

Victim Pays Damages to Tortfeasor: The When and Wherefore

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Résumé de l'article

Existe-t-il un monde où la victime d'un préjudice indemnise le responsable? Cet article analyse la règle de responsabilité de l'auteur du dommage de Calabresi et Melamed (Règle 4), où la victime a le droit d'empêcher une activité polluante si elle compense d'abord le pollueur. Selon l'application conventionnelle de cette règle, la victime collecte l'argent et compense le responsable, qui doit alors éliminer la nuisance (*ex ante*). Il n'y a aucune référence à la possibilité pour le responsable d'éliminer d'abord la nuisance et de recevoir ensuite une compensation (*ex post*). Nous soutenons que le moment du paiement doit être changé quand l'activité causant la nuisance a une valeur sociale et économique. Du point de vue du bien commun, les deux versions de la règle présentent à la fois des avantages et des inconvénients.

L'objectif principal de cet article est d'introduire un nouveau modèle de la Règle 4 afin d'aider législateurs, agences réglementaires et juges à déterminer quand la compensation devrait être exigible comme condition d'élimination d'une nuisance et quand le responsable devrait éliminer la nuisance avant d'être compensé.

Cet article introduit une perspective comparative qui révèle l'utilisation potentielle de la version *ex post* de la Règle 4, rendue manifeste par la tradition juridique juive. En fait, notre proposition en faveur d'une division entre les versions *ex ante* et *ex post* de la règle est renforcée par cette comparaison.

Offrir deux modes d'implémentation de la Règle 4 faciliterait l'adaptation d'une solution appropriée aux circonstances et élargiraient donc les possibilités d'utilisation de cette règle.

VICTIM PAYS DAMAGES TO TORTFEASOR: THE WHEN AND WHEREFORE

*Benjamin Shmueli and Yuval Sinai**

Is there a reality in which the victim pays damages to the tortfeasor? This article analyzes Calabresi and Melamed's liability rule for the damaging party (Rule 4), where the damaged party has the right to prevent pollution if the polluter is compensated first. Under the conventional application of this rule, the victim first collects the money and compensates the injurer, and only then is the injurer required to eliminate the nuisance (*ex ante*). There is no reference to a possibility of the injurer first eliminating the nuisance and only then receiving compensation (*ex post*). We argue that the timing of the payment should be changed when the activity causing the nuisance has social and economic value. Each version of the rule advances the aggregate welfare in some sense, but also harms it in another.

The primary aim of the present article is to introduce a new model for Rule 4 that would guide legislators, regulators, and judges in deciding when to order compensation as a condition for eliminating the nuisance and when to order the injurer to remove the nuisance first and only then collect the funds.

This article also introduces a comparative perspective that reveals the potential use of the *ex post* version of Rule 4, as manifest in sources of the Jewish legal tradition. This comparison further bolsters our proposal in favour of a division between *ex ante* and *ex post* versions of the rule.

Ultimately, offering two versions for the implementation of Rule 4 would better enable the adaptation of a suitable solution according to the circumstances and thus would widen the possibilities for the rule's use.

Existe-t-il un monde où la victime d'un préjudice indemnise le responsable? Cet article analyse la règle de responsabilité de l'auteur du dommage de Calabresi et Melamed (Règle 4), où la victime a le droit d'empêcher une activité polluante si elle compense d'abord le pollueur. Selon l'application conventionnelle de cette règle, la victime collecte l'argent et compense le responsable, qui doit alors éliminer la nuisance (*ex ante*). Il n'y a aucune référence à la possibilité pour le responsable d'éliminer d'abord la nuisance et de recevoir ensuite une compensation (*ex post*). Nous soutenons que le moment du paiement doit être changé quand l'activité causant la nuisance a une valeur sociale et économique. Du point de vue du bien commun, les deux versions de la règle présentent à la fois des avantages et des inconvénients.

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Offrir deux modes d'implémentation de la Règle 4 faciliterait l'adaptation d'une solution appropriée aux circonstances et élargiraient donc les possibilités d'utilisation de cette règle.

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Introduction

In the hometown of one of the authors, call it town B, a high-voltage electrical power line runs next to the author's apartment in a residential building, on a street with numerous skyscrapers. According to certain measurements, the cable emits radiation in excess of healthy limits in the vicinity of residential areas. The cable is owned by the Electric Company (EC) and was installed several years before the residential buildings were constructed. The line carries electricity not to town B itself but from town A to town C. Thus, residents of the street do not benefit from the nuisance in any way. Empirical evidence indicates a certain rise in the number of cases of cancer on the street in recent years, especially among children. The residents would like the EC to move the cable elsewhere or to bury it underground. The cost of either solution is in the hundreds of thousands of dollars. The EC is not willing to shoulder the costs because the cable preceded the residents and was placed there legally. Neither does the municipality regard itself as responsible for moving the cable, despite the fact that the topic was a hot one during the mayoral elections.

Several thousand residents of the street tried to organize. The residents established an action committee that attempted to hire a lawyer to file a claim or at least an initial pleading. The lawyer agreed to work in exchange for expenses only, as she herself is a resident of the street. To this end, a collection of one hundred dollars was required from every household. The residents understand that whatever solution will be reached, they will have to pay a significant portion of the cost of moving or burying the cable. Collection is sluggish, however, and every resident relies on others to pay at first. It is difficult, therefore, to collect the funds as a precondition for the elimination of the nuisance.

Using cases similar to the above, which was an actual case, this article attempts to elucidate the issues involved primarily from an economic point of view, as articulated in Calabresi and Melamed's writing on nuisance (known as the "four rules" or "the cathedral"),¹ as well as in other sources. Calabresi and Melamed's four rules, describing the distinctions between property rules, liability rules, and inalienability, are clearly applicable to the EC case. We focus our analysis on the challenging Rule 4—a liability rule for the damaging party, whereby the victim has the right to prevent the harm by stopping the polluting activities or demanding that they be done in a way that does not pollute, but the injurer must be compensated; if the injurer is not compensated, she may continue her activities.

¹ Guido Calabresi & A Douglas Melamed, "Property Rules, Liability Rules, and Inalienability: One View of the Cathedral" (1972) 85:6 Harv L Rev 1089.

In Calabresi and Melamed's article, as well as in later scholarship on that article, there is no detailed discussion of how the rule works in practice. Does the victim first collect the money and compensate the injurer, and only then is the injurer required to eliminate the nuisance—what we call the *ex ante* version of the rule? Or does the injurer first eliminate the nuisance, and only then is the victim compensated—what we call the *ex post* version of the rule? Calabresi and Melamed's article, as well as other theoretical literature and the applicable case law, seem to describe the conventional account of the manner in which the rule is applied in the order of events of the first, *ex ante* option, and there is no reference to the possibility of an *ex post* version. Moreover, the literature and case law contain no comprehensive discussion of any of the following questions: Which of the versions of the rule is preferable from a consequentialist perspective—the *ex ante*, the *ex post*, or maybe a combined intermediate version? What are the considerations to be used to determine which version should be used in any given circumstance? The present article aims to clarify these questions and to introduce a new model of Rule 4 that would make it more applicable and efficient. We argue that it is possible to alter the *timing* of the payment of compensation to the injurer for eliminating the nuisance, in cases in which the nuisance-causing activity has social and economic value, and to implement the rule in a different format rather than renounce it entirely.

In both the *ex ante* and *ex post* versions, the victim has the right to prevent the pollution by completely stopping the polluting activities—or demanding that they be conducted in a way that does not pollute—as long as the polluter is compensated. The key difference lies in *when* the polluter is compensated. The application of the two versions—*ex ante* and *ex post*²—in different cases can serve as a solid foundation for presenting the

² In the analysis of economic models, the term *ex ante* typically refers to a decision in principle regarding the level of activity, where the objective is to create an internalization based on which the decision maker can make an optimal decision. In this case, in order for the damaged parties to begin to act (e.g., in the case of a contractor who wants to start building) in the vicinity of the nuisance, they must internalize the full damage they will cause to the creator of the nuisance and the fact that they will need to pay her for that damage so that she can remove the nuisance, consistent with the rationale of Rule 4, as explained in the next Part. We do not want to create an externalization on the part of the decision maker so that, for example, a contractor builds an apartment complex near a polluting factory and when revenues from the project are lower than those from the factory, the contractor demands that a third party bear these costs. If the externalization takes place, there is no guarantee that the incentives of the tortfeasor will be effective and the deterrence optimal. In this article we are not concerned with the *ex ante* decision itself. It is clear to us that in this situation economic efficiency demands that the tortfeasor be compensated by the damaged parties, through general liability, for the removal of the nuisance. One party pays the other based on a Coasean deal. Here, we address Calabresi and Melamed's Rule 4. The contractor internalizes it

rule in a more complex light that can help with its implementation and broaden a court's ability to pursue beneficial social or economic policy.³

Consider again the EC case. The problems illustrated in this case pertain mostly to the difficulty of raising the initial amount needed to file the first claim by the lawyer, who charged only for expenses. But this issue suggests the greater difficulty of raising the larger amount that the residents must pay later in order to remove the cable, if the negotiation or the legal proceedings result in a compromise in which the EC, the city, and the residents must share the high cost of transferring the cable. In this type of situation, based on the *ex ante* version of the rule, the nuisance will presumably remain in place. Apparently, there is no justification to change the order of operations because the nuisance preceded the residents and was put in place legally. But based on the *ex post* version, the EC would remove the cable first and only then collect payment from the residents. In this case, the nuisance is eliminated, and the difficulty of collecting the money one way or another devolves to the EC. From the residents' point of view this is clearly the preferred course of action. We must admit, however, that applying the *ex post* option may scuttle the intention of certain entrepreneurs and investors to operate in some areas, given the

and knows how many residents need to buy apartments so that the benefits exceed the damage caused by the tortfeasor, who will have to be compensated. We deal with the *ex post* period, in the course of which, having already decided in the *ex ante* stage that a particular move is efficient (in this case, that the nuisance will be removed but the creator of the nuisance will be compensated), we examine the timing of the payment to the creator of the nuisance. But see Lucian Arye Bebchuk, "Property Rights and Liability Rules: The Ex Ante View of the Cathedral" (2001) 100:3 Mich L Rev 601. Bebchuk's use of the terms *ex ante* and *ex post* differs from the use of these terms in this article. Bebchuk's use of *ex ante* and *ex post* makes reference to the moment at which a given externality arises. In his example, he presents a downstream resort suffering losses because of an upstream factory polluting the river (*ibid* at 602). *Ex ante* refers to the period before the pollution occurred, and *ex post* to the situation after the negative externality of pollution has arisen, significantly altering the calculus of aggregate and individual cost-benefit for the involved parties (*ibid* at 603). In our usage, the terms *ex ante* and *ex post* retain their respective meanings of before and after the fact, but their point of reference is the sequence of the removal of a public nuisance and of the payment in compensation for doing so. That is, *ex ante* refers to a situation where compensation must be paid before the removal of a public nuisance and as a condition for it, and *ex post* refers to a situation where the public nuisance must be removed before the receipt of any compensation. For further discussion of the advantages and the drawbacks of the *ex post* version of Rule 4, see Part III, below.

³ It should be noted that the present article does not deal with intermediate situations in which the tortfeasor switches over to a low level of activity as a possible interim solution and an alternative to Rule 4. See e.g. Ian Ayres & Eric Talley, "Solomonic Bargaining: Dividing a Legal Entitlement to Facilitate Coasean Trade" (1995) 104:5 Yale LJ 1027 at 1078–80 (dealing with activity level division, which concerns allocating a partial right to each party). Therefore, to use the EC case as an example, we do not deal with situations where the electric cable operates for shorter periods or at a lower voltage.

difficulties it may cause them, even if they preceded the residents and were there legally. Each version of the model advances the aggregate welfare in some sense, but also harms it in another. In what cases can the victims use the ex post version of the rule, which clearly benefits them more than the ex ante version? In every case? Only in particularly dangerous cases? In every case in which the victims' residence preceded the nuisance? In no instance in which the nuisance preceded their residence and was established legally? And what happens when only some of the residents are willing to pay?

Comparing the advantages and drawbacks of each version enables us to present a sketch for a new model of Rule 4. The model attempts to incorporate a variety of relevant consequentialist and behavioural considerations in order to determine when it is appropriate and efficient to apply each version and to examine a possible implementation of some intermediate versions. This examination is significant given Rule 4's efficiency—at least according to Calabresi and Melamed—on one hand, and the fact that it has not been widely applied in practice by appellate courts, except in eminent domain (administrative taking) cases,⁴ on the other. Therefore, a secondary goal of the present article is to make this sophisticated rule more applicable in practice. Notwithstanding the above, examining the theoretical depths of the rule is significant in itself even if, as a result of regulations prohibiting construction near potential nuisances, some examples are no longer applicable in practice. By contrast, other examples will always remain applicable.

Since this article may be the first to discuss the issue of the timing of the payment within the context of liability rules and takings, we will discuss the issue of timing in the contexts of some well-known problems in the application of Rule 4. Among these are the problem of determining which party (polluters or residents) values the entitlement more,⁵ the information problem,⁶ the collective action and free-rider problems,⁷ and moral hazard.⁸

⁴ Calabresi and Melamed explain that it is actually eminent domain takings of a nonconforming use (see Calabresi & Melamed, *supra* note 1 at 1117, n 58). We will use the terms "eminent domain" or "takings", even though scholars sometimes use these terms as examples for Rule 2 only.

⁵ See presentation in Part I.B.1. and applications in Parts II, III.A., and V.H., below.

⁶ See presentation in Part I.B.1. and applications in Parts II, III.A., and V.A., C., F., H., below.

⁷ See presentation in Part I.B.2. and applications in Parts II, III.A., C., D., and V.A., D., F., G., below.

⁸ See presentation in Part I.B.3. and applications in Parts II, III.A., and V.C., below.

In a comparative analysis, we also explore the potential use of the ex post version of Rule 4 in the Jewish legal tradition. In our analysis, the rule receives a boost from the ancient Jewish sources. We show that Rule 4, which represented an important innovation in economic theory when it was introduced in 1972, was mentioned in the Talmud some 1,500 years ago, and that the Talmudic and post-Talmudic sages mentioned explicitly the existence of the two versions of the rule—ex ante and ex post. They preferred the ex post version for utilitarian and behavioural reasons, but analysis of the text also sheds light on cases in which it is more suitable to apply the ex ante version.

The question of whether or not it matters if a liability rule for a taking requires payment up front, or after the injury, is dealt with in the context of Rule 4, when employed as a test case. However, the discussion and conclusions would also be relevant in the more general context in which this question may be asked (i.e., to any permissible premeditated taking). Our goal is to draw attention to this issue and to present two alternative versions of the rule, while seeking conclusions on which of them serves better in a given situation. There certainly will be room to examine the issue of timing in a broader sense: the discussion and the conclusions will be relevant also to other rules and regimes, especially to the liability rule in favour of the damaged party, that is Rule 2, the symmetrical rule of Rule 4, where the damaged party cannot compel the polluter to stop, but is eligible for damages compensating for the harm. One should ask whether the tortfeasor should compensate the victims ex ante or ex post. We will elaborate on this below.⁹

Part I introduces the foundations of Rule 4, as well as some problems discussed in the literature regarding that rule. Part II presents the advantages and the drawbacks of the common ex ante version of the rule and raises the collective action problem. Part III introduces an alternative, innovative ex post version of the rule, presents the potential advantages and disadvantages of this version, and raises the more serious collective action problem that manifests itself in this version. It addresses the question of redesigning the rule in order to achieve a more efficient division between ex ante or ex post versions in various cases. The comparative perspective introduced in this Part reveals the potential use of the ex post version of Rule 4, as manifest especially in sources of the Jewish legal tradition, touching upon relevant utilitarian and behavioural considerations. Part IV addresses the question of redesigning the rule in order to achieve a more efficient division between ex ante and ex post versions in various cases and examines whether it is possible to present some

⁹ See Conclusion, below.

intermediate versions. One of the main aims for presenting intermediate versions is the concern that shifting the burden to the defendant to collect the required damages comes at a cost and thus may make potential defendants, anticipating the difficulty in collecting the money from the plaintiffs, hesitate to make investments in activities that could be viewed as harmful in the future. The intermediate versions help the tortfeasor to realize her rights according to Rule 4. In Part V, we outline a series of parameters that would aid in choosing between the *ex ante* and the *ex post* (or intermediate) versions of the rule. We combine all the parameters to present a sketch for a proposed new model for the application of the rule. We conclude the discussion and ask whether the question of timing can also be examined in relation to Rule 2 and possibly even in relation to all permissible premeditated takings. Ultimately, offering two versions for the implementation of Rule 4 would better enable the adaptation of a suitable solution according to the circumstances and thus would widen the possibilities of the use of this rule in practice.

