relevant information can easily be provided. Nevertheless, it does not seem that there is a strong moral conviction that the tax authorities have a duty to provide this information.

The claim that the legal system does not aspire towards certainty with respect to the probability of sentencing only because such a certainty cannot be achieved presupposes that certainty with respect to both the size of the sentence and the probability of sentencing is desirable. Under this view, it is only the difficulties in gathering and conveying reliable information with respect to the probability of sentencing which explain why the legal system fails to achieve certainty in the probability of sentencing. Yet, intuitively the presupposition that certainty with respect to the probability of sentencing is desirable is dubious. The existing uncertainty with respect to the probability of detection and conviction does not generate uneasiness which is a byproduct of a concession required by pragmatic necessities. In contrast to the uneasiness raised by uncertainty with respect to the size of the sentence, uncertainty with respect to the probability of sentencing is not regarded as morally controversial.

Finally, the availability of compelling alternative arguments for the contemporary practices of the legal system does not undermine the importance of providing an additional efficiency-based justification for these practices. Even if one concedes the validity of alternative justifications, it should not undermine the search for new and perhaps more compelling justifications for the ways in which certainty is treated in the legal system.

F. Conclusion

The analysis in this section identifies several principles which reduce the degree of uncertainty with respect to the size of the sentence but do not affect the uncertainty with respect to the probability of sentencing. Those principles reflect a difference in the ethos governing the process of sentencing and the process governing the enforcement of criminal law.[24] The importance of providing an explanation for the great concern towards certainty with respect to the size of the sentence can be better appreciated if one recognizes its costs. The rule of lenity, for instance, is costly because it requires legislators to forgo judicial assistance in defining criminal obligations (Kahan, 1994, 351-56). Using open-ended statutory language provides large benefits to the legislature because it facilitates more efficient updating of legal norms and more efficient use of the legislature's time and limited resources. Similarly, the Sentencing Guidelines also involve large costs (Tonry, 1996, 86).[25]

II. CERTAINTY IN CRIMINAL LAW: AN EFFICIENCY-BASED EXPLANATION

This Part provides a normative defense of the contemporary practices analyzed in Part I. The basic premise of the analysis is that the manipulation of certainty is designed to increase the deterrent effects of the legal system. If individuals prefer uncertainty to certainty with respect to the size of the sanction, the legal system should adopt a system which guarantees certainty. Similarly, if individuals prefer certainty with respect to the probability of sentencing, the legal system should generate uncertainty. Consequently, the analysis relies on well-established results of experiments investigating attitudes towards uncertainty.[26]

The discussion will be divided into three parts. Section A clarifies the basic concepts used in the normative analysis while Section B uses these concepts to defend the practices and rules analyzed in Section A on efficiency-based grounds. Lastly, Section C briefly illustrates how the normative analysis can justify the variety of rules and practices described in Part I.

A. *Clarifying Concepts: Risk and Ambiguity*

The literature of behavioral economics distinguishes between two concepts of uncertainty: risk and ambiguity. Risk applies to uncertainty with respect to states of affairs, while ambiguity applies to uncertainty with respect to probabilities that certain states of affairs will materialize. The distinction between risk and ambiguity is important given that individuals' attitudes towards risk and ambiguity are different. Consequently, it is possible that risk and ambiguity should be manipulated in different ways in order to maximally enhance the deterrent effects of the criminal law system. Let us illustrate both types of uncertainty.

An average sanction of five years in prison can be the outcome of a low risk criminal law scheme in which every convicted criminal is sentenced to five years (uniform sentencing scheme); or it can be the outcome of a high risk sentencing lottery in which the sentence is a random variable with expected value of five, for example if eighty percent of the convicted criminals are sentenced to four years and twenty percent to nine years (non-ambiguous sentencing lottery).[27]

It is not difficult, however, to conceive of a system in which the sentence will involve both risk and ambiguity. Ambiguity in this context denotes the degree to which the person knows in advance the distribution of probabilities governing the sentence. To illustrate the

concept of ambiguity, imagine a system in which the sentence is determined by a lottery where the defendant has to guess the color of a ball that will be drawn at random out of an urn containing one hundred balls. Each of these balls is either red or blue. There are, however, two different urns. In urn 1, there are fifty red balls and fifty blue balls; in urn 2, there are an unknown number of red balls and blue balls.[28] Under the first system (using urn 1), the defendant faces risk with respect to the size of the sentence, but no ambiguity given that the probabilities that a certain sentence be imposed on him are known. Under the second system (using urn 2), the defendant faces both risk and ambiguity with respect to the size of the sentence given that the probability that a particular sanction be imposed is unknown. A full investigation of the deterrent effects of sentencing lotteries requires a comparison between three types of sentencing schemes: uniform sentencing schemes (one which involves no risk), a non-ambiguous sentencing lottery (one which involves risk but not ambiguity) and an ambiguous sentencing lottery (one which involves risk and ambiguity).

Another source of ambiguity involves the probability of sentencing. To illustrate the concept of ambiguity with respect to the probability of sentencing, one can imagine the police conducting a detection lottery where a policeman has to guess the color of a ball that will be drawn at random out of an urn containing one hundred balls. Each of these balls is either red or blue. The policeman's guess determines the resources devoted to the investigation of the particular crime. If he guesses correctly, the police will invest special resources to investigate the crime and guarantee a thirty percent chance of successful investigation. If he does not guess correctly, the resources spent in this investigation will be smaller and the probability of detection is ten percent. If this story sounds too fantastic to relate to real criminal justice systems, consider that the policy of conducting temporary enforcement campaigns achieves

precisely a similar result. A person who considers committing a crime may know that the police conduct from time to time temporary enforcement campaigns. The frequent changes and instability in the probability of sentencing makes it very difficult for the potential criminal to evaluate his prospects of being caught. The criminal is participating in a detection lottery where his chances of being caught depends on factors which are beyond his knowledge and is faced therefore with ambiguity with respect to the probability of detection.

Let us add a final clarification concerning the nature of uncertainty. What is important from a deterrence-based perspective is not the actual certainty of sentences or the probability of sentencing but the *perceived* certainty, or uncertainty, of the sentence and the probability of sentencing.[29] The ways in which risk and ambiguity influence the behavior of potential criminals, as well as the implications those have on the criminal law system, will be illustrated in Section B.

B. The Deterrent Effects of Uncertainty

1. The Efficiency of Certainty With Respect to the Size of the Sanction: The Case Against Sentencing Lotteries.

Efficiency considerations suggest that for a given level of expenses, deterrence should be maximized. Since the cost of sanctions depends on the average sanction,[30] the first question to answer is what is worse from the potential criminal's point of view: a sentencing scheme which guarantees certainty with respect to the size of the sanction or a sentencing scheme which does not guarantee such a certainty? Once we discover which scheme is worse from the perspective of the criminal, the state should adopt this scheme since it has larger deterrent

effects.

Suppose a person is convicted of a certain crime. Consider the following two sentencing options:

1. A five-year term in prison.
2. A non-ambiguous sentencing lottery where the probability that she is sentenced to two years in prison is 1/2 and where the probability that she is sentenced to eight years in prison is 1/2.[31]

The preferences criminals have in non-ambiguous sentencing lotteries depend on their attitude to risk. Modern analysis of risk links this attitude to the marginal utility derived from the outcomes. Consider a lottery that yields either two dollars or zero dollars, with probability one half each, and compare it with a certain gain of one dollar. Suppose that the marginal utility from the first dollar is ten, while the marginal utility from the second dollar is eight. Then, taking the risky prospect, the decision-maker would receive additional utility of either eighteen or zero, with probability of half each. The expected value of this added utility is thus nine. On the other hand, if she takes the second option, her added utility is ten. Risk aversion is therefore often perceived to be synonymous with diminishing marginal utility.

This simple explanation demonstrates that in order to investigate whether criminals prefer the non-ambiguous lottery or the uniform sentencing scheme, it is necessary to evaluate whether the marginal utility of years of freedom is increasing or decreasing. The marginal utility of year x in freedom is the difference in satisfaction a person has from not being in jail during this year, as seen from today's perspective.

There are powerful reasons which suggest that the marginal utility of years in freedom is diminishing. Even if the actual level of added utility is the same for all years, it is plausible that a decision-maker will discount future utility; hence, effectively, marginal utility is diminishing (Polinsky & Shavell, 1999; Posner, 1998, 249-250). Moreover, it seems that the

older a person gets, the less enjoyment she receives from freedom. A person who is confined to a home for the elderly loses little utility if such a facility is part of a prison. Moreover, the utility a person receives in prison is likely to be increasing. The disutility associated with the first year of prison might be particularly great because the stigma associated with imprisonment occurs early on (Polinski & Shavell, 1999). Lastly, a convicted criminal may become accustomed to prison life and consequently, her life in prison may become less burdensome. Thus, both the decreasing marginal utility received from years of freedom (because of discounting effects and because of the effects of aging) and the decreasing marginal disutility received from years in prison suggest that the marginal utility of years in freedom is diminishing.[32]

The following table lists the marginal utility a potential criminal receives from being out of prison for each of the next ten years (MU means marginal utility):

Year	1	2	3	4	5	6	7	8	9	10
MU	20	19	18	17	16	15	14	13	12	11

If a person receives a five year term of imprisonment, then her total loss of utility is the sum of the marginal utilities of the first five years, namely 90. On the other hand, if she serves two years her loss of utility is 39, and if she serves eight years, her loss of utility is 132. On average, her loss is 85.5, which is less than 90. In other words, if the marginal utility from years of freedom of the convicted person is diminishing then she will prefer the sentencing lottery to the uniform sentencing scheme.[33]

The result may seem counterintuitive, apparently contradicting the claim that diminishing marginal utility leads to a preference for the known outcome. But there is no contradiction here. The reason that criminals prefer a sentencing lottery is that if sent to prison, the convicted person has to surrender first the next few years, namely those years

which have the highest marginal utility. Thus, if a person is sentenced to five years in prison, she surrenders the next five years. If, on the other hand, she faces a lottery, she gains a larger benefit from the possible beneficial outcome, for instance two years in prison, than the loss resulting from the undesirable outcome, for instance eight years in prison. These considerations clearly suggest that in cases in which the sanctions involve imprisonment, individuals prefer sentencing lotteries over a uniform sentencing scheme.[34]

It is important to concede some of the limitations of this analysis. Most people are risk-prone in some respects and risk-averse in others. One could arguably claim that the marginal utility of the second year of freedom is smaller than the marginal utility of the first year and deny that the marginal utility of the tenth year is smaller than that of the second. Thus, the preference for a sentencing lottery over a uniform sentencing scheme may depend on the particular range of possible sentences offered in the lottery. These cautious remarks are important and yet, in designing a criminal law system, the policy-maker can take into account only rough generalizations. Those sketched above seem best to explain the contemporary practices and to cohere with the findings of social science.

Arguably, this argument is limited only to imprisonment. The reason we can get these results even though marginal utility is diminishing is because convicted criminals surrender their most valued years first. This is not the case with money. If a person has to pay a fine, she gives up first her less valuable dollars in terms of utility. In that case, diminishing marginal utility implies risk aversion and consequently, it seems that a person would prefer a known fine to a random fine with the same expected value.[35] Does it then follow that society should prefer random fines to nonstochastic fines?

This conclusion ignores established findings in cognitive psychology. Experimental

research suggests that most subjects are risk-averse with respect to outcomes that are better than the status quo, while most subjects are risk-loving with respect to outcomes that are worse than the status quo (Kahneman & Tversky, 1979). In other words, when facing a lottery with only positive (that is, better than the status quo) payoffs, decision-makers usually prefer the average outcome of the lottery to the lottery itself. On the other hand, if all outcomes in a lottery are negative, decision-makers typically prefer the lottery to its expected loss. A potential criminal who must choose either to face a lottery or a uniform fine with the same expected value would prefer, if he is risk-loving, the lottery to the uniform fine.

The results of a simple experiment can demonstrate the difference in risk-aversion with respect to gains and losses. Researchers asked subjects to choose between a certain gain of $240 and a twenty-five percent chance of gaining $1000; eighty-four percent of the subjects preferred the certain gain, even though the other option has an expected value that is ten dollars higher (25% chance x $1000 = $250). Conversely, when subjects were given a choice between a certain loss of $750 and a seventy-five percent chance of losing $1000, eighty-seven percent preferred the gamble, even though the expected values of the sure loss ($750) and the gamble (75% x $1000 = $750) are the same (Korobkin & Guthrie, 1997, 96).

The claim that non-ambiguous sentencing lotteries are inferior to uniform sentencing schemes might not be thought particularly significant given that few would suggest the use of such sentencing lotteries. This view is misleading, however, since a system of indeterminate sentencing is not very different from a sentencing lottery. The risk that one would face a harsh judge and consequently be sentenced harshly is not different in principle from the risk faced by a criminal who faces a judge who flips a coin to determine the sentence. A sentencing lottery is therefore a living reality rather than merely an academic fantasy. Consequently, it is valuable to

examine criminals' attitudes towards it.[36]

So far, our analysis has involved a comparison of a uniform sentencing scheme and a non-ambiguous sentencing lottery. In order to complete the analysis, one should explore the effects of an ambiguous sentencing lottery, namely, the case in which a person faces unknown probabilities of being subjected to diverse sanctions.

Empirical research indicates that individuals are averse to ambiguity. Ellsberg suggested the following experiment (Ellsberg, 1961). Suppose an urn contains ninety balls, thirty of which are known to be yellow, while each of the other sixty is known to be either blue or red, but the exact composition of these sixty balls is unknown. In each of the next four lotteries, one ball will be picked at random, and the decision-maker will be paid according to its color. The four lotteries are:

$100 if yellow, zero otherwise;
$100 if blue, zero otherwise;
$100 if yellow or red, zero if blue; and
$100 if blue or red, zero if yellow.

Ellsberg suggested that most decision-makers prefer the first lottery to the second but the fourth to the third. This preference violates standard probability theory, since a decision-maker who prefers the first lottery to the second reveals that he believes "yellow" to be more likely than "blue." On the other hand, preferring the last lottery to the third reveals that, for this decision-maker, "blue or red" is more likely to happen that "yellow or red," hence blue is more likely than yellow, a contradiction.