I. Liability Rule for the Damaging Party (Rule 4)

A. *Foundations and Justifications*

According to Calabresi and Melamed, there are three basic types of protection for entitlements—property rules, liability rules, and rules of inalienability.¹⁰ After identifying these three types of protection, Calabresi and Melamed formulated four rules, drawing examples from nuisance (pollution) cases: (1) a property rule in favour of the damaged party where the damaged party requests and receives an injunction ordering the polluter to cease polluting (Rule 1);¹¹ (2) a liability rule in favour of the damaged party, where the damaged party cannot compel the polluter to stop, but receives damages compensating for the harm (Rule 2);¹² (3) a property rule in favour of the polluter, where the polluter is judged not to be a nuisance and thus has the right to continue polluting, with the damaged party, if it so wishes, able to buy the entitlement in a negotiation (Rule 3);¹³ and (4) a liability rule in favour of the polluter, where the damaged party, in exchange for compensating the polluter, has the right to prevent the pollution by completely stopping the polluting activities or demanding that the activities be done in a way that does not pollute. As long as the polluter is not compensated, there is no obligation to stop the polluting ac-

¹⁰ Calabresi & Melamed, *supra* note 1 at 1105.

¹¹ *Ibid* at 1115–16.

¹² *Ibid* at 1116.

¹³ *Ibid*.

tivities (Rule 4).¹⁴ The remedies in Rules 1 and 3 come from property law and enforce a right to either use property or prevent the use of the property. The remedies in Rules 2 and 4 come from tort law and provide for monetary damages.¹⁵

According to Calabresi and Melamed, “we are likely to turn to liability rules whenever we are uncertain whether the polluter or the pollutees can most cheaply avoid the cost of pollution.”¹⁶ As Calabresi and Melamed explain, the entitlement of the pollutees to be free from pollution unless compensated will be granted in some uncertain cases not because polluting is worth less to the polluter than freedom from pollution is to the pollutees, but simply because we do not know whether the polluter desired to pollute more than the pollutees desired to be free from pollution.¹⁷ Until their article, if a court concerned itself with economic efficiency, and believed it was limited to Rules 1, 2, and 3, the court could only test the value of the pollution by means of Rule 2, the imposition of nuisance damages on the polluter.¹⁸ Calabresi and Melamed explained that Rule 4 also provides for “at least the possibility that the opposite entitlement” leads to greater “economic efficiency in situations of uncertainty.”¹⁹

Calabresi and Melamed argue that the rule is also justified on distributional grounds.²⁰ They provide an example of a factory (the factory case) which, “by using cheap coal, pollutes a very wealthy section of town and employs many low income workers to produce a product purchased primarily by the poor.”²¹ Implementing Rule 4, which means here the “payment of damages to the factory after allowing the homeowners to compel it to use better coal, and assessment of the cost of damages to the homeowners,” would be, in Calabresi and Melamed’s opinion, the only way “to accomplish both the distributional and efficiency goals.”²² They also argue

¹⁴ *Ibid* at 1116–21.

¹⁵ Other scholars have made adaptations to these rules, adding Rules 5 and 6 (see e.g. Ian Ayres, “Monsanto Lecture: Protecting Property with Puts” (1998) 32:2 Val U L Rev 793 [Ayres, “Protecting Property”]). For a summary of Rules 5 and 6, see Ronen Avraham, “Modular Liability Rules” (2004) 24:3 Intl Rev L & Econ 269 at 272, n 9. See also Henry E Smith, “Property and Property Rules” (2004) 79:5 NYUL Rev 1719 at 1794–95 (arguing that there is a problem with put options because they place on every party the burden of having to pay for an entitlement they may never have contemplated).

¹⁶ Calabresi & Melamed, *supra* note 1 at 1119.

¹⁷ *Ibid* at 1120.

¹⁸ *Ibid*.

¹⁹ *Ibid*.

²⁰ *Ibid* at 1121.

²¹ *Ibid*.

²² *Ibid*.

that were the factory using cheap coal before any of the wealthy houses were built, implementing the rule would also be compatible with justice considerations.²³ Thus, Rule 4 allows for a greater consideration of policy concerns and does not exclude the question of which party arrived on the scene first.

B. Problems

Rule 4 in particular, and the four rules in general, have been subject to a great many debates and discussions. Some of these relate to our issue in one way or another, and they will be presented and discussed later in the article as to their possible interactions and intersections with the issue of the timing of payment.

1. The Problem of Determining Which Party Values the Entitlement More and the Information Problem

One of the problems raised in the literature is the problem of determining which party (polluters or residents) values the entitlement more.²⁴ As Calabresi and Melamed recognize, in implementing Rule 4, it is difficult to assess the compensation owed to the polluter and to assess the shares of payment among the residents.²⁵ This issue links to the larger problem of how to establish which side to the dispute most values the entitlement. Let us explain. For a taking to be efficient, the taking party has to value the asset more than the owner. If the strike price for a Rule 4 call option can be set correctly, and the cost of exercising such options is not high, Rule 4 could be efficient. Without a reliable mechanism that can reveal the true values of the polluter, the compensation can hardly be assessed correctly. Addressing this problem in a wider context is of course beyond the scope of this article, but it needs to be emphasized that, as a result of this problem, neither voluntary bargaining nor court adjudication (nor regulation) could consistently improve social welfare. In the EC case, there is uncertainty about the aggregate value to the residents, and even an ex post rule such as the one we offer in this article would not necessarily resolve this uncertainty. For example, it might turn out that residents collectively value the nuisance removal less than the assessment they are required to pay ex post. The ex post version, as compared to the

²³ *Ibid* at 1123.

²⁴ On the evaluation problem in general, see e.g. Ayres & Talley, *supra* note 3 at 1030 (highlighting the difficulty of determining how private parties value property due to the incentive for parties to misrepresent said values, leading to greater transaction costs).

²⁵ Calabresi & Melamed, *supra* note 1 at 1120–21.

ex ante version, favours the residents, as we shall see below in detail.²⁶ As such, the application of the ex post version should be aligned with scenarios in which the residents are more likely to be the higher valuer.

This comparison takes us to another related problem—the information problem.²⁷ In this respect, Rule 4 is generally more efficient based on the assumption that liability rules generally lead to greater welfare (than property rules) because they essentially force a transaction to take place, whereas misrepresentation can prevent a transaction from occurring.²⁸ The information problem arises when parties cannot practically bargain with one another. There is a general consensus that liability rules work better in these cases because a nuisance will only be avoided if the cost of avoidance is less than the cost of the harm whereas a property rule would require the prevention of a nuisance even when prevention costs more than harm. Property rules tend to be more efficient when few parties are present because a low court estimation will tend to induce more takings than is efficient and a high estimation will work similarly to the property rule anyway by inducing a low amount of takings; the reason is that a property rule leads to a lesser need to bargain and thus leads to a lower chance of bargaining failure.²⁹ Finally on this point, Henry E. Smith claims that property rules save on information costs because they allow

²⁶ See Part III.A., below.

²⁷ See Ian Ayres & JM Balkin, “Legal Entitlements as Auctions: Property Rules, Liability Rules, and Beyond” (1996) 106:3 Yale LJ 703 (contrary to Calabresi and Melamed’s early argument, “[i]t is by no means clear that property rules are always more efficient when bargaining is possible” at 706); Louis Kaplow & Steven Shavell, “Do Liability Rules Facilitate Bargaining? A Reply to Ayres and Talley” (1995) 105:1 Yale LJ 221 at 226–29 [Kaplow & Shavell, “Liability Rules”] (the thesis that split liability rules facilitate bargaining is not sufficiently supported and property rules tend to produce higher welfare where imperfect bargaining is present); Ayres & Talley, *supra* note 3.

²⁸ Kaplow and Shavell dispute the claim made by Ayres and Talley that the information-forcing effect of liability rules will facilitate bargaining. They argue that information problems do exist in liability rules such as Rule 4, according to their approach, but they are more salient in property rules (Kaplow & Shavell, “Liability Rules”, *supra* note 27 at 226–27). Elsewhere Kaplow and Shavell also discuss and formalize Calabresi and Melamed’s insight for the conditions under which liability rules are superior to property rules in a world with “one-sided” incomplete information (Louis Kaplow & Steven Shavell, “Property Rules Versus Liability Rules: An Economic Analysis” (1996) 109:4 Harv L Rev 713 [Kaplow & Shavell, “Economic Analysis”]). They outline different situations in which information is perfect or imperfect and discuss, accordingly, which of the rules—liability or property—are more efficient (*ibid* at 718, 725, 732–36).

²⁹ See Kaplow & Shavell, “Economic Analysis”, *supra* note 28 at 764–65. The number of plaintiffs or defendants will also be relevant as part of the parameters presented below in order to choose between ex ante and ex post versions (see Part V.A., below).

parties to enact exclusions, prevent resource use on “wasteful self-help,” and forego much opportunistic behaviour.³⁰

2. Moral Hazard

A number of laws and regulations “force” people to take measures to protect their property interests. The issue here is that state enforcement of property rights creates a moral hazard,³¹ inducing the polluter to pollute as if the polluting activities did not harm anyone.³² For example, if a company knows it will receive full compensation if somebody takes its building, it will be likely to overinvest in the building either to discourage the taking or to reap a higher payment for the building. In some cases, such as where the building will be demolished subsequent to the taking, it would have been better for society had that investment gone elsewhere.³³ In our case, therefore, polluters may be induced to overinvest if they know they will receive full compensation. In other words, in the *ex ante* version, the polluter has an incentive to invest highly in the pollution to make it

³⁰ Smith, *supra* note 15 at 1724. Smith argues that Kaplow and Shavell’s idea that one can initiate takings and retakings to induce more information is probably true, but it is not very likely to be cost-effective (see Kaplow & Shavell, “Economic Analysis”, *supra* note 28 at 764–65). See also Ian Ayres & Paul M Goldbart, “Optimal Delegation and Decoupling in the Design of Liability Rules” (2001) 100:1 Mich L Rev 1 at 9 (analyzing different liability rules that take advantage of private parties’ superior information and arguing that the courts are able to decouple allocative concerns from distributive concerns in posting liability rules); Ian Ayres, *Optional Law: The Structure of Legal Entitlements* (Chicago: University of Chicago Press, 2005) [Ayres, *Optional Law*] at 146–51.

³¹ See Abraham Bell & Gideon Parchomovsky, “The Case for Imperfect Enforcement of Property Rights” (2012) 160:7 U Pa L Rev 1927 at 1929 [Bell & Parchomovsky, “Imperfect Enforcement”] (showing that state enforcement of property rights can create moral hazard, leading to wasteful investment incentives). It seems to us that this idea is relevant not only to state enforcement, but to insurance as well. Basically, it can occur whenever the impact of the loss is shielded from the property owner.

³² See generally Tom Baker, “On the Genealogy of Moral Hazard” (1996) 75:2 Tex L Rev 237. See also Jacob Loshin, “Insurance Law’s Hapless Busybody: A Case Against the Insurable Interest Requirement” (2007) 117:3 Yale LJ 474 (analyzing moral hazard in regard to requiring an insurable interest in order to take out life or property insurance and arguing that the current system increases moral hazard); Ayres & Balkin, *supra* note 27 at 714 (arguing that while higher-order regimes induce more information, they do create the problem of moral hazard where parties are unwilling to invest in properties that they think they might not be able to keep). The authors also explain higher-order regimes as auctions (*ibid* at 708–09). But see Richard A Epstein, “A Clear View of *The Cathedral*: The Dominance of Property Rules” (1997) 106:7 Yale LJ 2091 at 2108–09 [Epstein, “A Clear View”] (criticizing the notion of auction liability rules).

³³ See Bell & Parchomovsky, “Imperfect Enforcement”, *supra* note 31 at 1930.

less likely she can be bought out. In this case, Rule 4 may be thwarted in practice.³⁴

3. The Collective Action and Free-Rider Problems

One of the main problems with paying compensation in order to stop a public nuisance has to do with the high transaction or administrative costs in collecting payment from the public, especially when it is a large group. Each individual relies on another, and it is difficult to bring all of them to a uniform position. This is the collective action problem—a situation in which many individuals would benefit from a certain action, but the action has an associated cost, which makes it unlikely that any one individual will undertake it alone. The rational choice is therefore to undertake this course as a collective action, the cost of which is to be shared.³⁵

Collective action (or public choice), is an outgrowth of game theory that deals with how people cooperate in furthering their individual and group interests through participation in joint undertakings.³⁶ As an academic discipline, collective action involves the application of analytical tools usually employed in the study of economics to areas such as law, sociology, and political science.³⁷ There is doubt about the efficacy of collective action under certain circumstances and about whether external coercion is required in order to convince individuals to participate in collective undertakings.³⁸ Conversely, a prevalent opinion may support the advantages of collective action in collective bargaining, trade representation, and other areas of socio-political activism.

As such, the theoretical framework of collective action, which considers individual choice in the aggregate and standing alone, can facilitate

³⁴ The moral hazard problem may also be relevant to the decision of whether to choose an ex ante or ex post version of Rule 4 (see e.g. Lawrence Blume, Daniel L. Rubinfeld & Perry Shapiro, "The Taking of Land: When Should Compensation Be Paid?" (1984) 99:1 QJ Economics 71 (exploring the efficiency problem of moral hazard in takings by eminent domain)).

³⁵ See generally Mancur Olson, Jr., *The Logic of Collective Action: Public Goods and the Theory of Groups* (Cambridge, Mass.: Harvard University Press, 1965); Lars Udén, "Twenty-Five Years with *The Logic of Collective Action*" (1993) 36:3 Acta Sociologica 239.

³⁶ See generally Todd Sandler, *Collective Action: Theory and Applications* (Ann Arbor: University of Michigan Press, 1992).

³⁷ For four models for collective action, see Pamela E. Oliver, "Formal Models of Collective Action" (1993) 19 Annual Rev Sociology 271.

³⁸ See e.g. Richard A. Posner, "Social Norms and the Law: An Economic Approach" (1997) 87:2 American Economic Rev 365.

analysis of the rule from an additional perspective. This issue is also related to the problem of free riders.³⁹ Specifically, the study of human behaviour illustrates that individuals may not always act in ways that further their own best interests or economic benefit.⁴⁰

An analysis of the incentive structure and group dynamics that function to consolidate or break apart collective undertakings can serve to clarify further the boundaries and parameters affecting the application of Rule 4, whether in the *ex ante* or the *ex post* version. Of further interest is the study of what better advances the individual's interests: solitary efforts or collective action. Although potentially increasing bargaining power, collective action can often result in reduced initiative and motivation on the part of individual participants of the group, thereby reducing aggregate effectiveness because of laziness or decreased motivation to act together. This means that if there are many victims, such a process can prevent the elimination of the nuisance because the collection of money may fail. There is a preliminary problem of identifying all the residents and determining what should be the cost of compensation for each of them, based on size, the degree of actual damage, and the like; the administrative costs can be very high.