These and similar results were repeated in many experiments (MacCrimmon & Larsson, 1979). These experiments indicate the presence of an important psychological factor, namely the ambiguity aversion with respect to information concerning the probabilities of events. Ambiguity represents the degree of lack of confidence, or lack of reliability, of the

information one has concerning the relative likelihood of events. The first lottery is preferred to the second because the decision-maker knows that he has one third chance of winning the first lottery, but has no knowledge of his chances of winning the second lottery. At the same time, they prefer the fourth lottery to the third because they know that they have two thirds chance of winning the fourth lottery but have no knowledge of their chances of winning the third lottery. Most subjects prefer the certain probability of getting the prize to the uncertain probability of getting it. Ellsberg's experiment illustrates that individuals are sensitive not only to the probabilities of events but also to the ambiguity of the information concerning these probabilities.

Schmeidler suggested the following intuitive approach to uncertainty (Schmeidler, 1989). Consider again the above example of the urn with the three types of balls. The probabilistic estimate of the event "blue or red" is two thirds, because the decision-maker knows that there are sixty such balls out of ninety. It is the probability of the event "blue" (and that of the event "red") that is probably underestimated. When "red" and "blue" yield the same outcome (both yield one-hundred dollars or both yield zero), this phenomenon has no implications since the two events are considered as one event whose probability is two-thirds. However, when the two events yield different outcomes, one needs to estimate the probability of each event separately. In this case, Schmeidler argues, people overestimate the probabilities of events leading to bad outcomes, and underestimate the probabilities of events leading to good outcomes. We formally present the case in which the uncertainty may result in one of two outcomes.[37]

There is, however, one difficulty in applying the Ellsberg paradox to our context. Ellsberg illustrated that individuals are ambiguity-averse with respect to gains. But, for the

27

sake of our analysis, it needs to be shown that individuals are averse to ambiguous chances of incurring a loss, that is, punishment. Later experiments established this fact. In one of the experiments, individuals were confronted with differing risks from air pollution exposure. In one panel, individuals received risk information from two experts, one of whom believed the risk was 150 per million and the other believed the risk was 200 per million. The mean risk that respondents viewed as equivalent to this risk range was 178 per million. If the extent of ambiguity is increased there is even greater aversion to the uncertainty. When one expert believes the risk is 110 and the other assesses it at 240, the average of the risk remains at 175. Respondents, however, view the mean risk that is equivalent to this risk range as being equivalent to 191(Viscusi, 1996, 641-42)![38] This experiment shows that the worst case scenario tends to loom disproportionately large in people's minds. To the extent that individuals' knowledge with respect to risks is imprecise, individuals will tend to be excessively averse to risk. This result can be applied to our context. If the probabilities of a harsher sanction and a light sanction were unknown, individuals would be excessively averse to the risk of losing the lottery. Consequently, criminals would prefer a non-ambiguous sentencing lottery to an ambiguous sentencing lottery.

The findings so far are incomplete and they can provide no firm conclusions with respect to the preference of individuals between non-ambiguous sentencing lottery and a uniform sentencing scheme. It is clear that criminals prefer a non-ambiguous sentencing lottery over a uniform sentencing scheme. It is also clear that criminals prefer a non-ambiguous sentencing lottery to an ambiguous sentencing lottery because of ambiguity aversion. Yet it is unclear whether criminals prefer a uniform sentencing scheme to an ambiguous sentencing lottery, or whether they prefer an ambiguous sentencing lottery to a uniform sentencing

scheme. This gap raises a dilemma for the decision-making process. If individuals prefer a uniform sentencing scheme to an ambiguous sentencing lottery, society should prefer the ambiguous lottery. But if individuals prefer an ambiguous lottery to a uniform sentencing scheme, society should prefer a uniform sentencing scheme.

The optimal sentencing system depends on the intensity of the preferences of potential criminals. If potential criminals are strongly averse to ambiguity, they may rank the three options as follows:

1. Non ambiguous sentencing lottery
2. A uniform sentencing scheme
3. An ambiguous sentencing scheme

If this is the ranking of potential criminals, society should prefer an ambiguous sentencing lottery. Yet, it is also possible that ambiguity aversion is not intense and consequently that potential criminals rank the three options as follows:

1. Non-ambiguous sentencing lottery
2. An ambiguous sentencing lottery
3. A uniform sentencing scheme

In this case, society should prefer a uniform sentencing scheme to an ambiguous sentencing lottery. The practice of reinforcing certainty with respect to the size of the sentence is justified if indeed individuals disfavor a uniform sentencing scheme to any sentencing lottery (ambiguous or non ambiguous). The optimal choice depends ultimately on the preferences of potential criminals, that is, on the relative strength of ambiguity aversion.

2. The Efficiency of Uncertainty With Respect to the Probability of Sentencing: The Case for Detection Lotteries.

The probability of sentencing denotes the probability that a person who commits a crime

will be detected and convicted. The probability of sentencing depends therefore on two primary factors: the probability of detection (determined by the law enforcement system) and the probability of conviction (determined by evidence law and procedural law).[39]

In order to justify uncertainty with respect to the probability of sentencing, it is sufficient to point out that generating certainty is costly.[40] Hence, the indifference of the legal system with respect to certainty of the probability of sentencing can be explained simply on the grounds that none of the considerations which justify the reinforcement of certainty with respect to the size of the sanction apply in this context. Yet, we believe that, in addition, one can provide reasons why the legal system should not simply be indifferent to certainty, but should reinforce uncertainty.

It seems evident that generating risks with respect to the probability of sentencing is of no value. Expected utility theory does not distinguish between lotteries and compound lotteries (lotteries in which the outcomes are themselves lotteries). For example, if a person believes that there is an equal chance that the enforcement probability of detection is five percent and fifteen percent, then effectively she believes that the probability of detection is ten percent (0.5 x 5% + 0.5 x 15% = 10%). But uncertainty with respect to the probability of sentencing can be conducive to deterrence in cases in which uncertainty generates ambiguity, that is, in cases in which individuals are ignorant as to the probability of sentencing. Let us provide an example which can illustrate the advantages of ambiguity in this context.

It is well known that the IRS does not audit all tax returns. Suppose now that the IRS has the budget to audit ten percent of the total number of tax returns. Suppose, for simplicity, that all returns are equally expensive to audit and that taxpayers are homogeneous, in the sense that they all have similar occupations, income, and deductibles. Also, assume that if a file is

audited, then the IRS reveals all the truth concerning this file. In other words, any tax evasion

will then be detected (and punished). How should the IRS determine which files to check?

Here are two possible ways:

1. Sample, at random, ten percent of the returns, so each taxpayer has the same probability of being audited. Make this policy and the size of the sample known; or
2. Sample, at random, ten percent of the returns, so each tax payer has the same probability of being audited. Inform the public that the sample is some number between five and fifteen percent and keep the size of the sample unknown.