If so, the collective action problem can create a situation in which organizational difficulties can prevent the collection of money to pay the creator of the nuisance, thereby scuttling the elimination of the nuisance despite the desire to eliminate it. This issue exacerbates the problem of free riders; even if many want to organize and pay, there can always be a portion of that group that knows how to benefit from the removal of the nuisance, with others paying their share as well. Some are truly indifferent about the elimination of the nuisance, even if objectively it may harm them as well. Those who are willing to pay will not want to pay the share of the free riders, even if it means the continuance of the nuisance.⁴¹

³⁹ See Wolfgang Stroebe & Bruno S. Frey, "Self-Interest and Collective Action: The Economics and Psychology of Public Goods" (1982) 21:2 *British J Social Psychology* 121. But see Friedrich Schneider & Werner W. Pommerehne, "Free Riding and Collective Action: An Experiment in Public Microeconomics" (1981) 96:4 *QJ Economics* 689.

⁴⁰ See e.g. the different articles in (1998) 50:5 *Stan L Rev* (presenting advantages of a behavioural approach to economics and limitations of rational choice in economic decision making, counter-arguments, and a rejoinder).

⁴¹ Cf. Ayres, "Protecting Property", *supra* note 15 at 821 (arguing, through demonstrations of Rules 2 and 6, that a put option can be preferable to a call option in regard to the collective action problem and the information problem). See also Ayres, *Optional Law*, *supra* note 30 at 14–15 (explaining that the *ex ante* version gives the resident the option of not paying if the court sets the amount too high, whereas the resident under the *ex post* version exercises an option when filing suit); Avraham, *supra* note 15 at 270–74 (analyzing the information problem with regard to a new family of liability

Finally, one cannot ignore the general critiques of the assumption that Calabresi and Melamed's liability rule is efficient. Of course, deciding which of the opinions—whether or not the rule is efficient—is more convincing is beyond the scope of this article and there are solid arguments for both views.⁴²

We proceed to examine the ex post versus the ex ante versions of Rule 4 assuming that the rule is efficient, but without ignoring the possible interactions of the timing issue with the other issues and problems presented in this Part as they concern Rule 4.

II. Ex Ante Version of Rule 4: Advantages and Drawbacks

Rule 4 has not been widely implemented—except in eminent domain cases—despite its efficiency in the eyes of Calabresi and Melamed, and its rationale in cases in which the nuisance preceded the victim. In general, these are cases in which the victim is the public and the aggregate damage to the public is greater than the benefit derived from the nuisance by the injurer. At the same time, the injurer has the privilege to emit pollution (because of the precedence in the operation of the nuisance) and therefore must be compensated.⁴³ For example, a system that did not allow for the compensation of factory owners would serve as an increased deterrent to investment in factories, thus decreasing the aggregate welfare. On the one hand, its implementation allows maintaining a certain flexibility. The one who came first, if the injurer, has rights, but these are not absolute and, under certain circumstances, they can be restricted. The mere precedence in ownership does not give the right to create facts on the ground for all eternity. It is true that the establishment of the factory was efficient at a time when there were no residents. The investor decided to establish a factory based on cost-benefit considerations prevailing at that time. As long as it is impossible to prove otherwise, the assumption remains that this use is the more efficient one. Nevertheless, even if natural urban growth leads to residential properties being built adjacent to the factory, as distinct from free riders hoping to win compensation, the optimal use of the land would still require that the factory cease polluting.

rules—modular liability rules—which use information from both parties rather than simply from one).

⁴² See e.g. Ayres & Balkin, *supra* note 27; Richard A Epstein, "Protecting Property Rights with Legal Remedies: A Common Sense Reply to Professor Ayres" (1998) 32:3 Val U L Rev 833; Ayres, "Protecting Property", *supra* note 15; Smith, *supra* note 15; Epstein, "A Clear View", *supra* note 32.

⁴³ See Richard A Posner, *Economic Analysis of Law* (Boston: Little, Brown and Company, 1972) at 27–28. But see RH Coase, "The Problem of Social Cost" (1960) 3 JL & Econ 1 (rejecting the very idea of precedence of the nuisance).

Thus, the rule helps strike a successful balance and grants the basic right to the victim to sue based on the rights of those who “came to the nuisance.” At the same time, the rule does not disincentivize activities that in principle increase the aggregate welfare. Therefore, if society wishes to protect factory owners and to encourage them to invest despite the risk that someday they will have to shut down because of a change in circumstances, though not allowing them to continue the nuisance under all circumstances, the rule obligates the victim to pay compensation if a claim is filed against them. The balance is based, among other factors, on the fact that as long as the injurer has not received the compensation she can continue causing the nuisance. We shall see that it is precisely in this essential point of efficiency that the application of the *ex post* version of the rule can result in innovation.

As Smith explains, another efficiency captured by the use of property rules is based on the assumption that property owners will want to maximize the value of their property.⁴⁴ Thus, playing a waiting game may allow owners to discover higher valued uses of their property. This standpoint would seem to support an *ex ante* version, which is more property oriented than the *ex post* version because the *ex ante* version allows a property owner more time to maximize the value of his or her property.⁴⁵ This outcome would allow for greater social capital by allowing the party to increase the value of the land. However, it would make takings less likely overall.

But Calabresi and Melamed themselves point out that Rule 4 is rarely applied, even though it ought to be a frequently used device.⁴⁶ One possible explanation for the rare use of the rule concerns the reality of cases of regulation that prevent building next to areas where nuisances are present, eliminating the problem from the beginning.

The factory case demonstrates many of the additional problems involved in the implementation of Rule 4. As Calabresi and Melamed explain, there are serious practical problems of coercion under this rule.⁴⁷ The collective action and free-rider problems are definitely present in the *ex ante* version of the rule, as explained above.⁴⁸ But below⁴⁹ we see that

⁴⁴ Smith, *supra* note 15 at 1763.

⁴⁵ See also the discussion in Part III, below.

⁴⁶ Calabresi & Melamed, *supra* note 1 at 1116–17. See also Epstein, “A Clear View”, *supra* note 32 at 2103–04.

⁴⁷ Calabresi & Melamed, *supra* note 1 at 1121–22. See also *supra* note 21 and accompanying text.

⁴⁸ See Part I.B.3., above.

⁴⁹ See Part III, below.

these problems are also present in the ex post version. As a possible reflection of the information problem,⁵⁰ an ex ante payment may be more appropriate, despite the collective action problem, in certain circumstances where the damage to the injured party is known or easy to identify. For instance, if a polluter damages property values in a way that can be measured by appraisal, it may be more efficient to enact liability based on the readily measurable damages rather than parsing what may be idiosyncratic valuations on the part of the injurer.⁵¹ Ex ante payments would be more efficient administratively; however, they also run the risk of undercompensating if the goal is to put assets into the hands of the highest valuing user. Moreover, beyond the problem of collective action, there are many costs associated with enforcing the transfer of property rights. High costs do not allow trading in the property rights transfer market in order to bring about an efficient outcome.⁵²

Calabresi and Melamed further emphasize that the rule applies in cases of takings or expropriation for the benefit of the public (eminent domain cases).⁵³ These cases include the rule for the protection of the owner of the nuisance when the victim is the public that needs to expropriate the owner's property rights. To prevent extortion on the part of the owner, the public can expropriate her right and pay only compensation. But it is difficult to identify each individual and make her pay compensation. It is also difficult to measure and determine the degrees to which varying parties suffered damage and to impose the payment of compensation accordingly. Therefore, implementing the rule does not appear feasible in this case.

Additional difficulties with the rule are demonstrated in the case law. In 1972, the year in which Calabresi and Melamed's article was published, the Supreme Court of Arizona reached a result similar to that of the rule in its ex ante version in the *Spur* case.⁵⁴ The question was whether to permanently enjoin Spur Industries, Inc. from operating a cattle feedlot near Del E. Webb Development Company's Sun City. There were two main issues to address: (1) If the operation of a business, such as a cattle feedlot, is lawful in the first instance but becomes a nuisance by reason of a nearby residential area, may the feedlot operation be enjoined

⁵⁰ See Part I.B.1., above.

⁵¹ Cf. Avraham, *supra* note 15 at 287 (analyzing which rule allows for the greatest gain in welfare from using information in asymmetrical information cases).

⁵² See Coase, *supra* note 43 at 14–15. See also Calabresi & Melamed, *supra* note 1 at 1093–98.

⁵³ Calabresi & Melamed, *supra* note 1 at 1117–18, n 58.

⁵⁴ *Spur Industries, Inc v Del E Webb Development Co*, 108 Ariz 178, 494 P (2d) 700 (Ariz Sup Ct 1972) [*Spur*].

in an action brought by the developer of the residential area? (2) Assuming that the nuisance (of noise and odour) may be enjoined, may the developer of a completely new town in a previously agricultural area be required to indemnify the operator of the feedlot, who must move or cease operation? *Del E. Webb*, having shown special injury in the loss of sales, had standing to bring suit to enjoin the nuisance. The court enjoined the operation of the feedlot and raised the question that is at the basis of Rule 4: must *Del E. Webb* indemnify *Spur*?

The court held that if *Webb* had been the only injured party it would have felt justified in stating that the doctrine of “coming to the nuisance” would have barred the relief sought by *Webb*. At the same time, had *Spur* located the feedlot near the outskirts of a city, and had the city grown toward the feedlot, *Spur* would have had to suffer the cost of abating the nuisance to people locating within the growth pattern of an expanding city. There was no indication at the time that a new city would spring up; therefore, *Spur* was required to move not because of any wrongdoing on its part but because of the rights and interests of the public. At the same time, *Webb* was entitled to the relief not because it was blameless, but because of the damage to the people who had been encouraged to purchase homes in *Sun City*. But for a balanced outcome, an indemnification was in order for those who were forced to leave because the developer took advantage of the lesser land values in the area. The court explicitly restricted this outcome to the case at hand, and presumably there is no other court that has so ruled in a similar case.

Applying the rule in such *ex ante* cases has various disadvantages. We have seen above⁵⁵ the possible problem of moral hazard. As mentioned there, the polluter has an incentive to overinvest in the polluting asset to make it less likely she can be bought out, which means that Rule 4 may be thwarted in practice, at least in the *ex ante* version. Furthermore, the *ex ante* version grants the injurer extensive power to raise the price of eliminating the nuisance (unless the matter is settled in court). Nothing is urgent for the injurer—as long as the funds are not paid, she has no incentive to eliminate the nuisance, and the price of its removal can only increase. This result grants too strong a bargaining power to the injurer.

Indeed, some of the criticism of the Coase theorem focuses on the claim that trading in the market for nuisance property rights provides an opportunity for extortion because the owner of the property rights can ask any price or refuse to sell, thus preventing a transaction that was likely to produce an optimal social solution according to Coase’s consequentialist

⁵⁵ See Part I.B.2., above.

considerations.⁵⁶ The injurer would eventually not internalize the externalities. The victims may be willing to pay a large amount and do everything possible to eliminate the nuisance. In the case of a public nuisance (i.e., where many individuals or public organizations such as schools or hospitals are involved), it is also possible to act at an entirely different level, that of taking and expropriation, in order to prevent extortion. But it requires an entirely different system. This may be possible at times—although not in each and every case—and when it is, the *ex ante* rule can be applied more easily.

Nevertheless, it appears that the *Spur* case is suitable for applying the rule in its *ex ante* version. First and foremost, the administrative costs are relatively low because it is a case of one individual against another, and there is no problem of collecting funds from various victims as in the EC case. If there are many victims, the process of collecting the money from many individuals can fail due to the high administrative costs of identifying all the residents and determining to what extent each was damaged. This problem can be further exacerbated by those who, perhaps claiming that the nuisance does not disturb them, seek to free ride, as we have described above.

Note that one may argue that Webb represents the interests of many potential or current residents, and we cannot therefore speak of only one victim in the *Spur* case. Technically this is true, but not from the point of view of the argument for free riders and collective action. If the residents were suing *Spur*, separately or together with Webb, it would have been a situation in which there were many victims. But here, only Webb brought an action. Even though this action actually represented not only its narrow commercial interests but also the residents' interests, there are no problems of free riders and collective action, because once Webb is ordered to pay *Spur* for stopping the nuisance, it does not have to collect money from the residents in order to do so, but simply to pay. Of course, Webb may increase the prices of the apartments in order to reimburse itself for the payments it made. It should be recalled that the reason for the action was not only to improve the quality of life of the current residents. Webb did not act on behalf of the current residents, even though there was no doubt it used their interest; it acted on behalf of potential buyers who now are deterred from buying. In other words, it acted on behalf of itself, wishing to sell. We can assume that it would not do the same thing if there

⁵⁶ See e.g. Calabresi & Melamed, *supra* note 1 at 1106–07, 1123. However, it seems like this would be more true in situations where the nuisance is so severe that the residents effectively have to buy out the polluter. Otherwise, the holdout problem might not be as problematic because the polluter will presumably sell once the value offered is higher than what she values the industry at.

were no apartments left to sell. It seems, therefore, that when a party acts individually, even though it claims to represent in practice the interests of others as well, there are no additional administrative costs, because there are no problems of free riders and collective action.

It is also clear that in *Spur*, the elimination of the nuisance, despite all the problems caused by the odour and the flies, is not particularly urgent. The nuisance developed gradually. The residents wanted to improve the quality of their lives, and Webb wanted to sell additional units. These are legitimate aspirations, but there is no special urgency that warrants instructing *Spur* to eliminate the nuisance first, even if flies can become a health hazard.

Furthermore, the breeding of cattle is an important economic activity that cannot be easily renounced. If it must be transferred, it makes sense to pay for the transfer, indeed before it takes place, in order to make it possible. If the burden were to fall entirely on the shoulders of the injurer it is not certain that she would be able to afford it. It can prevent potential players from entering the industry. In this situation, *Spur* may not have been deterred from entering the industry, but it may not have had enough capital built up to afford moving first and being compensated later, thus forcing it to close up shop entirely. This result is a disincentive for socially and economically desirable activities, especially of those that were legally active in the area before the arrival of the victim, a result that is contrary to aggregate welfare and that produces overdeterrence.

For these reasons, it appears that in cases such as *Spur* the court's application of the rule in its common, ex ante format is logical and justified. But the question arises: What happens in different cases in which applying the ex ante rule is not effective, is not just, and involves large administrative costs? These issues are discussed in the next Part.

III. Ex Post Version of Rule 4

A. *Advantages and Drawbacks*

In some cases, applying the rule in its ex ante version is not effective or just and will not produce the desired outcome. In such cases the opposite order should be considered, in which the injurer is forced to eliminate the nuisance first and only then collect the money from the residents. To illustrate these situations, we create different versions of the *Spur* case and show why, in each of them, applying the ex ante version is problematic and the ex post version should be used.

In a case similar to *Spur*, but where the claim would have been filed not by Webb but by the buyers of the residences who came to the nuisance, the result may have been different. Applying the ex ante version in

this case would have had significant costs associated with collecting payment from all the residents and organizing them for the purpose of the claim. Moreover, it is possible that part of their account would have had to be settled with Webb by taking into consideration contractual aspects and laws regulating sales. In this case, it may have made sense to apply the ex post version, if the public interest—i.e., the health of the public and its sensitivity to odours—would have justified it.

In such a case of many damaged residents facing one injurer, the administrative costs of collecting the money will be very high, unlike in *Spur*. In this case it is likely that the nuisance will continue, with severe consequences, as in the EC case. Social laziness and free riders create a problem of collective action. In addition, a preliminary problem of identifying all the injured residents must be addressed. In some cases, tenants occupy the property and it is necessary to locate the owners. It is also difficult to measure and determine which part of the public suffers greater damage and which part is affected less to compensate them accordingly. In most cases, it will simply be almost impossible to apply effective ex ante collection, and applying it ex post must be considered. All of these problems did not arise in the *Spur* case, simply because the action was brought solely by Webb and not by a large group of residents. Thus, in the original *Spur* case, the ex ante version was indeed fitting.