The last section demonstrated that decision-makers do not consider unknown probabilities in

the same way they consider known probabilities. According to the model articulated by

Schmeidler (Schmeidler, 1989), taxpayers would overestimate the probability of events leading

to bad outcomes. In our case, that means that if they do not know the exact probabilities of

detection and conviction they would overestimate them. Consequently, they would commit

fewer crimes when they do not know these probabilities than when they know them. The IRS

should therefore prefer the second policy to the first. An optimal legal system is therefore a

system which disguises as much as possible the probability of sentencing. Ambiguity with

respect to the probability of sentencing is a desirable feature of our enforcement mechanism.

But is it possible to maintain an ambiguous enforcement policy? It is obvious that a

mere announcement that the government is going to sample between five and fifteen percent

of the returns may not be reliable. One way of generating ambiguity is to change the sample

frequently. If taxpayers know that the criteria for determining the sample change frequently in

an erratic manner, their confidence in their judgment as to the size of the sample is limited. The

shifts and instability in the probability of sentencing can be conducive to deterrence if they

serve to disguise the actual probability of sentencing and make it difficult for potential

criminals to evaluate their prospects of being detected and convicted. The absence of any

constraints analogous to the ones which govern the determination of the size of the sentence is a precondition which facilitates frequent changes in the probability of sentencing – changes which, in turn, are conducive to ambiguity.

Arguably, there are circumstances under which ambiguity is not conducive to deterrence. If ambiguity distorts people's judgments with respect to the sample such that they believe that the probability of detection is on average lower than it actually is, ambiguity may be detrimental to deterrence. If, for instance, under conditions of ambiguity, the government samples on average fourteen percent of the records and individuals believe that the probability shifts between five and fifteen percent, then they would behave as if the probability is higher than ten percent (because of their ambiguity aversion) and yet lower than fourteen (the actual probability) given that they believe that the average probability of sentencing is much lower than it actually is.

This hypothetical, however, presupposes that the perceived average probability is much lower than the actual average probability. It presupposes, therefore, false beliefs with respect to the average probability of sentencing. It is more realistic, however, that individuals who consider whether to commit a crime would acquire accurate beliefs with respect to the average probability of detection. If such knowledge is acquired in our example, individuals would know that the sample is on average fourteen percent and yet, due to the uncertainty generated by the frequent shifts in the size of the sample, would behave as if the probability was higher than fourteen percent.

Even if individuals have false beliefs with respect to the average probability, it is better, other things being equal, that individuals have little confidence in their evaluation of the probability of detection. Thus, if the actual average probability of detection is ten percent

while individuals falsely believe that it is on average fifteen percent, it is better if they lack confidence in their belief. Similarly, if the actual average probability of detection is fifteen percent while individuals falsely believe it is ten percent, it is better if they lack confidence in their judgment. Ambiguity with respect to the probability of sentencing is therefore a desirable feature of a legal system irrespective of whether individuals have true or false beliefs with respect to the average probability.

The conclusions of our analysis can be presented by using a table which depicts the different possible ways in which the legal system can treat uncertainty:

Sanction / Probability of Sentencing	Uniform Sentencing Scheme	Non Ambiguous Sentencing Lottery	Ambiguous Sentencing Lottery
Non Ambiguous	1	2	3
Ambiguous	4	5	6

The findings of this section can be summarized:

1) 1 is better for society than 2 and 4 is better for society than 5. A system which guarantees a uniform scheme of sentencing is superior to a non-ambiguous sentencing lottery.

2) 3 is better for society than 2 and 6 is better for society than 5. An ambiguous sentencing lottery is better than a non-ambiguous sentencing lottery.

3) 4 is better for society than 1, 5 is better for society than 2, and 6 is better for society than 3. An ambiguous probability of sentencing is superior to a non-ambiguous probability of sentencing.

4) The societal choice between 1 or 3 and 4 or 6 depends on further empirical findings. In particular, it depends on the intensity of ambiguity aversion.

Part I presented several doctrines and principles which govern the determination of the sentence but have no analogues in the context of the determination of the probability of sentencing. It is time to explore more rigorously whether the different attitudes toward risk and ambiguity can explain the different principles governing the determination of the sentence, on the one hand, and the determination of the probability of sentencing, on the other.

The overriding normative principle which governs the determination of certainty can be stated as follows. The criminal law system aims at providing maximum deterrence at minimal costs. The costs of the criminal law system are determined by the costs of sentencing and by the costs of the detection and conviction systems. Certainty and uncertainty with respect to the sentence or the probability of sentencing should be manipulated in a way which increases the deterrent effects of the criminal law system.

The different doctrines and practices that were explored in Part I can all be interpreted as particular examples of this general principle. Given that individuals prefer a non-ambiguous sentencing lottery to a uniform sentencing scheme, the risk that a sanction will be increased retroactively has little impact on their behavior. In order to illustrate this, let us assume that there is no prohibition on retroactive sanctioning. Let us also assume that the probability that the sanction for a particular offense will be increased from ten to twenty years is fifty percent. Our analysis suggests that the deterrent effect of this possible increase in sentence is smaller than the deterrent effect of increasing the uniform sanction from ten to fifteen years.

Admittedly, one could argue that the absence of constraints on retroactivity would

introduce not only risk but also ambiguity into the legal system. Individuals may have no way of evaluating the probability that criminal statutes will be retroactively changed and consequently their lack of confidence with respect to the probability of change may be conducive to deterrence. Our findings do not preclude this possibility. They only point out what the relevant considerations are. The more intense the ambiguity aversion is, the more likely it is that the prohibition on retroactivity cannot be justified on efficiency-based grounds. Establishing the desirability of the prohibition on retroactivity requires therefore further empirical investigation. It is not difficult to apply similar considerations in the context of other doctrines analyzed above such as the rule of lenity, or the requirement of stability.

The extensive discourse over the Federal Sentencing Guidelines could benefit from this understanding of the attitudes of criminals towards uncertainty. In order to establish this claim, let us make two counterfactual presuppositions. First, let us assume that the new sentencing guidelines provide certainty with respect to the size of the sanction. Second, let us assume that the expected sanction under the old indeterminate sentencing system is equal to the one under the new sentencing guidelines.[41] From an efficiency-based perspective, the crucial difference between the two sentencing systems is in the attitude of potential criminals towards risk. Under the rule of indeterminate sentencing, potential criminals are subject to greater risk with respect to the size of the sentence than under the new system. Thus, if criminals were risk averse with respect to the size of the sanction, an indeterminate system would provide better deterrence. But given the attitudes of criminals, it is likely that reinforcing certainty with respect to the size of the sanction is conducive to deterrence.

Those results, though, should be qualified. If an indeterminate sentencing scheme generates both risk and ambiguity, our model cannot clearly suggest what the optimal solution is. Under these

circumstances, further empirical research must be done in order to provide clear guidelines for the policy-maker.[42]

It may seem as if the traditional justice-based justification can explain the prohibition on retroactivity and some of the other doctrines and principles analyzed in Part I. Arguably, under this view, a sentencing lottery violates both the fair warning requirement and the parity requirement --- the requirement that individuals who commit similar crimes should be subjected to similar penalties.[43]

Yet, our investigation raises serious questions regarding the validity of traditional justice-based justifications. First, it shows that justice-based justifications ignore the uncertainty and disparity with respect to the probability of sentencing. Justice-based justifications often neglect the need to explain why uncertainty with respect to the size of the sanction is important while uncertainty with respect to the probability of sentencing is not. Moreover, for reasons which were elaborated earlier in this Part, both the convicted criminal facing the prospects of a sentencing lottery and the individual who considers whether to commit a crime would prefer a sentencing lottery to a uniform sentencing scheme. Can justice require inflicting on individuals a sentencing scheme which they would reject and reject instead a scheme which is favored by them on the grounds that the latter is unfair to them? Establishing that this is impossible is beyond the tasks of this article and yet this observation must raise concerns about the ultimate validity of justice-based considerations.

CONCLUSION

The traditional scholarship in criminal law, on the one hand, and the mechanisms for

36

enforcing criminal law, on the other hand, were often conducted separately. The utilitarian insight, later endorsed by the law and economics movement, was that the determination of the sentence and the determination of the probability of sentencing are related to each other. Yet, despite this recognition, the actual practices and rhetoric of the traditional criminal law discourse are so entrenched that the differential practices governing the determination of certainty and uncertainty with respect to the size of the sentence and with respect to the probability of sentencing have never been examined.

Our examination challenges the blind acceptance of these practices and yet it ultimately recognizes their social value. It raises questions with respect to these practices merely in order to reaffirm them. Theologians' practices in the Middle Ages and the modern legal system may in fact be efficient in the way they manipulate certainty. However, our endorsement of these practices is a limited and contingent one. A thorough investigation needs to be conducted in order to determine the degree to which the behavioral observations used in this Article are operative in the criminal context. More particularly, it is important to determine whether criminals operate in criminal contexts in a way predicted by the experiments conducted by Tversky and Ellsberg. More thorough experimental and theoretical research needs to be conducted in order to determine the public's perceptions with respect to certainty in the criminal law context – perceptions which ultimately are crucial in determining the efficacy of the criminal law system. Finally, it is equally important to explore the way certainty operates in the context of private law. We shall leave those investigations for another occasion.

References

Andenaes, Johannes. 1966 "The General Preventive Effects of Punishment," 114 *U. Pa. L. Rev*. 949-983.

Beale, Sara. 1995. "Too Many and Too Few: New Principles to Define the Proper Limits for Federal Crime Jurisdiction," 46 *Hastings L.J.* 979-1018.

Bebchuk, Lucian Arye & Kaplow, Louis, 1993. "Optimal Sanctions and Differences in Individuals' Likelihood of Avoiding Detection," 13 *Int'l Rev. L. & Econ*. 217-24.

Ben Shahar Omri & Alon Harel. 1996. "The Economics of the Law of Criminal Attempts: A Victim-Centered Perspective," 145 *U. Pa. L. Rev*. 299-351.

Bentham, Jeremy 1781, 1988. *The Principles of Morals and Legislation*. Buffalo, New York, Prometheus Books.

Braithwaite John & Pettit, Philip. 1990. *Not Just Deserts: A Republican Theory of Criminal Justice* New York, Calrendon Press, Oxford University Press.

Clymer, Steven. 1997. "Unequal Justice: The Federalization of Criminal Law," 70 *So. Cal. L. Rev.* 643-739.

Dan-Cohen, Meir. 1984. "Decision Rules and Conduct rules: On Acoustic Separation in Criminal Law," 97 *Harv. L. Rev.* 625-677.

Davis, Culp Kenneth. 1969 *Discretionary Justice: A Preliminary Inquiry* Urbana Chicago London, University of Illinois Press.

Diver S. Colin. 1983. "The Optimal Precision of Administrative Rules," 93 *Yale L.J.* 65-109.

Ellsberg, Daniel. 1961. "Risk, Ambiguity, and the Savage Axioms," 75 *Q.J. Econ.* 643-669.

Einhorn J. Hillel & Hogarth, M. Robin "Decision Making Under Ambiguity," 59 *J. Bus.* S225-S250.

Elster, Jon. 1998. "A Plea for Mechanisms," in P. Hedstrom & R. Swedberg *eds Social Mechanisms: An Analytical Approach to Social Theory.* New York, Cambridge University Press .

The Federalist. 1961. *The Federalist Papers.* New York, New American Library.

Frankel, E. Marvin. 1972. *Criminal Sentences: Law Without Order* New York, Hill and Wang.

Freed, J. Daniel. 1992. "Federal Sentencing in the Wake of Guidelines: Unacceptable Limits on the Discretion of Sentencers," 101 *Yale L.J.* 1681-1747.

Fuller, L. Lon. 1969. *The Morality of Law.* New Haven, Yale U. Press, Revised Edition.

Haines W. Roger, Cole Kevin Woll C. Jennifer. 1995. Federal Sentencing Guidelines Handbook. New York, McGraw-Hill Companies.

Hammitt, K. James. 1997 "Comparative Risk Analysis in Action: Improving Comparative Risk Analysis," 8 Duke Env. L. & Pol'y F. 81-100.

Heaney, W. Geral. 1992. "Revisiting Disparity: Debating Guidelines Sentencing," 29 *Am. Crim. L. Rev*. 771-793.

Heller, Robert. 1977. "Comment, Selective Prosecution and the Federalization of Criminal Law: The Need for Meaningful Judicial Review of Prosecutorial Discretion" 145 *U. Pa. L. Rev.* 1309-1358.

Henriques, Mark 1990 Note: "Desuetude and Declaratory Judgment: A New Challenge to Obsolete Laws," 76 *Va. L. Rev*. 1057-1097.

Hollon, Greg. 1996. Note, "After the Federalization Binge: A Civil Liberties Hanover," 31 *Harv. C.R.-C.L. Rev.* 499-537.

Christine Jolls et al. 1988. "A Behavioral Approach to Law and Economics," 50 *Stan. L. Rev.*

1471-1550.

Issacharoff, Samuel. 1998. "Can There Be a Behavioral Law and Economics?," 51 Vand. L. Rev. 1729-1745.

Kahan, M. Dan. 1994. Lenity and Federal Common Law Crimes, 1994 *Sup. Ct. Rev*. 345-428.

Kahneman, Daniel & Tversky, Amos. 1979. "Prospect Theory: An Analysis of Decision Under Risk," 47 *Econometrica* 263-291.

Kane, P. S. 1993. "Note, Why Have you Singled Me Out? The Use of Prosecutorial Discretion for Selective Prosecution," 67 *Tul. L. Rev*. 2293-2310.

Karni, Edi and David Schmeidler, 1991: "Utility Theory Without Uncertainty." In W. Hildenbrand and H. Sonnenschein, (eds.): Handbook of Mathematical Economics, vol. IV, ch. 33. Amsterdam: North Holland.

Kelman, Mark. 1998. "Behavioral Economics as Part of Rhetorical Duet: A Response to Jolls, Sunstein, and Thaler," 50 *Stan. L. Rev.* 1577-1591.

Korobkin Russell & Guthrie, Chris. 1997. "Psychology, Economics, and Settlement: A New Look at the Role of the Lawyer" 76 *Tex. L. Rev*. 77-141.

Lewis, David. 1989. "The Punishment that Leaves Something to Chance," 18 *Philosophy and Public Affairs* 53-67.