Moreover, in other cases it may be urgent to eliminate the nuisance. Take, for example, the case of serious health risks caused by radiation from a nuclear reactor, which raises more than a quality of life issue and is downright dangerous. In such a case, particularly if the data indicate a problem of collective action, it may be more effective to first order the elimination of the nuisance in order to stop the damage and only then deal with matters of collection. It is true that in this situation the injurer has the upper hand in principle, being entitled to compensation for the elimination of the nuisance because she acted legally and preceded the residents. But the fact that the nuisance poses a real risk can change the delicate balance for the benefit of the ex post model. Thus, if the risk is great for the residents, it is possible to ask them to take it upon themselves to organize quickly and pay for the removal of the nuisance, which preceded them and was established legally. But in practice, the situation indicates that even in such cases there is a problem of collective action, as shown in the EC case. In a situation of this type, in order to increase the aggregate welfare and protect the public interest, a risk of high morbidity must first prompt the elimination of the nuisance, and only after should matters of collection be addressed.

Further, if the ex ante rule is implemented in the case of a nuisance that must be removed urgently, we should consider the possibility of collecting in advance from deep pockets, allowing them to charge all the residents after the nuisance has been eliminated. For example, if among the

victims, in addition to ordinary citizens, there is also a large factory, an insurance company, or a state organization, it should be considered, from a distributive point of view, to apply the rule *ex ante*. The money should be collected quickly from the deep pockets to pay the injurer, and only then should the collection of proportionate participation fees from each resident be organized. But it is of course likely that those with deep pockets will oppose attempts to have them pay first.

In addition, it may be necessary to consider the nature of the damaging activity. The raising and feeding of cattle is a socially and economically important activity. But if the activity carries no such importance, it would make sense not to scuttle the elimination of the nuisance by applying the *ex ante* version. In such a case, it would be more justified socially to remove the nuisance first, because removing it contributes more to the aggregate welfare than leaving it in place.

We must also consider the cost of transferring the nuisance itself. If the cost of transfer, as in *Spur*, is high, presumably considerations of efficiency will make it more difficult to apply the rule *ex post*. The cost of transferring a cattle stockyard or an electric cable is not equivalent to that of transferring a dovecote or a dog kennel. Even if the cost of eliminating the nuisance is not high, there would remain organizational difficulties, but it may make sense to apply the rule *ex post*, especially if the activity is not important socially and economically, and especially if it is dangerous.

Some of the practical difficulties in the implementation of the rule in the *ex ante* version, which Calabresi and Melamed themselves pointed out, are not present in practice in the *ex post* version. Applying an *ex post* version of Rule 4 seems to help solve, or at least ease, the information problem and deals with some of the criticism levelled against low-order regimes. According to Ayres and Balkin, the *ex ante* version of Rule 4, being a lower-order liability regime, does not take into account polluter information.⁵⁷ Thus, the only party whose information is used is the injured party. An *ex post* version, however, would induce the polluter to reveal valuation information in order to gather funds. This distinction is important because if Rule 4 does not harness the information of the takee, it is less efficient due to asymmetrical information.⁵⁸ If a court, for instance, chose to enact an *ex ante* payment alternative, the injured party would reveal information in trying to gather those funds. This (*ex ante*) version, though, does not seek to induce information on the part of the polluter. The *ex post* version may, therefore, provide some solutions. For example,

⁵⁷ Ayres & Balkin, *supra* note 27 at 710.

⁵⁸ See *ibid* at 710.

the court could try to induce information by presuming an ex post payment unless the polluter comes forward with information of her valuation. A potential problem with this solution is that it would induce inaccurate information by incentivizing the polluter to overstate her valuation of the property. It remains, nonetheless, an important improvement over the ex ante version.

Applying an ex post version of the rule may also lessen the problem of moral hazard. The timing of the payment may change the incentives that induce polluters to overinvest if they know they will receive full ex ante compensation for a taking. Indeed, in the ex ante version the polluter is induced to invest highly in the pollution to make it less likely that she can be bought out. In the ex post version, though, because she will have to initially front the cost, she may not invest as much. As mentioned, a state can thus factor in investment policy concerns when choosing between the ex ante and ex post versions of the rule.⁵⁹ Hence, this consideration is relevant to the measure of the desirability of the activity of the polluter.

The literature on moral hazard may further support an ex post alternative because it would require the polluter to bear some of the risks of the pollution by keeping assets at hand to move a nuisance if necessary. As Bell and Parchomovsky explain, state enforcement of property law acts as a type of insurance on property.⁶⁰ They argue that in order to mitigate moral hazard, states should make owners either partially responsible for losses or force them to adopt owner-sponsored protections in order to obtain insurance.⁶¹ It must be remembered, however, that this “insurance” is imperfect, as it relies largely on deterrence and success in apprehending offenders.⁶² Bell and Parchomovsky argue that such a lack of perfect enforcement is good from a moral hazard point of view.⁶³ As they demonstrate, some jurisdictions force gas stations to purchase pre-pay machinery for their pumping services because many gas stations are less inclined to invest in such infrastructure if they know they will be well compensated for loss of revenue due to theft.⁶⁴ Without such equipment, people

⁵⁹ See Blume, Rubinfeld & Shapiro, *supra* note 34 at 90–91.

⁶⁰ Bell & Parchomovsky, “Imperfect Enforcement”, *supra* note 31 at 1931–34 (explaining that the conventional economic analysis that we need state enforcement of property rights to spur long-term asset investment is not wrong, but incomplete).

⁶¹ *Ibid* at 1932, 1938.

⁶² *Ibid* at 1932.

⁶³ *Ibid* at 1933.

⁶⁴ *Ibid* at 1941.

may need to be apprehended and prosecuted for stealing gas, resulting in higher administration and enforcement costs.⁶⁵

Indeed, this rationale demonstrated by Bell and Parchomovsky seems to support, in principle, an ex post alternative. It requires the polluter to internalize some of the risks of the pollution by keeping assets available to remove a nuisance if necessary. In addition, the fact that a polluter could more easily lose the property would probably increase the likelihood that the polluter would take more precautions in polluting in order to mitigate the nuisance as much as possible. We do not wish, though, for a taking to become so easy in the ex post version that it increases the cost of business too much. The ex post version may avoid the moral hazard problem or serve at least as a partial solution. However, it may appear to be too much of a deterrent to investment because the removal of the nuisance is fully financed by the polluter. This problem can be solved, however, by bringing the administrative costs of collecting the funds into account when assessing the level of compensation. To avoid disincentivizing investors, especially if they were there before the residents, the compensation could also consist of the administrative costs of collecting the funds and perhaps even an additional amount in order to create some kind of safety net. In most cases, this amount is distributed amongst a large number of residents. While this additional amount may have a significant importance for the injurer, the amount for each resident need not be significantly raised. In this way, the burden to collect the funds after the removal of the nuisance will not necessarily be a deterrent, nor would it become a real moral hazard if the additional sum is not too high.

Nevertheless, the application of the rule in the ex post version has its own problems. For example, the collective action problem may be exacerbated because people have no incentive to pay after the nuisance has been removed, they will rely even more on others to do so, and of course there is also no incentive to pressure free riders to pay. Although the injurer can take legal action, she has other costs and expenses to consider. The injurer loses much of her bargaining power in general, and, in particular, her ability to negotiate the amount owed to her. Again, if the case is one of an individual against another, as in *Spur*, the problem is manageable. But if the injurer has already removed the nuisance and must pursue many residents individually to collect from them, she is likely to encounter serious difficulties. The problems of locating all victims in an attempt to determine the extent to which they suffered from the nuisance and how the injurer has to pay remain. The administrative costs will be enormous (and should be taken into account in assessing the amount, as mentioned

⁶⁵ *Ibid* at 1941–42.

above), and the costs of separate legal actions against all those who have not paid will also be very high. In some cases, hundreds or thousands of residents will be involved, who will have difficulty organizing, and in the case of the ex post version they will have no incentive to organize at all. Nevertheless, in the above cases there may be some justification for organizing because of the property rule's effectiveness, even if this is not entirely just with regard to the injurer, who observed the law and preceded the victims.

The proximity of the ex ante version to a property rule may be relevant to determining which party (polluters or residents) values the entitlement most. The rationale should be to choose a more rule-like (that is ex ante) version of Rule 4 where an informational difficulty is present and the court wants to err closer to a property rule. According to Epstein, in most situations, it is best to avoid instituting state interference because state interference regularly undercompensates. Indeed, compensation almost unilaterally refuses to take into account subjective valuation.⁶⁶ Hence, we see here an information problem from the subjective point of view. On the one hand, it makes sense to avoid subjective valuation as those valuations are costly to determine. On the other hand, a unilateral undercompensation would systematically favour one party over the other, making such undercompensation undesirable. Rule 4 timing can help solve this issue. Epstein argues that injunctions (that is, property rules) should not be used when the relative balance between valuations is far from equal.⁶⁷ In a situation where the court finds the relative balance is close to equal, or perhaps overlapping but where the variance in valuation can be somewhat high, the court may want to impose the ex ante version of the rule, which is closer to the property rule. For example, assume the polluter values the polluting industry between forty and sixty. The resident values her property between twenty-five and forty-five. Here, there is slight overlap, but if the variations fall to either end (the resident at twenty-five and the polluter at sixty), then an ex post rule, being less like a property rule, would heavily undercompensate. If the valuations were reversed, it would make a lot more sense to use the ex post version, because the chances that the resident valued the land higher would be significant. When the valuations are relatively equal, it seems the ex ante or ex post versions would work equally well, and the other factors for choosing between the rules (to be presented below) would come into play.

The ex post version faces an additional problem: the injurer must figure out how to finance the removal of the nuisance. Delay in the receipt of

⁶⁶ Epstein, "A Clear View", *supra* note 32 at 2093.

⁶⁷ *Ibid* at 2102.

the funds works against the creator of the nuisance by the fact that she will finance the complete removal of the nuisance and then (try to) receive the amount, in nominal rather than real terms, after a long delay and likely after having to pay legal and other expenses. Scholars have suggested that in certain situations compensation should be paid if reimbursement is delayed.⁶⁸ This reasonable suggestion is likely to lessen the problem when it arises in the ex post version as well. Of course, this solution is relevant only in cases in which the injurer has the ability to finance the removal of the nuisance.

Finally, one may say that if the ex ante and ex post versions are realized in a litigation setting, the consequences of each version do not appear very different from each other because the court can enforce the compensation and suspend factory operation. The collective action problem would happen in the prelitigation stage. The judgment-proof problem exists, just like in any other civil litigation. But there is a major difference between the two versions. The ex post version favours victims more than the ex ante version and makes the procedures much more difficult for the injurers, forcing them to finance the removal and only subsequently try to collect payment. Sometimes injurers will not have the money to do so, and even if they do, the time—which may be substantial, even running into multiple years—from the payments to the reimbursement means that they lose the interest or other advantages they could gain in using that money. As mentioned, we have offered some solutions to this problem.

To sum up, the ex post version of Rule 4 is preferable in certain aspects to the ex ante version, but it also has problems that require the ex post system to be relegated to certain situations. Later on we examine how to design a model for the rule according to which in some cases it is more appropriate to apply the ex ante version and in other cases the ex post version. But before pointing out the bases of the proposed model and presenting the parameters appropriate for applying the rule ex ante and ex post,⁶⁹ we should understand in depth the essence of the ex post version and the way in which it differs from the ex ante version based on the different applicability of the two versions in comparative Jewish law.

⁶⁸ See e.g. Osnat Jacobi & Avi Weiss, “The Effect of Time on Default Remedies for Breach of Contract” (2013) 35 Intl Rev L & Econ 13 (proposing to make up for the delay and recognize it as compensable damage, because when it happens, the delay adversely affects the ex ante incentives in the economic analysis). According to the authors, to the payment for the purchase of the right should be added the time value derived by the payer as a result of the delay, in order to provide the payer with optimal precautionary incentives. Delay of payment also has a distributional effect on the payee. If she does not receive interest on the delay that reflects the time value of the delayed payment, she remains undercompensated. See *ibid* at 14–15.

⁶⁹ See Part V, below.

B. The Ex Post Option Alongside the Ex Ante Option: A Comparative Perspective

Martin Shapiro has claimed that it should be a chief purpose of comparative law to provide data for testing general theories about law.⁷⁰ Examination of legal history reveals that parallels to Calabresi and Melamed's rules can be found in other legal systems, including Jewish law.

Indeed, the four rules share surprising similarities with some Talmudic sources, especially concerning issues of nuisance.⁷¹ The two are not mirror images, however. Differences are present, some of which can be explained by variations in place, time, and historical background. But the differences do not affect the general framework and the essence of the rules, which are remarkably similar. Our proposal in favour of a division between ex ante and ex post versions of Rule 4 is strengthened by a comparison with Jewish legal sources. Below we examine the manner in which the rule is implemented in Jewish law. Next, we look at what may be learned from the Jewish sources for the purpose of shaping a model suitable to present-day reality, capable of regulating the use of the rule.

1. The Talmudic Ex Post Model

In this section we show that Rule 4, which represented an important innovation in economic theory when it was introduced in 1972, was mentioned in the Talmud some 1,500 years ago. We also show that the Talmudic and post-Talmudic sages explicitly outlined the existence of the two versions of the rule, which we call ex ante and ex post. The sages preferred the ex post version, but analysis of the texts also sheds light on cases in which it is more suitable to apply the ex ante version.

The Talmud and other sources of Jewish law, at least on some topics, contain areas and aspects that have at least some rudimentary forms of an economic approach. Although the prevention of damage is a central ob-

⁷⁰ Martin Shapiro, *Courts: A Comparative and Political Analysis* (Chicago: University of Chicago Press, 1981) at vii.

⁷¹ It seems the first to identify certain parallels to the Coase Theorem and to Calabresi and Melamed's rules in Talmudic law was the economist Yehoshua Liebermann (see e.g. Yehoshua Liebermann, "The Coase Theorem in Jewish Law" (1981) 10:2 *J Leg Stud* 293 [Liebermann, "Coase Theorem"]; Yehoshua Liebermann, "Economic Efficiency and Making of the Law: The Case of Transaction Costs in Jewish Law" (1986) 15:2 *J Leg Stud* 387 [Liebermann, "Economic Efficiency"]; Yehoshua Liebermann, "Responsibility of the Firm to the Environment" in Aaron Levine & Moses Pava, eds, *Jewish Business Ethics: The Firm and Its Stakeholders* (Northvale, NJ: Jason Aronson, 1999) 147 [Liebermann, "Responsibility of the Firm"]).

jective of Maimonides' tort theory,⁷² and signs of it are present in Talmudic literature as well, this objective should not be regarded as the essence of everything because the causing of damage is not prohibited in all instances. In some cases, one may cause damage with proper balances and restraints. As shown below, causing damage has been allowed in cases where the damaging activity contributes to the welfare of society as a whole and is economically desirable. If damage has occurred, however, the injurer must pay because she is the primary beneficiary of the activity.

Let us examine the sources of the Talmudic ex post model. Consider the Mishnah,⁷³ one of the most important sources of Talmudic literature (167 BCE–200 CE), which deals with the subject of items that must be distanced from a neighbour's property: "One must distance a tree twenty-five cubits from a town."⁷⁴ As the Talmud explains later on, one may not have a tree growing within that distance in order not to interfere with the beauty and amenities of the town. We may compare this rule, for example, to closing a porch in a condominium in a way that may affect the building's beauty and the uniformity of the apartments within it.

The Mishnah also states that "if the town was there first, the tree must be cut and compensation need not be paid."⁷⁵ If the town were there first and one planted a tree afterward the tree must be cut down and compensation need not be paid to the owner.⁷⁶ The result is that the residents of the town are not legally bound to pay for the value of any such trees cut down, because there was no right to plant them there in the first place. Up to this point in the Mishnah, it seems like a clear implementation of Rule 1—property protection in favour of the victim where he receives an injunction ordering the injurer to cease his activity, or, in this

⁷² See Yuval Sinai & Benjamin Shmueli, "Calabresi's and Maimonides's Tort Law Theories: A Comparative Analysis and a Preliminary Sketch of a Modern Model of Differential Pluralistic Tort Liability Based on the Two Theories" (2014) 26:1 Yale JL & Human 59 at 64, 74–76. See also comment by Guido Calabresi, "We Imagine the Past to Remember the Future: Between Law, Economics, and Justice in Our Era and According to Maimonides" (2014) 26:1 Yale JL & Human 135.