MacCrimmon, K. R. & Larsson, S. 1979. "Utility Theory: Axioms Versus `Paradoxes'," in Expected Utility Hypotheses and the Allais Paradox (M.Allais and O. Hagen eds., Dordrecht, D. Reidel).

Miller, Marc. 1992."Purposes at Sentencing," 66 *So. Cal. L. Rev*. 413-481 .

Morris, Norval. 1982. *Madness and the Criminal Law*. Chicago and London, University of Chicago Press.

Nagel H. Ilene & Schulhofer, Stephen. 1992. "A Tale of Three Cities: An Empirical Study of Charging and Bargaining Practices Under the Federal Sentencing Guidelines," 66 *So. Cal. L. Rev.* 501-561.

Pizzi, T. William. 1993. "Understanding Prosecutorial Discretion in the United States: The Limits of Comparative Criminal Procedure as an Instrument of Reform," 54 *Ohio St. L.J.* 1325-1373.

Polinsky, Mitchell & Shavell, Steven. 1999. "On the Disutility and Discounting of Imprisonment and the Theory of Deterrence," 28 *J. Leg. Stud.* 1-16.

Posner, Richard. (1998). "Rational Choice, Behavioral Economics and the Law," 50 *Stan. L. Rev.* 1551-1575.

Posner, Richard. 1998. *Economic Analysis of Law* 5th ed. New York, New York, Aspen Law and Business.

Rawls, John. 1972. *A Theory of Justice.* Oxford, Oxford University Press.

Resnik, Judith. 1985. "Precluding Appeals," 70 *Cornell L. Rev*. 603-624.

Ricciardi, Laura& Sinclair, B. W. Michael. 1996. "Retroactive Civil Litigation," 27 *U. Tol. L. Rev*. 301-379.

Schmeidler, D. 1989. "Subjective Probability and Expected Utility Without Additivity," 57 *Econometrica* 571-587 .

Schulhofer, Stephen. 1992. "Assessing the Federal Sentencing Process: The Problem is Uniformity, Not Disparity," 29 *Am. Crim. L. Rev*. 833-873.

Stith, Kate & Cabranes, A. Jose. 1998*. Fear of Judging: Sentencing Guidelines in the Federal Courts.* Chicago and London, University of Chicago Press.

Sunstein, Cass. 1997. "Behavioral Analysis of Law," 64 *U. Chi. L. Rev*. 1175-1194.

Tonry, Michael. 1996. *Sentencing Matters.* New York, Oxford, Oxford University Press.

Viscusi, W. Kip. 1996. "Individual Rationality, Hazard Warnings, and the Foundations of Tort Law," 48 *Rutgers. L. Rev.* 625-671.

Von Hirsch, Andrew. 1976. *Doing Justice.* New York, Hill and Wang

Von Hirsch, Andrew. 1993. *Censure and Sanctions*. Oxford, Clarendon Press.

Vorenberg, James. 1981 "Decent Restraint of Prosecutorial Power," 94 *Harv. L. Rev*. 1521-1573.

Wigmore John Henry revised by Tillers, Peter. 1983. *Evidence in Trials at Common Law* 4th ed. Vol 1. Boston, Little Brown.

Footnotes

[1] The idea of a sentencing lottery is borrowed from Lewis (Lewis, 1989 p. 58) In contrast to Lewis, however, we provide reasons to reject a sentencing lottery scheme while Lewis endorses it and uses it to justify the differential treatment of attempts in criminal law.

Public opinion is clearly opposed to sentencing lotteries. In 1982, a judge in New York City flipped a coin to determine whether to sentence an individual to twenty or thirty days in jail. The public was outraged and the judge was censured (Resnick, 1985, 610-611). The aversion to sentencing lotteries is part of a broader phenomenon, namely the aversion to luck in the context of criminal law (Omri Ben Shahar & Alon Harel, 1996, 321).

[2] See infra Section I.A.

[3] Arguably, the claim that there are no "sentencing campaigns" is false. There are many contexts where there are event-inspired campaigns to increase the sanctions as a reaction to an exceptionally hideous crime. For instance, the recent pressure to increase the sentence for hate crimes was a reaction to several hideous hate crimes. Event-inspired campaigns to increase sanctions for crimes cannot, however, be compared to enforcement campaigns. Enforcement campaigns change the probability of detection temporarily, while event-inspired campaigns to increase or decrease sentencing bring about permanent increases or decreases in the sentence.

Another phenomenon that is arguably analogous to sentencing campaigns is the shifts in the willingness of prosecutors to engage in plea bargaining. Effectively, these shifts change the sanctions imposed on criminals at different times and could therefore arguably be described as sentencing campaigns. Yet, we believe that for this reason these changes raise moral concerns.

[4] See infra note 30.

[5] The recent emergence of "behavioral law and economics" is opposed by many (Isacharoff, 1998; Kelman, 1998; Posner, 1998). But the objections raised against behavioral law and economics are not applicable to our enterprise; they are directed primarily against the more ambitious attempt to develop a competing methodology to traditional law and economics. One may agree with the opponents of law and economics that behavioral law and economics is not a full-fledged theory and yet recognize that explanations based on general and persistent behavioral regularities are important and valuable.

[6] For a thorough discussion of these clauses, see (Riciarid & Sinclair, 1996, 302-12)

[7] There is one exception to the general rule that retroactive detection is not considered inappropriate. One doctrine which could be regarded as imposing some restrictions on retroactive detection is desuetude. Under the doctrine of desuetude, a law that has not been enforced for a long time is nullified (Henriques, 1990, 1068-69). But despite some attempts by scholars to advocate the use of the doctrine of desuetude, the doctrine has never been popular in the U.S. See (Henriques, 1990, 1068-69). A recent attempt to use the doctrine of desuetude by Judge Guido Calabresi in an assisted suicide case was later reversed by the Supreme Court. See Quill v. Vacco, 80 F.3d 716, 735 (2d Cir. 1996), *rev'd*, 521 U.S. 793 (1997).

[8] It is an established rule that the rules of criminal procedure can be changed retroactively, See, e.g., Thompson v. Missouri, 171 U.S. 380 (1898); Dobbert v. Florida, 432 U.S. 282 (1977), *rehearing denied*, 434 U.S. 882 (1977). The same view is adopted with respect to the rules of evidence. See Beazell v. Ohio, 269 U.S. 167 (1925); (Wigmore, 1983, 7).

[9] United States v. Wiltberger, 18 U.S. 76 (1820). In some jurisdictions the common law rule of strict construction has been codified. See, e.g., Fla. Stats. Ann. section 775.021(1)

("The provisions of this code . . . shall be strictly construed; when the language is susceptible of different constructions, it shall be construed most favorable to the accused.").

[10] Admittedly, the principle has been eroded in recent years. The Model Penal Code section 1.02(3) rejected the principle of lenity in favor of construction "according to fair import of their terms but when the language is susceptible of different constructions it shall be interpreted to further the general purposes. . . ."

[11] The view that the purpose of the rule of lenity is to eliminate uncertainties is supported by the fact that the primary justification given to the rule of lenity is that citizens have a right to be notified of the content of the criminal prohibitions as well as of the size of the sanctions imposed for violating these prohibitions. See United States v. Bass, 404 U.S. 336, 347 (1971); Liparota v. United States, 471 U.S. 419, 427 (1985). This interpretation is however rejected by others (Kahan, 1994, 399-405).

[12] This aspiration is the one which guided the Federal Sentencing Commission (Haines, Cole, Kevin, 1995; Tonry, 1996, 54-58).

[13] 28 U.S.C. section 991(b)(1)(B) states that the purpose of the Sentencing Commission is to establish sentencing policies and practices that "avoid…unwarranted sentencing disparities among defendants with similar records who have been guilty of similar criminal conduct while maintaining sufficient flexibility to permit individualized sentences when warranted." The view that reducing disparity is the primary goal of the Sentencing Guidelines is also shared by the courts. See, e.g., United States v. Restrepo, 946 F.2d 654 (9th Cir. 1991); United States v. Galloway, 943 F.2d 897 (8th Cir. 1991); United States v. Draper, 888 F.2d 1100, 1104 (6th Cir. 1989). This position is also supported by scholars (Stitch & Cabranes, 1998, 104). For a

general discussion of the purposes of the Federal Sentencing Guidelines, see (Miller, 1992)

[14] Arguably, a distinction should be drawn between the concern for reducing the disparity in sentencing and the concern for fair warning. It seems that the primary justification for the Guidelines is the urge towards consistency and disparity and not towards certainty. However, those values are interdependent and the rhetoric which is used to justify the Guidelines may in fact be misleading. Our enterprise reconstructs a better justification which may deviate from the standard justifications provided by the advocates of the Guidelines.

[15] For two effective critiques, see (Tonry, 1996; Stith & Cabranes, 1998).

[16] We are grateful to Dan Kahan for pressing this objection forcefully.

[17] See, e.g., Koon v. United States, 518 U.S. 1 (1986).

[18] One example is the concurrent jurisdiction of federal and state authorities. Broad grants of federal criminal jurisdiction created a situation in which defendants who commit identical crimes face grossly disparate sentences depending on whether they are prosecuted by the State or by the Federal Government (Beale, 1995, 996-1001; Holon, 1996, 503; Clymer, 1997, 646; Heller, 1977). One example illustrating the arbitrary outcomes of the concurrent jurisdiction is the case of "federal days." While serving as the United States District Attorney, Rudolph Giuliani initiated a program in which one day was chosen at random each week in which all street level drug dealers apprehended by local authorities would be prosecutred in federal court. Giuliani himself stated that "the idea was to create a Russian-roulette effect." (Beale, 1995, 1000; Heller, 1977, 1334 n.103; Hollon, 1996, 514). Courts have consistently rejected any attempt to challenge the disparate sentencing resulting from this power of federal prosecution (Beale, 1995, 1001-1002; Hollon, 1996, 505-11). Yet most scholars criticize the

disparity which is the byproduct of the concurrent jurisdiction.

[19] Some of the legal doctrines which aim at reinforcing certainty are costly for various reasons. For a detailed investigation of the costs of the rule of lenity, see (Kahan, 1994, 352-56).

[20] It is often said that an efficient legal system requires providing false information, or at least generating false perceptions with respect to the ways in which it operates (Dan-Cohen, 1984).

[21] It is important however to note that while many jurisdictions have some guidelines concerning the exercise of prosecutorial discretion, only very few publish them.

[22] One problem which makes the reinforcement of certainty with respect to the probability of sentencing particularly difficult is the fact that the costs of detection shift and fluctuate in an unpredictable manner while the costs of incarceration do not. Hence, the need to invest efficiently in detection requires frequent changes in the detection efforts.

[23] See infra section I.F.

[24] Expressions of the ethos governing the sentencing process can be found both in legislation and in judicial decisions. Model Penal Code sections 1.02(1)(d) & 1.02(2)(d) introduce these values into the guiding principles of the criminal code. Under Section 1.02(1)(d) of the Model Penal Code, one of the general purposes governing the definitions of offenses is "to give fair warning of the nature of the conduct declared to constitute an offense." Under Section 1.02(2)(d), one of the general purposes of the provisions governing the sentencing and treatment of offenders is "to give fair warning of the nature of the sentences that may be imposed on conviction of an offense". The Court often expresses similar sentiments in rhetorically powerful ways. See Ginzburg v. United

States, 383 U.S. 463, 477 (1966).

[25] In addition to the direct costs, in 1994 Congress enacted legislation authorizing billions of federal dollars to those states that establish guidelines similar to the one in the federal system (Tonry, 1996, 6). The next section investigates whether these costs can be justified on efficiency-based grounds.

[26] The conclusions of this investigation cannot be considered more than tentative. There are certainly conflicting features that suggest that people's attitudes towards uncertainty are not necessarily consistent. This work does not aim at providing conclusive answers concerning the deterrent effects of uncertainty with respect to the sentences, or with respect to the probability of sentencing. Indeed, in many fields it is accepted that some of the more important behavioral predictions made by psychologists do not support predictions outside the highly controlled experimental settings in which these mechanisms are observed. The reason is that those settings, considered in the aggregate, generate an array of mechanisms that point in conflicting directions. Because we lack fully specified, rule-governed theories about the interaction of the competing psychological mechanisms, those mechanisms cannot yield unambiguous predictions ex ante (Elster, 1998). All we can do with these mechanisms ex ante is frame hypotheses for empirical testing. This paper frames a hypothesis concerning the effects of uncertainty on deterrence. If plausible, this hypothesis should provide the basis for experimental work which will corroborate or refute it.

[27] Such a random outcome may be due to different attitudes judges have to sentencing, but it can also be introduced into the law by the legislature. In the former case, the random event is the identity of the judge and the probabilities represent relative frequencies of lenient (80%)

and stern (20%) judges. In the latter case, the legislature could set the standard sentence to be four years, but force each convicted person to take part in a lottery where with probability 20% they will be sentenced to five extra years in prison. Both kinds of information would be public and accessible to criminals. This scheme involves risks faced by criminals; yet given that the probabilities are known, it does not involve ambiguity.

[28] This is known as the Ellsberg Urn (Ellsberg, 1961)

[29] The importance of perceptions of the criminal justice system is of course well known among those who investigate the deterrent effects of the legal system (Andenaes, 1966). It is often the case that criminal law intentionally designs mechanisms to generate false perceptions (Dan-Cohen, 1984).

[30] Arguably, the overall costs of sentencing do not depend only on the average sentence. For instance, incarcerating one person for ten years may be more costly than incarcerating two individuals for five years each. Under this view, the costs of incarceration of one person for ten years may include, for instance, the complete inability of that person to reintegrate back into the society, while incarcerating two individuals for five years facilitates the reintegration of both into the society.

Yet this hypothesis is speculative. Equally plausible is the claim that incarcerating two individuals for five years may preclude the ability of both individuals to reintegrate into society and consequently that a sentencing lottery is less costly than a uniform sentencing scheme. We therefore ignore these complications because without more thorough research, the question of whether a sentencing lottery is more or less costly than a uniform sentencing scheme cannot be settled. It is possible that the costs of each system differ in different contexts and consequently

that no generalizations can be made.