⁷³ In order to translate and explain we used a few translations of The Mishnah: *Artscroll Mishnah Series* (Brooklyn, NY: Mesorah Publications, 1983); *Mishnayoth*, translated by Philip Blackman (New York: Judaica Press, 1964); *Talmud Bavli: Schottenstein Edition* (Brooklyn, NY: Mesorah Publications, 1992).

⁷⁴ Mishnah, *Bava Batra*, 2:7 [translated by author]. One cubit equals a distance varying from 18.9 to 22.7 inches.

⁷⁵ *Ibid* [translated by author].

⁷⁶ See Rashi commentary on this Mishnah (*ibid*). See also Rambam (Maimonides) Commentary on this Mishnah (*ibid*). Rashi, the renowned Talmud (and Torah) commentator explains that the town's agent is responsible for removing the tree while others explain that it is the tree's owner (*ibid*).

case, to distance it (the tree). If the activity was illegally established (the tree was planted after the town) the injurer must cease the activity—that is, cut down the tree—without receiving compensation.

The Mishnah then turns to the law of a tree already planted within the area that later becomes a town site: “However, if the tree was there first, he must nevertheless cut down the tree, and in this case [the town] pays compensation.”⁷⁷ This rule indicates that if the tree were present before the town was established, the town may still cut down the tree. However, the owner of the tree must be compensated since, when he planted the tree, it was permissible for him to do so. Therefore, the sages required the tree’s owner to cut it down first, and, if the town’s residents did not pay, he could demand compensation in court.⁷⁸ Those responsible would then be able to collect the money to pay him.⁷⁹

Some commentators explain that although the tree was planted legally, it must be cut down because the public interest, that is, the beauty and amenities of the town, takes precedence over the rights of the individual.⁸⁰ Nevertheless, according to this Talmudic version of the rule, the tree’s owner is compensated for his loss. This rule stands in contrast to the law of a tree that was planted legally and afterward became a nuisance to an individual neighbour. In that case, the tree would not be cut down.⁸¹

The Mishnah, then, concerning the matter of the tree, touches on a situation identical with that of the polluting factory that preceded the residential neighbourhood (as mentioned by Calabresi and Melamed) as well as the scenario in *Spur*. The Jewish sources have chosen the same solution suggested by Calabresi and Melamed, that being the application of Rule 4, but the Jewish sources actually applied what we call the *ex post* version of the rule. In the Mishnah, the elimination of the nuisance is the cutting down of the tree. In these cases, a property issue is at stake—who was there first? If the tree was there first, the tree is cut down and the victim compensates the injurer. But cutting down the tree need not await the payment of compensation. By contrast, if the town was there before the tree, the owners of the nuisance must cut down the tree without receiving compensation (Rule 1). The cutting of the tree is reminiscent of modern-day expropriation and nationalization, as discussed by Calabresi

⁷⁷ *Ibid* [translated by author].

⁷⁸ Babylonian Talmud, *Bava Batra*, 24b.

⁷⁹ See Rambam commentary on this Mishnah, *supra* note 74.

⁸⁰ See Babylonian Talmud, *Bava Batra*, 24b.

⁸¹ See Babylonian Talmud, *Bava Batra*, 25b. See also Rambam commentary on this Mishnah (*ibid*).

and Melamed within the context of the rule. Both there and here the rule is applicable in principle.

A more in-depth examination of the topic is found in the Talmud, which contains an instructive consequentialist-behaviourist elucidation of when it is necessary to apply the ex ante version and when it should be used in the ex post format described in the Mishnah. The Talmud notes that “it was indicated in the Mishnah: If the tree came first and the city was built afterward, he must cut down the tree, and [the city] pays compensation.”⁸² The Talmud describes the difficulty presented by this ruling in this way: “But let [the tree’s owner] say to [the city’s residents]: ‘Pay me first and I will then cut down the tree.’”⁸³ Why must the tree’s owner cut down the tree before he receives payment? Since the tree was planted legally before the city was built and he is forced to cut it down with compensation for the sake of the city’s beautification, he is, in effect, selling his tree to the city. As such, he should not be required to cut it down until he receives payment.⁸⁴

It appears from the question raised by the Talmud that the sages were definitely aware of the possibility of using the ex ante version. They ask, therefore, why not choose a solution whereby the injurer does not have to stop the activity causing the nuisance unless the victim pays him in advance? One Talmudic commentator indicates that at issue is the sale of the injurer’s earlier property right to perform on his land various activities—in this case, the planting of a tree—to the victim. In the words of that source, “[a]ccording to the law, because the tree was first ... [the tree’s owner] can tell [the victims]: pay me compensation first and only then will I cut down the tree, *for it is as if he sold it to them*.”⁸⁵ Nevertheless, although the required result should have been that the residents of the town pay him before he cuts down the tree, similar to the ex ante version, the Mishnah ruled on a reverse order of operation, that is, an ex post version. In this case, the Talmud asks why that is the case. This question appears to be a moral one of the first order. If the activity of planting trees is desirable in principle, and the owner of the tree cuts it down first, he is likely to face difficulties and delays in collecting the payment to which he is entitled.

Rav Kahana resolves this difficulty with an answer that appears to be based on a criterion of efficiency. This solution is relevant precisely to the

⁸² Babylonian Talmud, *Bava Batra*, 24b [translated by author].

⁸³ *Ibid* [translated by author].

⁸⁴ See Rambam and Tosafot commentaries on this Mishnah, *supra* note 74.

⁸⁵ Ran commentary on Babylonian Talmud, *Bava Batra*, 24b [emphasis added; translated by author].

difficulty in collecting payment. As Rav Kahana explained: “[A] pot in the charge of two cooks is neither hot nor cold; each one relies on the other to do the necessary work” (hereinafter PCT).⁸⁶ This was a popular folk saying in Talmudic times and is relevant to the collective action problem in our times as well.⁸⁷ Indeed, PCT is similar to the collective action problem. It means that were the owner of the tree entitled to let the tree remain until he was paid, it would never be cut down because none of the town residents would consent to be the first to pay, as in the EC case. Indeed, the tree is cut down before payment is rendered, because, otherwise, no one will take it upon themselves to advance the money for payment and the tree will not be removed. PCT is thus the Talmudic version of the modern transaction or administrative costs and collective action problems.

If the owner of the tree could delay the cutting down of the tree until receiving payment, it would never be cut down because the bureaucrats of the town count upon each other; each one relies on another to collect the money from the citizens and pay it to the owner of the tree. This means that the transaction cost is high.

The PCT principle, then, can be justified from an economic perspective. There are apparently many instances of damage to the public where even if it is appropriate to apply the rule, it must be done differently than in the *ex ante* version. The Talmud explains that, unlike in the *ex ante* version, there are situations in which, despite the fact that the residents of the town can stop the nuisance and cause the tree to be cut down, and the owner of the tree must receive compensation, it is preferable to stop the damaging or polluting activity first and only then collect the compensation and pay it to the polluter. It is important to emphasize this point, which also sharpens the elements of the *ex ante* version. Note that in the context of the rule, Calabresi and Melamed also presented a similar case to the one that appears at the end of the Mishnah—the factory case.⁸⁸ In that case, the factory had been using cheap coal prior to the construction of the housing surrounding it and now the neighbours claim that the factory pollutes (a situation similar to the one in *Spur*). But unlike the Talmudic analysis, Calabresi and Melamed’s analysis did not examine which of the two versions of the rule, *ex ante* or *ex post*, should be applied.

As noted above, in the *ex ante* version there is a risk that the injurer will make exaggerated demands and even extort the victim in order to re-

⁸⁶ *Ibid* [translated by author].

⁸⁷ See Babylonian Talmud, *Eruvin*, 3a.

⁸⁸ Calabresi & Melamed, *supra* note 1 at 1123. See also *supra* note 21 and accompanying text.

ceive a high price for eliminating the nuisance. This fear appears to be more justified in the *ex ante* version than in the Talmudic *ex post* version because according to the latter, in the case of public nuisances, the nuisance is eliminated first and the injurer has no opportunity to extort. Thus, according to the Talmud, the owner of the nuisance is in an inferior position than he would be if the rule were applied in its *ex ante* version. This situation makes the elimination of the nuisance contingent upon receiving proper compensation. This difference is likely to also be manifested in the amount of compensation the owner of the nuisance receives. According to the *ex post* version, there is less fear of the owner of the nuisance extorting payment by not agreeing to stop the activity until he receives high compensation because his manoeuvring space and ability to extort are greatly limited. Therefore, it is reasonable to assume that he will receive less because, first and foremost, he is obligated to remove the nuisance.

So far, the decision on whether to use Rule 4 in its regular *ex ante* version or in the *ex post* version shown here appears to be based solely on considerations of efficiency. Although these considerations are significant for assigning cases pertaining to Rule 4 to the *ex ante* or *ex post* versions, as we have tried to show so far, we suggest that at least according to Talmudic sources, the point of view is not only one of efficiency. The sources of Jewish law reveal that it is also possible to explain the idea of PCT and the application of Rule 4 in its *ex post* Talmudic format according to both consequentialist and behavioural theories. It is vital to take these other perspectives into account when creating a model that offers a correct division and classification of cases by *ex ante* and *ex post* versions.

Some scholars based Rule 4 in its Talmudic *ex post* version on various consequentialist considerations. Thus, Yehoshua Liebermann based the solution offered by the Talmud in the PCT case on transaction costs.⁸⁹ Zvi Ilani presented a somewhat different economic justification.⁹⁰ Liebermann and Ilani mainly emphasized the economic foundations of the rule. But it

⁸⁹ Liebermann, "Economic Efficiency", *supra* note 71 at 396 (explaining PCT on grounds of "cost of bargaining"); Liebermann, "Coase Theorem", *supra* note 71 at 297 (presenting "[t]he trading principle [that] follows directly from the reciprocity principle"); Liebermann, "Responsibility of the Firm", *supra* note 71 at 163–65 (also interpreting the PCT case from the perspective of the trading principle).

⁹⁰ Zvi Ilani, "Efficiency Considerations in Handling Ecologic Nuisances in Halakhic Literature as Compared with Modern Economic Theories" (1991) 16 *Shenaton ha-Mishpat ha-Ivri* [Annual of the Institute for Research in Jewish Law] 27 at 77–78 (explaining that in a case where the damaged party is a public and not an individual, and the owners of the nuisance have property rights to it, and the nuisance was first, each resident of the town relies on the other and therefore there is no one in charge of the transaction for the purchase of property rights from the owner of the nuisance).

appears that at the basis of the Talmudic ex post rule there is also a purely behavioural idea—the phenomena of social laziness and of free riders, which are also mentioned by Calabresi and Melamed.⁹¹ In what cases will there be differences in the application of Rule 4 in its ex post Talmudic format between the situation in which the consequentialist theory serves as a basis for the PCT idea and the situation in which it is the behavioural theory that serves as the basis for PCT?⁹²

We address this question by referring to previous Talmudic examples. It is possible that a difference of this type exists in places in which the public has no special difficulty organizing to collect funds for payment be-

⁹¹ Indeed, the idea of PCT is mentioned elsewhere in the Talmud (*Eruvin*, 3a) in a context that is not economical but rather is prohibited by religion—the possibility of moving objects from place to place on the Sabbath (Saturday, the holy day on which, according to the *Halakha*, there are restrictions on moving objects from place to place in certain cases), and it is clear that there the focus of the issue is purely behavioural. In other words, the tendency of individuals in a group is to rely on their colleagues. Something similar transpires from the statement of one of the sages who discusses the division of labour between two elite religious groups who served in the Temple, and mentions in this context the behavioural notion of PCT: “And there is no doubt that whenever a job is imposed on two or more people more negligence is found than when a job is imposed on one alone, because often both of them rely on the other and between them the job is not done” (Sefer HaHinuch, *mitzvah* 389 [translated by author]).

⁹² A focus on the behavioural basis of PCT, although not in the context of nuisance, appears also in the post-Talmudic literature. A typical example is found in a responsum of one of the important decisors (see R David Ben Zimra, *Responsa Radbaz*, 2:728). Ben Zimra discusses the question of whether the fact that an old person sat in a given seat in the synagogue grants his son the property right to continue sitting in the same seat after his aged father dies. In his answer, Ben Zimra rules that even if the father sat in that seat for a very long time without members of the community protesting, this does not prove that the community of the synagogue sold him this particular seat, and in his words, “[e]ven if [the son] claims that the community sold that seat to his father this is not a case of possession because the synagogue belongs to the many, some of whom may protest based on PCT” (*ibid* [translated by author]). This example illustrates the behaviourist consideration that underlies the PCT rule even where the consequentialist consideration is irrelevant. In the present situation, under Jewish law, it would have been sufficient for one of the members of the synagogue to protest officially—without incurring any legal or commercial costs—to the old man who sat in a fixed place and tell him that the seat did not belong to him for the latter not be considered as having acquired ownership of that particular seat. It was not economic concerns that prevented the worshippers from protesting; the reason was purely behavioural. Although everyone knew the old man was not sitting in a place that belonged to him, no one protested because each worshiper knew that (although the action did not require mobilization of economic resources) the matter affected not only him but all the members of the synagogue. As a result he assumed, or it was convenient for him to assume, that someone else would “do the unpleasant work” of protesting before the old man—indeed, it is not pleasant to point out to an old man who sits in a fixed place in the synagogue that the seat does not belong to him. Thus, in practice nobody protested, but this does not imply that the seat has been sold to the old man. This is a purely behavioural consideration, similar to the idea of social laziness.

cause a person of authority has been appointed to protect the public interest (e.g., an official at city hall responsible for the quality of the environment and for protecting the appearance of the town). Naturally, that public official, whose main job is to deal with these matters and is paid for doing so, will identify the injurers who damage the appearance of the town, such as the person who plants a tree without maintaining adequate distance from the town. The public official will then initiate a legal action to cause the injurer to stop the nuisance and, if necessary, compensate the injurer from a public fund intended for this purpose. The official may oversee inspectors specifically hired for this purpose, but he has exclusive authority in this matter as this is his unique function. It appears that in a situation of this type, it would be difficult to justify applying the *ex post* version based on the consequentialist theory because transaction costs would be minimal. Typically, such costs follow from the complexity of organizing the community, but in this case, there is no need for it to organize given that there is already someone in authority appointed to protect the public interest. Thus, it is more likely that in a situation in which there is already a person responsible for acting to eliminate the nuisance, there is no need to demand that the injurer eliminate the nuisance prior to receiving compensation. Instead, the regular order of operations of Rule 4 should be followed, as enunciated by the *ex ante* version. But if we take the behavioural theory as the basis for the PCT idea, it is possible that there is no difference between a situation in which the public needs to self-organize and one in which a person is appointed to oversee the public interest. The official appointed to oversee the public interest does not always take a purely personal interest in the matter. As such, there is a possibility that this official will neglect his duties by relying on other officials to act in his place.

In sum, we found that according to Jewish law, in the case of a public nuisance to which the rule applies, the owner of the nuisance must remove it first and only then claim the compensation—that is, an *ex post* option. The argument for this version is based on the assumption that creating dependence between the agreement of the injurer to eliminate the nuisance and the receipt of payment in advance is likely to delay the elimination of the nuisance indefinitely. This version of the rule, naturally, differs significantly from the original *ex ante* version.

Can the economic analysts of contemporary law, who examine the applicability of the rule to modern reality, adopt the Talmudic principles formulated more than 1,500 years ago? In our opinion, there is no need to adopt these principles fully as they were formulated to apply to an ancient economic-historical reality and not adapted to modern times. For instance, the tree situation does not come close to reaching the level of collective administrative difficulty that is reached in *Spur*. But it is certainly possible to learn much from the Talmudic sources, provided that they are

approached carefully and with great attention to some of the methodological and material differences in the thought of modern law and economics scholars and Talmudic sages.