In sum, the claim that the costs of sanctions depend only on the average sanction is not based on a conviction that this is the case, but on the inability to determine which scheme is more costly. We thank Harold Edgar and Ben Zippurski for raising this objection.

[31] In the suggested lottery, individuals are informed immediately of the outcome of the lottery. I thank Mike Otsuka for raising the following interesting variation on the sentencing lottery. Under his suggestion, one could design a system in which the outcome of the lottery is not known and consequently the person spends the first two years in prison without knowing whether they are going to be released after two years or after eight years. The preferences of individuals with respect to this lottery could be different because of the anxiety caused by one's ignorance with respect to the outcome of the lottery. Note, however, that the system could provide a fixed sentence of five years without notification. So the crucial difference here is not between a sentencing lottery and a fixed sentence, but between a known sentence and an unknown sentence.

We do not discuss this sort of case in this paper, although we believe that the question of why criminals are informed of the length of their sentence deserves close attention.

[32] Mike Otsuka argued that the premise underlying the analysis, namely that the utility derived from years in prison is independent of the length of the sentence, is false. According to his view, it is typically easier to endure the first year in a short sentence than the first year in a longer sentence because, in the former case, one can take comfort in the fact that the ordeal will be over soon.

It is hard, however, to predict the implications of this phenomenon with respect to the

preference between a uniform sentence and a sentencing lottery. Take as an example the case in which a person faces the choice between five years in prison and a lottery in which he has equal chances of being subjected to two years and eight years in prison. On the one hand, it seems that the person will be even more willing to go through a lottery because winning the sentencing lottery has greater benefits than predicted. The two years of a two-year sentence are less burdensome than the first two years of a five years sentence. On the other hand, it means that losing the lottery has larger costs than predicted given that the first two years of an eight years sentence are more painful than the first two years of a five years sentence.

[33] The same psychological mechanisms operate in the case of mitigation of sanctions, but there the normative analysis may lead to different results. Mitigating sentences is often perceived as a way to provide an incentive to people who are in prison to modify their behavior. The larger the expected utility resulting from the mitigation, the larger are the incentives provided by the mitigation. Consequently, in evaluating the optimal mitigation system, society should prefer the mitigation system that is favored by prisoners in order to provide prisoners with stronger incentives to modify their behavior. Given the preference prisoners have for a sentencing lottery over a uniform mitigation scheme, it seems that uncertainty with respect to mitigation is better from a societal perspective.

Naturally there are other considerations which effect the optimal mitigation system. Criminals may take the practice of mitigating sentences into account at the initial stages - the stages in which they consider whether or not to commit the crime. From this perspective, the criminal considers not only the sanction as determined by the court, but also the sanction as is initially determined by the court and later amended by the institutions responsible for

mitigation. The mitigation is perceived as affecting the size of the sanction and consequently, looked at from this perspective, the principles which govern certainty with respect to the mitigation are the same ones which determine the desired certainty with respect to the sanctions in the first place.

[34] The above analysis is summarized in the following theorem.

Theorem 1. Let $u(x)$ be the total utility a person receives from being out of prison for the next x years, $x \geq o$, and assume diminishing marginal utility, that is, $u''(x) < 0$. Let $X = (x_1, p_1; ...; x_n, p_n)$ be a lottery that yields a sentence of the next x_i years in prison with probability $p_i, i = 1, ..., n$. Denote its expected value by $\overline{X} = \sum_{i=1}^{n} p_i x_i$. Then the convicted person prefers X to $\overline{X}$.

[35] This can be shown by comparing the earlier case with the parallel situation of a decision-maker who has to make a choice between giving up 5 dollars, on the one hand, and participating in a lottery in which she has a 50% chance of loosing 2 dollars and a 50% chance of losing 8 dollars, on the other hand. Suppose her current wealth level is ten dollars, and consider the following level of marginal utility (MU) from dollars for the first ten dollars.

Dollars	1	2	3	4	5	6	7	8	9	10
MU	20	19	18	17	16	15	14	13	12	11

If the decision-maker chooses to pay 5 dollars, her utility drops by 65. If she takes the gamble and loses 2 dollars, her utility drops by 23, and if she pays 8 dollars, her utility goes

down by 116. On average, she loses 69.5 (in utility terms), which exceeds the loss of 65. Consequently, it seems that the decision-maker prefers the loss of 5 dollars to the lottery. The difference between the monetary sanction and the jail is that in the case of monetary sanction, the decision-maker first gives up his less "expensive" dollars, namely those that have the lower marginal utility, while if sent to prison, the decision-maker gives up her most valuable years, namely those that have the highest marginal utility.

[36] We have not examined the case of uncertainty in capital punishment cases. However, it could be that the great uncertainty and the arbitrary nature of the choice to use capital punishment explain the ineffectiveness of capital punishment.

[37] Consider lotteries of the form $(x, s_1; y, s_2)$ where s_1 and s_2 are the (only) two possible events that may happen. Such a lottery yields x if s_1 happens, and y if s_2 happens. Suppose further that the decision-maker is uncertain about the exact values of the probabilities of the two events. Schmeidler suggests that the value of such a lottery is:

$v(s_1)u(x) + (1 - v(s_1))u(y)$ if y is better than x

and

$v(s_2)u(y) + (1 - v(s_2))u(x)$ if x is better than y

where $v(s_1) + v(s_2) > 1$. In other words, the decision-maker overestimates the probability of the event that leads to the undesirable outcome. For the general case, see (Edi Karni & Schmeidler (1991)).

[38] For other similar experiments, see (Hammitt, 1997, 96-98).

Admittedly, some have shown cases in which individuals are ambiguity-seeking (Einhorn & Hogarth, 1986). But, as Einhorn and Hogarth show ambiguity-proneness is much

less prevalent than ambiguity aversion.

[39] It is important to distinguish between the average probability of sentencing of criminals in general and the probability of sentencing a particular individual. The probability of sentencing which influences the behavior of any potential criminal is not the average probability of sentencing of criminals in general, but the potential individual criminal's perception of *her own* likelihood to be sentenced – likelihood which may differ from the average likelihood of criminals in general to be detected (Bebchuk & Kaplow, 1993). It is important, however, to note that the individual's probability of sentencing is related to the institutional rate of sentencing. So it may be that a would-be criminal believes that her dexterity reduces the probability of detection (or that her clumsiness increases this rate). But this is a relatively known factor that is added to the unknown institutional probability of sentencing, and therefore cannot eliminate the unpredictability permitted and even reinforced by the law enforcement agencies.

[40] See discussion in supra section I.F.

[41] In reality, the Federal Sentencing Guidelines impose sentences which are much harsher than the ones which prevailed under the old system.

[42] Despite the extensive writings in the economic analysis of criminal law, there was no serious attempt to use economic methodology in order to evaluate the desirability of the Sentencing Guidelines.

[43] The fair warning requirement is a fundamental principle of the rule of law and is reflected for instance in the Model Penal Code. The parity requirement is analyzed in (Von Hirsch, Doing Justice, 1976, 72-73; Von Hirsch, 1993, 18-19, 25-26). Yet it is rejected by

others (Braithwaite & Pettit, 1990, 196-200; Morris, 1982, chap. 5)