First, economic analysts of law, especially those following Coase, measure economic efficiency by considering the issue of who sustained greater damage—the creator of the nuisance or the victims. In other words, these analysts compare the damage to the creator of the nuisance with the extent of damage to the victims, that is, the damage to one versus the benefit to the other. In light of this test, we should review the cases mentioned in the Talmud and check the benefit to the city versus the damage to the individual. For example, if the benefit to the city is small but the damage to the injurer is high, it may be undesirable to apply the *ex post* version, and vice versa. It is possible that in Jewish law this parameter is not particularly important, but it must have significance in modern law. In Jewish law, within community life, there may be significance in eliminating the nuisance regardless of the benefit or damage given the importance of the community. In this type of situation, eliminating the nuisance may be of such high significance, beyond the local damage that it causes, that it makes no sense to conduct a cost-benefit analysis, the results of which could be that the tree is not too harmful and therefore should not be removed, certainly not *ex post*. Thus, even if the damage caused by the tree is not excessively harmful to the city, there is significance to its advance removal. At the same time, specifically in a case involving the removal of a tree, Jewish law is extremely particular because of the special importance that the *Halakha* ascribes to protecting trees, especially those that bear fruit.⁹³

Second, we should examine the character of the city. It is possible that ancient urban life in general, and the Jewish community in particular, was significantly different from the urban situation of today. There was no planning agent, mayor, or officials representing a legal entity. Most collective issues evolved gradually, and it may be difficult to find a defining moment that points to the arrival of a large number of people at the nuisance and to the beginning of the problem. In the case of such a city, it may be preferable to choose the city over the creator of the nuisance even if, as noted, the choice is decided upon without a cost-benefit analysis of the creator of the nuisance versus the city.

Note that the above comments do not lead to the conclusion that one cannot learn about present-day reality from Jewish and Talmudic principles. On the contrary, there is much to learn from them. However, for Talmudic sources to be used as genuine sources of inspiration for the

⁹³ See e.g. Maimonides' Code, *Laws of Kings*, 6: 8–9.

modern model, such as the one we present below, they must be adapted cautiously to current realities and legal ways of thinking.

2. Post-Talmudic Applications

Several post-Talmudic scholars have applied Rule 4 in its Talmudic ex post format. These scholars introduced an interesting development of Rule 4 and its application in cases somewhat different from the nuisance case discussed in the Talmud.

Let us first consider the case mentioned in the responsa dealing with the situation prevalent in Jewish communities in Medieval Europe that were allowed to live in a city or in a certain district as long as a certain number of Jews paid tax to the ruling Duke of the city or district. One scholar in Medieval Germany, Rabbi Azriel, was asked about a case concerning the Jewish community in Loraine, Germany,⁹⁴ where some of the members of the community moved to villages outside the city. This move actually endangered the rest of the congregation in the city because the Duke threatened to expel them from the city if they did not arrange for those Jews to return to the city and resume the patronage of the Duke. The reason for this threat was that he wanted to increase his income from the taxes he collected from the Jewish community. Rabbi Azriel replied that the many members of the community could force the individuals who moved to villages to go back to the city and live there with the rest of the community in order to avoid the damage to the public that would be caused by expulsion from the city. He also addressed the damage caused to those individuals who live in the villages as a result of their being forced to move back to the city. That said, he stated, based on the Talmudic case of the tree near the city, that the individuals who live in the villages should not postpone moving back to the city until they receive compensation, but rather, “because others, the many [members of the community residing in the city that the Duke threatens to expel] are endangered, [those who reside in villages] should eliminate the damage [and move back to the city] and after that they could claim compensation.”⁹⁵ As such, Rabbi Azriel called for an implementation of Rule 4 in its ex post version.

We can see, therefore, that the question of the applicability of the rule in the ex post versus ex ante version depends on the danger to which the damaged party is exposed. The greater the danger is, the more important it is to eliminate it using the ex post version. Therefore, if at stake is a

⁹⁴ See Mordechai ben Hillel HaKohen, *Sefer ha-Mordekhai*, Kiddushin 561; Rabbi Moses Isserles, *ha-Mapah*, an inline commentary on the *Shulchan Aruch*, Hoshen Mishpat 155:22.

⁹⁵ HaKohen, *supra* note 94 [translated by author].

health risk such as radiation from an electric cable, which can cause dangerous illness, the *ex post* version should be considered. But in this case, the damage was not life threatening. As noted at the end of Part III.B.1., it is possible that community life played a significant role here irrespective of the danger. In other words, perhaps it was easier for Rabbi Azriel to order the villagers to return to the city because of his desire that they should not separate themselves but live within the Jewish community, and in this way observe the Torah and the commandments more readily.

This halakhic ruling of Rabbi Azriel was an important precedent mentioned and discussed by other scholars dealing with similar issues concerning the imposition on individuals of actions required to prevent damage to the public. It seems, however, that the halakhic ruling regarding the Duke of Lorraine is rather extreme. It forces individuals to move from their homes, causing damage to property and probably to freedom of movement—if we look at it from the point of view of basic human rights in modern times—in order to prevent danger to the public. It should, therefore, be examined in light of its special circumstances and the anticipated threat of expulsion of the Jews from Lorraine.

Indeed, in another responsa, one of the sages, Rabbi Yair Bacharach (seventeenth century, Germany) wrote that one should avoid extrapolating from Rabbi Azriel's answer about the Duke of Lorraine to other cases in which the special circumstances of the case of the Duke of Lorraine are absent.⁹⁶ Rabbi Bacharach himself discusses a case that is, in a sense, the opposite of the one concerning the Duke of Lorraine. In that case, the authorities did not allow more than a certain number of Jews to live together in a particular area, and contravening this decree was subject to punishment. A Jew made some efforts to arrange a two-year residence permit for himself in a certain area, although doing so had the potential of causing damage to the Jews already residing in that area because of the instructions of the authorities. Therefore, the effort of that Jew may provoke the authorities to act against the Jews who resided there and cause them to re-examine the legality of their presence. This situation also involves special circumstances that need to be considered. According to Rabbi Bacharach, the public cannot always force an individual to act in such a way so as to avoid causing harm to them on his account. They can only act under the special circumstances as articulated by the case of the Duke of Lorraine which include three conditions: (1) the Jewish community is large and organized, such as the Jewish community living in Lorraine and only damage caused to it is considered to be damage to the public; (2) the individuals who will have to act against their will (and move

⁹⁶ Yair Chayim Bacharach, *Responsa Havot Yair* (Jerusalem, 1973) 213.

from the villages to the city) in order to prevent damage to the community will later, but not in advance, be able to easily collect compensation from the community through a claim filed against its leaders; and (3) the damage that is likely to be caused to the community is clear and certain. In the former case, the Duke explicitly threatened to expel the Jewish community from the city and therefore the harm feared is clear and certain.

According to Rabbi Bacharach, these three conditions were not met in the present case because the Jews living in the area did not constitute an organized community but rather represented a number of individuals who happened to live in the same area without any connection between them. In any case, they were not defined as a public that had an advantage compared to individuals. In this situation, if an individual is forced to refrain from moving to the area, he will later find it difficult to claim damages because the Jews who lived in that area were not organized into a community. Therefore, he will not be able to sue anyone. There were no community leaders as in the case of the Duke, and it was clear that the administrative costs were very high in Rabbi Bacharach's case. Furthermore, it was not obvious that damage will definitely result from the efforts of that Jew to reside in the area for two years. Therefore, Rabbi Bacharach ruled that one cannot force that Jew to desist from making an effort to reside in that area. Thus, he did not apply the *ex post* version as was ruled in the response concerning the case of the Duke of Lorraine but rather applied the Talmudic rule after setting its boundaries and pointing out that the case that was brought to his attention did not lie within these boundaries. Again, the possibility arises that here too in the background to Rabbi Bacharach's answer was the absence of a community dimension. In other words, because there was no community, it did not make sense to prevent a Jew settling among other Jews. Rabbi Bacharach's response further sharpens the parameters we present here for the purpose of constructing a modern model. We add that in order to apply the PCT, the public should indeed be an organized community and not merely a cluster of individuals who happen to live in the same place.

We continue our review of the Jewish sources to sharpen the parameters needed to construct a modern model. In the following source a *distributional* aspect enters the picture. Despite Rabbi Bacharach's reservations, another Eastern European sage of the seventeenth century, Rabbi Menachem Mendel Krochmel, sought to learn from the answer about the Duke of Lorraine and the application of Rule 4 in a case brought before him by the leaders of the Prustitz community.⁹⁷ The King's soldiers came

⁹⁷ Menachem Mendel ben Abraham Krochmal, *Responsa Zemach Zedek* (Amsterdam, 1766) 18; Hirsch ben Jacob Eisenstadt of Byelostok, *Pithei Teshuva* (Morasha Le-hanchil: Jerusalem, 1999) 155:6.

to the city as they went to war and stopped there for about a month. Most of the Jewish community wanted to arrange with the Governor of the city, by paying him a certain amount of settlement money, that the soldiers would not be billeted in the houses of the Jews. The Jews feared that the presence of the soldiers would cause them damage, such as theft, injury to business, the need to take care of the soldiers, and the spoiling of their kosher food. It also became known that if it was decided that the soldiers were to be billeted in the Jewish homes, the cost to the entire Jewish community would be twice as high as the amount of money that would be needed to pay the Governor to persuade him otherwise. But the wealthier people of the Jewish community asked the community leaders not to make this deal with the Governor and insisted that payment to the Governor be delayed until the community members confirmed that the money would be collected on an equal basis. They demanded that the same amount be collected from each household, rich and poor alike, and not differentially so that those who had more money would pay more. By contrast, most community members as well as their leaders insisted that they should first pay the agreed amount to the Governor, as quickly as possible, by collecting money from the rich community members. Only then would they be able to determine the amount that each member of the community should be charged, and on what terms.

Rabbi Krochmel ruled that justice is on the side of the community members and that they can force the rich people to first provide the funds to settle with the Governor, so that he would not allow the soldiers to stay with the Jews, and only then determine how much each member of the community should pay. Subsequently, the wealthy people would be able to recover from the community the rest of the money they had advanced. The rationale of Rabbi Krochmel's ruling is utilitarian:

This is damage to the many because they will indeed have to pay twice as much if they [the soldiers] stay in the Jewish homes. It is also true that they are afraid of thieves and [inability to] keep down business negotiations [because of soldiers staying in their homes]. Therefore the [rich] individuals first need to eliminate the damage to the public and then discuss how to raise the money [the amount paid to the Governor] whether based on wealth [on a differential basis], by households [every homeowner pays an equal amount], or by actual number of houses.⁹⁸

Rabbi Krochmel performed a cost-benefit analysis and ruled that the rich should immediately pay all the funds needed for settlement with the Governor so that he would not place soldiers in the houses of the Jews. His ruling follows his understanding that (1) payment of the amount

⁹⁸ *Ibid* [translated by author].

agreed upon as the settlement with the Governor is the most effective given that the anticipated damage from billeting the soldiers in Jewish homes costs more because it affects the public and (2) it is cheaper for the community to pay the amount of money in question to the Governor and not to accommodate the soldiers in community members' homes. Efficiency is relevant not only to the comparison of the costs in both cases, but also to the administrative costs. It is also clear that in the case of collection from the wealthy only, the costs are markedly lower. This efficiency is based on two factors: (1) it involves collecting the money from fewer people and (2) it avoids the problem of collecting the money from those who do not have the means.

The main sources on which Rabbi Krochmel bases his ruling are Rabbi Azriel's answer about the Duke of Lorraine and the Talmudic text stating that if the tree preceded the city, it should be cut down first, and only then should the owner be compensated. From these sources, Rabbi Krochmel learned that "individuals must first eliminate the nuisance to the many and then discuss with them [the amount of the compensation]." ⁹⁹ Therefore, he seeks to conclude that "in our case [of the King's soldiers] first the damage to the public needs to be eliminated and then [compensation can be] discussed." ¹⁰⁰ Rabbi Krochmel was aware of the difference between the case he was asked about and that of the Duke of Lorraine, but he believed there was no impediment to using the case of the Duke for the case at hand because in both cases, there was clearly a fear of causing significant damage to the Jewish community. This fear could not be eliminated in a cheaper way. Moreover, in the case under consideration, there were circumstances indicating that it was logical to impose the obligation to pay initially on the rich, as they are also members of the same community. In any case, the liability to pay for eliminating the damage to the community applies to the wealthy as well; the only question is how much they have to pay in comparison to other members of the community who are not so well off. ¹⁰¹

Note that this method is the best and quickest way of eliminating the danger, assuming that members of the community will sustain the damage (payment) in any case. In this sense, this example may differ slightly from previous ones, but the principle is based on similar legal assumptions. This difference leads us to sharpen our understanding of the parameter of public need, coming from an entirely different direction. In-

⁹⁹ *Ibid* [translated by author].

¹⁰⁰ *Ibid* [translated by author].

¹⁰¹ In this respect, this example is unlike the case of the Duke of Lorraine, where the residents of the villages were not official members and partners of the Jewish community residing in the city.

deed, this latest responsa brings a new and even modern dimension to this parameter. In some cases, the question is not merely whether or not to pay the money in order to eliminate the nuisance or not. It is clear that it is necessary to pay the money, and it is clear that it is necessary to raise the money as a condition for eliminating danger or the fear of danger (an *ex ante* version). The only question is whether to (1) do it quickly, and therefore consider only efficiency and renounce (at least for the time being) the principles of justice and equality, opting for a quick collection from people with the most readily available resources or (2) despite the risk, adhere to the principles of equality and justice and consider principles of differential collection, even if these considerations are not efficient as far as the expediency required to eliminate the concern.

The distributional analysis performed by Calabresi and Melamed regarding Rule 4 is highly relevant here. It may also provide a rational reasoning for Rabbi Krochmel's decision to first take the money from the rich people of the community. Indeed, the distributional considerations also have modern consequences. In the contemporary reality, and not only the one discussed by Rabbi Bacharach, there are cases where there is a special urgency to take emergency security or economic measures in order to prevent serious damage to the public. It is possible to imagine a situation of urgent security or economic need, whether due to the sudden outbreak of war, a sudden economic collapse, or a natural disaster requiring immediate emergency preparations where the government or municipality is helpless and lacking resources. In such a case, it may be necessary to use the vehicles or property of the public to assist the fighting forces or to rehabilitate the country's economy (e.g., through a quick collection of money from wealthy citizens or state loans to be repaid years later). In such cases, the government must, at times, for reasons of efficiency, take emergency measures to raise massive funds to finance urgent actions necessary to counter a security or economic threat. Temporary or permanent expropriation of property such as cars, the confiscation of funds, or immediate loans from wealthy organizations or even wealthy individuals are much more efficient steps than an orderly differential collection from the citizenry. If measures are already in place to compensate those whose property was seized to meet an emergency, then there will still be time to collect funds from other citizens too. Later, the correct proportion can be returned to the wealthy according to a differential, or another fair, model.

Usually, bureaucracy means that the confiscation or collection mechanisms are too slow to be effective. At times of crisis, however, there is often little choice. If extreme weather is expected, for example, and some residents must be dispossessed so barriers can be built, it is appropriate to apply the rule in the *ex post* format, so as to avoid protracted negotiations for compensation. We must therefore examine the nature of public need. In emergencies, when there is a serious and immediate concern for

immediate damage to the public, it is more suitable to use the ex post version. Until criteria for collection and confiscation are established and the collection of compensation is organized, precious time is lost. But in cases where there is no clear and imminent danger, or where the danger cannot necessarily be prevented effectively, it may be better to use the ex ante format, or it may be preferable to use distributional considerations, as in the case brought before Rabbi Bacharach.

In this section, we saw that the Jewish legal scholars advocated the ex post option and used this option in real life. Some of the considerations mentioned in the Jewish sources present a number of parameters which could be useful when considering when it would be better to use the ex ante version and when it would be better to use the ex post one to which we will return in Part V.

IV. Intermediate Versions

In this Part, we briefly examine two options for intermediate versions of Rule 4. Offering intermediate versions alongside the ex ante and ex post versions may enhance the adaptation of a proper solution that further expands the opportunities of Rule 4 in practice. These versions may diminish the possibility of potential investors being disincentivized from investing in socially desirable projects. The first intermediate version is a combination of the ex ante and the ex post versions. The second intermediate version is a combination of an ex post option and a preliminary injunction.¹⁰²

¹⁰² Another example of an intermediate version of Calabresi and Melamed's rules (in their traditional ex ante formulation only) can be found in Bell and Parchomovsky's "pliability rules" (see Abraham Bell & Gideon Parchomovsky, "Pliability Rules" (2002) 101:1 Mich L Rev 1). The authors introduce a third type of legal protection—pliability rules—which combine the features of property rules and liability rules, either sequentially or simultaneously (*ibid* at 5, 25–27). Pliability rules are essentially intermediate rules that afford one party protection until a triggering event shifts the protection. These rules can sometimes switch between liability and property protection when certain triggers are enacted. Pliability rules are thus ideal for situations where a legal entitlement must cope with changing circumstances, conflicting policy goals, or the inherent limitations of property and liability rules. Among other fields, the authors uncover ways in which pliability rules can "revolutionize" the eminent domain jurisprudence (*ibid* at 8, 75–77). In nuisance cases, a court can allow a party to continue to pollute for five years, knowing that a permanent injunction would be issued at the end of the period. This arrangement is more flexible than either a strict liability or a strict property rule (*ibid* at 5–6). Under the static Calabresian and Melamedian analysis, some corporations may have the continued authority to pollute, provided that they compensate residents (*ibid* at 38). By contrast, under the dynamic pliability approach, the property rule of the residents is converted into a liability rule, recognizing the value of the activity that causes the pollution. This dynamic model is superior to the static method because it

A. Between Ex Ante and Ex Post: Distributing the Financing of the Cost of the Removal of the Nuisance

As we have seen, both the ex ante and ex post versions of Rule 4 have their own problems, but an intermediate version of the distribution of risk between the creator of the nuisance and the victim can, in certain situations, assuage some of these problems while still retaining the relative benefits of either version. More technically, after determining the estimated cost of eliminating the nuisance, a decision is made (in court after the fact, or by the regulator in advance) concerning a payment to the tortfeasor of part of the amount—e.g., half—before eliminating the nuisance, with the rest to be paid afterward. The same body that collected half the amount before eliminating the nuisance and as a condition for its elimination (ex ante) will collect the remaining portion after the nuisance has been eliminated (ex post). Not only will it be easier to collect only a partial amount, but this mechanism would create an incentive to design an effective collection mechanism because if the first part is not collected in advance, the nuisance is not removed.

Thus, in some cases, if there is a concern that the tortfeasor will collapse economically if she must finance the elimination of the nuisance or if she must eliminate it first and only later collect from the victims, it may be reasonable to divide the risk so as not to disincentivize potential injurers from investing. Some of the cost can be imposed on the victim, to be paid ex ante and as a condition for the elimination of the nuisance, and she will then pay the remaining portion after the elimination of the nuisance. This payment by the victim can be treated as a prepayment, ex ante, if there is a fundamental rationale for applying the ex post version.¹⁰³

As mentioned above, applying an ex ante version of the rule may create a problem of moral hazard, while applying the ex post version may solve this problem in a way that may severely affect the polluter's financ-

recognizes that residents enjoy the right to property protection up to the point where the pollution-causing activity reaches a certain value threshold; at this stage, the pliability rule switches the property rule to a liability rule (*ibid* at 38–39). Hence, the authors explain that eminent domain actually justifies one in saying that all property rules are really pliability rules because the government can take one's property. Under eminent domain, the owner benefits from property protection until the government decides to seize the asset, in which case the owner has the liability right to “just compensation” (*ibid* at 59–60). This flexibility helps reduce the “all-or-nothing” court analysis (*ibid* at 7). Bell and Parchomovsky demonstrate that pliability rules can be applied to other fields including corporate law (*ibid* at 32–34) and intellectual property (*ibid* at 39–43).

¹⁰³ Cf Ayres & Talley, *supra* note 3 at 1029–30 (exploring different ways of dividing an entitlement, always splitting a property right between two parties in Solomonian fashion).

ing. Also, it seems that applying the ex post version may mitigate the responsibility on the part of the residents more than is needed. An intermediate version can be considered as a more delicate and balanced solution in distributing the financing of the removal of the nuisance between the parties while still not deterring the nuisance creator from investing and engaging in desirable activities. Such an intermediate payment option might thus have a similar influence to a deductible on an insurance premium, inducing the injurer to take steps to avoid the situation altogether, because of the prospect of paying the premium, but covering the cost of the taking in the situation where a taking occurs.

The intermediate version does not solve the problem of free riders because if people do not like and do not want to pay as a condition for eliminating the nuisance, they will not pay and will rely on others to do so despite the fact that the payment ex ante may be less than one hundred per cent. But it is also possible that the intermediate version may be more attractive for at least some potential free riders because people often prefer to postpone payment, even if they know that they will eventually have to make up the difference. Moreover, many people prefer to buy goods in instalments, in some cases even if they have the amount needed to purchase the product immediately. Intermediate financing under the intermediate version is the same as purchasing the nuisance property in instalments. In addition, while some people may seek to free ride entirely, others may seek to free ride only when the amount is large. Thus, one may be able to induce some free riders to pay early if the amount of payment is lower. While they may still free ride later, they will at least have partially paid.

It is possible to argue that the intermediate version is arbitrary because there is no optimum point relevant to all creators of nuisances regarding the appropriate percentage of the cost of eliminating the nuisance that they must receive ex ante (and the rest ex post) so that they can eliminate the nuisance without incurring economic collapse. But a lack of an optimum point does not reduce the flexibility of the intermediate approach. In practice, the intermediate version is better for the tortfeasor than the ex post version applied in a random manner. However, for a portion of the tortfeasors, partial predetermined funding will not be sufficient to eliminate the nuisance. If it were possible to reach such a point, the intermediate version would be very effective. For example, if it were known, based on reliable data, that in order to remove a particular type of polluting factory at least forty per cent of funding is needed, this decision could be included in the intermediate version—the creator of the nuisance would be responsible, according to the original ex post version, for sixty per cent of the funding needed for the elimination of the nuisance and the victim would be responsible for the remaining forty per cent. Of course, even if an optimal point that fits each case could be found, which is seldom possible, we would have to create it separately for each type of activi-

ty, thereby adding further costs. Indeed, even if successful, it still cannot be guaranteed that the tortfeasor could actually finance the sixty per cent, thus receiving compensation only during the ex post phase. In addition, the possibility of the intermediate version reduces the frequency of the ex ante version overburdening the tortfeasor and of the ex post version undercompensating the victims.

Naturally, we can determine that the intermediate version is case dependent, not arbitrary, and that the parties must appear before a third party (a court or a regulator) that will decide on the distribution of funding during the ex ante period. Here, the creator of the nuisance can introduce evidence concerning the maximum percentage of the cost of eliminating the nuisance that she can afford without collapsing. For example, she could bring the testimony of her bank manager to indicate the amount of funding for which she could obtain credit. The third party would take this into account and decide what percentage of the cost of the elimination of the nuisance will be imposed on the tortfeasor and what percentage will be imposed in the first phase on the victim, with the rest to be funded ex post. Dependence on a third party, however, increases administrative costs, which means that this non-arbitrary solution is not necessarily more effective than using the ex post or ex ante liability rule (although in some cases the application of the ex post or ex ante versions would also involve a third party, such as a court).

B. An Ex Ante Version Combined with a Preliminary Injunction

In certain cases, such as when a nuisance could cause imminent danger, the ex post version may be preferred so as to stop the nuisance as soon as possible. Nonetheless, the ex post version of Rule 4 does not seem to be the only way to solve the problem of clear and present danger. An ex ante Rule 4 combined with a preliminary injunction that temporarily stops the pollution may have the same effect. In such a case, the tortfeasor has to stop the pollution according to the preliminary injunction, and thus the danger is avoided. The court would then preclude the preliminary injunction from becoming permanent until the victims paid the tortfeasor in full—or perhaps a portion, as in the intermediate version above.

This solution demonstrates a possible combination of two different remedies. It can be especially appropriate in cases of imminent danger because the nuisance is removed immediately following the preliminary injunction.¹⁰⁴ The tortfeasor would have to wait a shorter time to be com-

¹⁰⁴ In cases in which there is no such a danger, let alone cases of minor intrusions, this intermediate solution should not be enacted. See Epstein, "A Clear View", *supra* note 32 at 2102–03 (explaining that courts use a "live and let live" rule to deny injunctions over

pensated than under the ex post version as the injunction is only temporary and would be cancelled if the tortfeasor were not fully compensated.

However, one of the disadvantages of this solution is the need for the party seeking a preliminary injunction (the injured) to post a high-value bond in order to secure the enjoined party (the injurer) for damages suffered.¹⁰⁵ In addition to the costs of posting a high-value bond, there are also administrative costs in the sense of needing to apply to the court in any event, and, as mentioned above, administrative costs should be assessed too in determining the amount of compensation.

Nevertheless, this solution provides another way for the tortfeasor to realize her rights, and she can choose which solution she prefers, according to the circumstances. One option would be to petition the court to order temporary financing according to the first intermediate solution presented above. A second option would be to choose the solution of a combined preliminary injunction and compensation. For example, if the tortfeasor estimates that she could provide a high sum of money paid to secure according to the terms of the bond (and understands that the money would actually be blocked until the court decides whether the injunction will be permanent or be removed) she could choose the second solution. She could choose the first solution in the event that she can easily provide partial financing, either by bringing cash or by taking a loan from the bank. Hence, these intermediate versions can serve as additional options for the tortfeasor to act in order to realize her rights according to Rule 4.

V. A Sketch for a Proposed New Model for the Application of the Rule: The Parameters

In trying to determine when it is appropriate to apply the ex post version of the model, the ex ante version, or an intermediate version, several questions must be addressed: (1) How can we guarantee the compensation for the creator of the nuisance (given that she is entitled to it according to the rule) while, at the same time, protecting the public interest by removing the nuisance? (2) Which of the variants of Rule 4 provides a better solution to the problems of evaluation and information? (3) What is the best way to ensure the removal of a public nuisance in light of the difficulties inherent in collective action?

minor nuisances because litigation over one of the numerous minor nuisances is likely to spur needless litigation over others).

¹⁰⁵ See Geoffrey C Hazard Jr, John Leubsdorf & Debra Lyn Bassett, *Civil Procedure*, 6th ed (New York: Foundation Press, 2011) at 404. See also Dan B Dobbs, "Should Security Be Required as a Pre-Condition to Provisional Injunctive Relief?" (1974) 52:6 NCL Rev 1091 at 1092–93.

With regard to (1), we should not disregard the possible deterrent to engage in desirable activities if nuisance creators know that they may not be compensated for eliminating the nuisance even if they acted legally and preceded the victims. We should also note that none of the versions provide a complete solution for (1). Regarding (2), we saw different possible interactions between the timing issue and the issues of information and evaluation. Things are not always unequivocal, but we will suggest a parameter based on these issues. Regarding (3), it seems that making the removal of the nuisance conditional upon the ability of the collective to overcome the challenges posed by collective action ensures that, in its ex ante format, the rule will seldom be applied. Assuming that the interest of the public or of the collective takes precedence over that of the individual, and assuming that it provides a more economical solution in the aggregate, it seems that the ex post version is superior. Even if the ex post version does not guarantee immediate compensation for the removal of the nuisance, it nevertheless results in an improvement of the overall situation. Indeed, it provides a practical solution for the removal of the nuisance in the public interest, but it may fail to address the issue of compensation successfully, which is an important basis for the rule.

The parameters presented below sketch a proposed model. These parameters are based on different concerns and are not focused exclusively on economic efficiency. Legislators, regulators, and the courts can use these parameters to make the choice between the ex ante, ex post, and intermediate options. As the parameters indicate, a few clear and strict conditions must be fulfilled before the rule is applied in its ex post version. If the conditions are not fulfilled, the rule should be applied in its default, ex ante version, if at all. In any case, common sense and logic must be used. The decision should be based on the individual circumstances of each case. The list of parameters is merely an aid in making the decision whether to place the entire risk on the creator of the nuisance or on the victim, or to divide the risk.¹⁰⁶ Note also that in order to overcome or at least ameliorate the increased problems of collective action and free riders in the ex post version, we suggested above that in this variant a certain amount or percentage be added to the amount of the compensation, in order to create some kind of a safety net.

A. Individual Versus Individual and Individual Versus the Public in Regard to Administrative Costs

Usually, when it comes to an individual injurer facing an individual victim, there is no special problem collecting the funds to pay the injur-

¹⁰⁶ See Part IV.A., above.

er for eliminating the nuisance, as in the *Spur* case. The problem of social laziness and free riders does not exist here because the victim wants to put an end the process and is willing to pay for the elimination of nuisance. That said, there is the problem of the excessive power wielded by the injurer. In any case, the ex ante version of the rule applies here, except in dangerous cases.

Note that, as mentioned above,¹⁰⁷ we count the number of victims in the *Spur* case as one because even though Del E. Webb seems to represent the interests of many potential or current residents, Webb is only one party and, as such, it stands alone. This fact may significantly reduce administrative costs and problems of free riders. In addition, the interests of the residents and the company will not always be identical. The important point here is the number of the parties to the procedure. The same holds true for a case in which all the residents would have agreed upon a representative and given her the authority to decide on their behalf so that the other party faced only one party. One-on-one contests reduce administrative costs and eliminate the problem of free riders. Of course, sometimes reality is different from theory. If, for instance, a class action failed to be certified, the fact that multiple parties agree to have one person represent them will not eliminate the costs in determining the injuries to absent parties who were not adequately represented. In the *Spur* case, there may only be one party, but there may be many people who are not represented who have been injured.

The problem of collective action may prevent the possibility of eliminating the nuisance in cases in which there are many victims because of inadequate collection. As noted above, there is a preliminary problem of finding all the residents and examining the cost of compensation to each of them. Administrative costs can be very high here, and the nuisance will presumably stand. Therefore, the higher the number of the victims, the more likely the court uses an ex post version, and vice versa.

Note that when an individual engages in an activity that has social benefits, such as the planting of a tree, even if this activity started when another individual lived in the vicinity and who is now damaged by the nuisance, the individual injurer is entitled to compensation from her neighbour in exchange for eliminating the nuisance, according to the ex ante version, as was decided in *Spur*. By contrast, when significant damage is caused to the public, the ex post version is more applicable. Nevertheless, the matter depends on the validity of the aggregate parameters

¹⁰⁷ See Part II, above.

described below, so that there are definitely cases in which the ex ante version will be applicable to damage caused to the public as well.¹⁰⁸

B. The Number of Uses that Needs to Be Evaluated

Smith argues that the law makes prolific use of the exclusionary property rule for the following reason: property laws are understood as delegating to the owner the right to evaluate possible uses of the property.¹⁰⁹ We think this point is particularly important from the efficiency standpoint when there are many uses that need to be evaluated. Coming from a Rule 4 standpoint, the more possible uses there are for property, the more difficult and costly it is to evaluate them. Thus, because the property owner has the most knowledge of the property and the highest discovery potential, the regulatory authority so empowered may decide to opt for a more property-like rule in situations where there are many potential uses for the property. One could argue that a Rule 4 that made things more property-like would be one that decreased the frequency of takings. Thus, an ex ante version, which, as mentioned, is closer to property rules than the ex post version, seems to be more efficient in situations where there are many possible uses or a potential for many uses. The government may be able to capture the different valuations in use, but it will likely have to expend much more in costs in order to do so. This may also be the outcome in cases in which evaluation is problematic for other reasons with even a rough estimation being impossible.

¹⁰⁸ This parameter might also intersect with the information problem (see Part I.B.1., above). See Ayres & Talley, *supra* note 3 at 1048–50 (breaking down the analysis into a “game”, which shows that since the injured are to enjoin the injurer anyway, the liability rule gives the injurer an incentive to divulge private information and attempt to bribe the injured not to enjoin his property). Following Ayres and Talley, we believe an injurer’s incentive to bribe will be much higher in an ex post version of Rule 4, since here, even in a case of an individual versus another individual, the injured party may be unable to pay to remove the nuisance, or may take a long time to raise the funds required. In such a situation, the injurer could simply hedge her bet and avoid being induced into revealing information. See also Ayres, “Protecting Property”, *supra* note 15. Ayres claims that the law should give the seller a put option in situations where there is only one potential buyer—who thus has a bilateral monopoly position (*ibid* at 802). Situations with only one buyer can prove to be inefficient as parties attempt to hold out for a better price (*ibid* at 803). We think this problem may be extended to a Rule 4 analysis where there are multiple parties since even here a bilateral monopoly position cannot be ruled out. For example, if ten houses are affected, the polluter would likely need to buy each one individually, resulting in ten bilateral monopolies. A put option that allowed her to force a transaction could be more efficient. Therefore, although usually the ex post version best serves damage done to the public, when the situation contains multiple bilateral monopolies the ex ante version is to be preferred.

¹⁰⁹ Smith, *supra* note 15 at 1759–60.

C. The Nature of the Activity to Be Eliminated

The question of whether the damaging activity has social and economic importance, which cannot be easily renounced, is also of consequence. In truth, there are always difficulties in determining the objective importance of the activity; the social value of different productive activities can be assessed differently not only by courts or regulators, but also by the parties themselves. Of course, this analysis may lead us back to the evaluation and information problems. In cases in which these problems appear and there is no good solution, this parameter should be less influential than the others. But in situations in which the social importance of the activity is beyond any doubt to all parties involved, and they could assume that the court would see the activity as important, this parameter should get more weight.

How should this parameter affect the the timing of payment? The more socially and economically important the activity is, the more logical it is to pay for transferring the nuisance in general, and, specifically, to pay for the transfer in advance (*ex ante*) in order to make the transfer possible. Otherwise, the injurer may not be able to finance transferring the nuisance. The result may be a deterrent to important social and economic activities, especially for those who have been legally active in the field before the victims arrived, a result that contradicts the aggregate welfare and causes overdeterrence. Nevertheless, we should also take into account the intensity and scope of the activity. For example, in *Spur*, it is beneficial to allow raising cattle, but this fact does not mean that whoever raises cattle necessarily exercises the degree of caution needed to prevent damage or that the intensity of the activity is appropriate from a social point of view. The test should be marginal—we should check whether the imposition of liability *ex post* or *ex ante* results in internalization of the damage in a way that produces optimum investment in preventive measures or in changing the scope of the activity to an optimal level. Therefore, so as not to disincentivize an activity that is economically and socially important, it is also necessary to examine the appropriate extent of precautionary measures and the degree to which the intensity of the activity is appropriate. Finally, as mentioned above, applying an intermediate version of the rule may be used as a proper balance between the will to solve a problem of moral hazard in cases of state enforcement of property rights, on the one hand, and the will not to put the whole burden of financing the removal of the nuisance on the shoulders of the nuisance creator, on the other.

Hence, if the activity has a social and economic importance, one should tend to apply the *ex ante* version, despite the moral hazard problem, in order to induce the nuisance creator to invest in it. In cases in which the activity is not so socially and economically important, the tendency should be to apply the *ex post* version. The state could enforce *ex*

ante payments in industries it deems particularly valuable and ex post payments in other industries. However, if the activity is indeed desirable but there is a fear of massive investment on the part of the nuisance creator in order not to be bought out, the solution can be the application of the intermediate version. In this way, Rule 4 may not be thwarted.

D. The Urgency and Imminence of the Danger of the Nuisance

Considerations of danger to human life (public or individual) form the basis of another key parameter, or a sub-parameter under the former one. In matters of life and death, it is more justifiable to apply the ex post version and first remove the nuisance. It is possible to say that if the activity is endangering, the victims have a high incentive to eliminate it, and the ex ante rule should be applied because the victims will quickly collect the money in order to preserve their health. But the reality shows that they are not in the best position to do so even with a health hazard looming over their heads. In practice, as shown in health hazards like those in the EC case, there is a problem of collective action. There will always be free riders and those who, even when in danger, will not want to pay the share of the free riders. In this situation, it is necessary to act first for the immediate elimination of the nuisance, and only then deal with matters of collection.

Some of the proposed secondary parameters are: (1) the extent to which the case concerns the public; (2) the certainty of the danger; (3) the urgency and imminence of the danger; and (4) the ability to recover payment from the public afterwards without special bureaucratic difficulties. The clearer the compliance with these conditions, the more appropriate it is to apply the ex post version. When these conditions are only partially met, as in cases in which the quality of life of the residents suffers but there is no matter of life and death or an urgent and vital need, decision makers should consider the application of the ex ante rule or refrain from applying any rule at all.

The urgency and imminence of the danger can also be an important parameter for considering the second intermediate solution offered above, that is an ex ante version of Rule 4 combined with a preliminary injunction that temporarily stops the pollution. The value of the bond can be determined according to the risk of error and the public concern. For instance, the court could require minimal bond amounts in cases where there was imminent danger and a higher bond when imminent danger was not present or when the problem of collection would not be as difficult.

E. The Cost of Eliminating the Nuisance and the Cost of Mistakes

For reasons of efficiency, if the cost of transferring the nuisance is high, as in *Spur*, it makes less sense to apply the ex post version. This outcome is especially true if the activity is socially and economically more desirable than it is dangerous because applying the ex post version will deter such activities. If the cost of eliminating the nuisance is not high, as in transferring pigeonholes or dog kennels, it may make sense to apply the ex post rule, especially if the activity is not socially and economically important and is dangerous.

At the same time, one must also consider the cost of mistakes in the decision to remove the nuisance because it may end up being very costly in the future, even if the nuisance could be removed at a relatively low cost. The cost of transferring a dovecote is not high, but it is possible that the pigeons will choose to return only to the old location. By contrast, it is possible to relocate a barbershop whose traffic of customers disturbs the neighbours in its entirety, and if a mistake has been made it can be returned without difficulty to the previous location. The same is true for a dog kennel. But if a troublesome dog is placed in quarantine or put to sleep, the mistake is costly.

In sum, in calculating the cost of removing the nuisance we must take into account not only the cost of relocating the nuisance but also the probability that it will be high due to the cost of the mistake. Thus, the cost of the mistake becomes part of the calculation of the cost of removing the nuisance and is not a separate consideration.

F. Distributional Considerations

The ex ante version places a strong emphasis on efficiency considerations whereas the ex post version also considers distributive aspects. In a state of emergency, such as when the government cannot provide for the basic needs of the public, there is a rational reason for adding some distributional considerations into the mix and to take the money first from deep pockets (rich organizations or people) in the community in ex post cases. After the nuisance has been eliminated, these deep pockets will be allowed to collect from the others. If it is possible to identify such deep pockets among the damaged public, and if the danger is indeed severe and imminent, it makes sense that the rule will be applied ex ante. In this case, the deep pockets will shoulder the immediate burden of the payment to the injurer for eliminating the nuisance, or similarly to a mass disaster, by paying the authorities, which cannot cope with an act of supernatural nuisance, for the benefit of the public.

One concern of the large collection from deep pockets is that such a collection may have undesired collateral effects. For instance, it may be

the case that it prevents or hinders investment, which often is conducted largely by wealthy parties. In other words, there seems to be a collateral economic consequence in distributing costs in the *ex ante* version to deep pockets. If deep pockets are required to confront the cost initially, being indemnified by others in the community later, those persons, who tend to invest much more capital than their counterparts, may find it difficult to invest such capital, leading to a shrinking or slowed growth in the overarching economy. One possible reason for this possibility is that deep pockets' assets are not always liquid. They may have all their assets tied up in investments. Even if their assets are liquid, deep pockets are often rich (or often stay rich) because they are successful investors. Even when it is socially desirable to put the cost on them because they have deep pockets, it would probably, in theory, have a net loss on the overall economy because the investment potential of those who are most able and most likely to invest on a large economic scale is reduced.¹¹⁰

For those reasons, the parameter of taking from deep pockets in *ex ante* cases needs to be limited according to five cumulative qualifications. First, it would be done in states of emergency only when the public interest is superior to other personal interests. Second, whoever pays more than their share compared to other victims in *ex ante* cases would be indemnified by the other victims (with interest), in order to save the value of the money. Third, the use of money from parties with deep pockets in *ex ante* cases would be done only in cases in which those parties also suffer from the nuisance. This situation, admittedly, allows for the possible incursion of the free-rider problem; however, the free-rider problem alone is often preferable to the collective action problem, which contains the free-rider problem as well. Fourth, the use of money from parties with deep pockets in *ex ante* cases would be done in cases in which the aggregate benefit of the removal of the nuisance for them and for the rest of the victims not only exceeds the nuisance proceeding, as the regular rationale for Rule 4, but also exceeds the benefits the deep pockets would have if the money were invested or used by them for other purposes. Although there may be administrative costs associated with this analysis, it seems justified in limited emergency cases, at least according to distributional considerations. Other than that, deep pockets should have the burden to prove that their benefits from future potential investments would exceed

¹¹⁰ But see Ayres & Goldbart, *supra* note 30 at 33 who argue that changing the entitlement allocations can have various effects on investment incentives. More specifically, the authors claim that allocating a resident the initial entitlement together with a put option creates a much stronger incentive for the resident to invest in her land. Thus, it seems that depending on where the court wants to encourage investment, it may possibly choose an *ex ante* payment to encourage organizational investment or an *ex post* payment to encourage residential investment.

the benefit to the entire group of victims (including themselves) from the removal of the nuisance using the same money. Fifth, although it may also have administrative costs, parties with deep pockets that would claim to have no liquid money in the amount close to that required to pay for the removal of the nuisance but only investments and real estate, etc., would have the right to plea and prove they did not have liquid money at the moment. Parties with deep pockets would not be required to sell their assets or to break investments in order to finance the removal of the nuisance. The latter qualification is also relevant in the next parameter.¹¹¹

G. The Economic Resilience of the Injurer and the Fear of Its Collapse

Since the creator of the nuisance, who operated legally and preceded the victims, is generally not to blame, it is necessary to examine her financial strength and whether she is in danger of collapsing economically if she must fund the relocation or the removal of the nuisance alone. At issue is not only the personal situation of the creator of the nuisance. Applying the ex post version in cases in which, for financial reasons, the creator of the nuisance may not be able to continue her activities somewhere else, may result in a serious deterrent for socially and economically desirable activities. Interruptions in business may also be taken into account (despite possible administrative costs). Perhaps the organization would ordinarily be able to move the nuisance but in certain circumstances would lose out on an important contract, thus being prevented from removing the nuisance in practice. In these cases of injurers who were legally active in the area before the arrival of the victims, applying the ex post version may be contrary to the aggregate welfare, and thus create over-deterrence.

Distribution of risks along the lines of the intermediate version, in which the financing is divided between the parties, is also possible when some of the conditions listed above are met and there are valid arguments in favour of implementing both the ex ante and ex post versions. In such cases, it is possible that the point of optimum efficiency requires the distribution of risks rather than their imposition on one side only.

H. Information and Evaluation

One of the practical implications of the above discussion regarding the information and evaluation problems has to do with the issue of timing.

¹¹¹ Distributional considerations are also relevant to Rule 6 (see Ayres, “Protecting Property”, *supra* note 15 at 804–08).

As suggested above,¹¹² in a situation where courts find that the relative balance as to which party values the entitlement most is close to equal, or overlapping but where the variance in valuation can be somewhat high, we think the *ex ante* version of Rule 4—which is closer to a property rule—should be implemented. In these cases, the *ex post* version of Rule 4, which is less like a property rule, would entail serious undercompensation. If the valuations are reversed, as demonstrated above,¹¹³ the *ex post* version should be implemented, because the chances that the resident valued the land higher would be significant. Of course, when the valuations of the parties seem relatively equal, there should be no preference for either of the variants.

Conclusion

The comparison between the *ex post* and *ex ante* versions of the liability rule in favour of the damaging party—Rule 4, the presentation of intermediate versions, and the possibility of presenting a new model based on the comparison between the two versions can strengthen the foundations of the rule and its implementation in practice. It better enables the adaptation of a suitable solution according to the different circumstances of each case.

Moreover, Rule 4 received further support from an unexpected place—ancient sources of Jewish law. There is much to learn from these sources, but for Jewish sources to be used as a genuine source of inspiration for the modern model, such as the one we presented above, they must be adapted to current reality and to its legal way of thinking.

This article demonstrates that not enough thought has been given to the *timing* of payment for removing a nuisance in cases in which the injurer acted legally and preceded the victims. The logic underlying the rule is to avoid providing a disincentive for activities under such conditions by ensuring that the injurer is paid for removing the nuisance. This point is the great innovation. But the question of the timing of compensation is crucial in this context, because applying the rule *ex ante* does not ensure compensation in practice, primarily as a result of high administrative costs, collective action, and free-rider problems. At the same time, applying the rule only in its *ex post* version has its own problems.

Therefore, we focused on timing and presented a list of parameters based on efficiency, distributional, and behavioural considerations. The aim was to guide legislators, regulators, judges, and other decision mak-

¹¹² See Part III.A., above.

¹¹³ See *ibid.*

ers on when to order compensation as a condition for eliminating the nuisance and when to order the injurer to remove the nuisance first and only then engage in collecting the funds. We also presented the possibility of applying an intermediate version in certain cases in which only a portion of the conditions is fulfilled, in which case it would be possible to divide the liability for ex ante financing between the creator of the nuisance and the victims. The intermediate solution would follow with the balance to be paid by the victims after the elimination of the nuisance or according to another intermediate version, which is a combination between the ex ante option and a preliminary injunction. The intermediate versions were presented in order for the tortfeasor to better realize her rights according to the rule.

Introducing the issue of the timing of the payment into the considerations of Rule 4, and having two versions of the rule to apply in practice, can make the rule more attractive, implementable, efficient, and equitable. More than this, we discussed whether or not it matters if a liability rule for a taking requires payment up front or only after the injury in the context of Rule 4—which is the most innovative rule that Calabresi and Melamed presented. Therefore, we chose the liability rule for the damaging party as a test case. However, the discussion and the conclusions would also be relevant in the more general context in which this question may be asked such as the liability rule in favour of the damaged party (Rule 2, the “symmetrical” rule of Rule 4), where the damaged party cannot compel the polluter to stop, but is eligible for damages compensating for the harm. One can ask whether the injurer should compensate the victims ex ante or ex post or whether one of the intermediate solutions should be used.¹¹⁴ More generally, the question of timing can be relevant to any permissible premeditated taking. However, our goal was merely to draw attention to this issue and to present two versions, seeking to find which of them works better in a given situation. Beyond the test case of

¹¹⁴ It can be assumed that in some classic cases of mass torts, there is only one tortfeasor and many victims. Applying Rule 2 means that there are few problems of collective action or free riders in these cases because only one tortfeasor must pay. This contradicts the opposite classic case of Rule 2, in which many victims must pay and there is a need to collect from each of them. Of course, there can be cases in which there is more than one tortfeasor, as in a case in which many factories pollute the same river, and here the same problems also arise in the application of Rule 2. It can also be assumed that the question of timing can be relevant to Rules 5 and 6 (see Calabresi & Melamed, *supra* note 1 at 1120–1121), and perhaps even to “liability rules” (see Bell & Parchomovsky, “Liability Rules”, *supra* note 102). The enabling of intermediate solutions such as liability rules within the context of the traditional ex ante version, and the added possibility of their implementation in the ex post version presented here, may provide new avenues for applying Rule 4 to unforeseen and changing circumstances.

Rule 4, there will certainly be room to examine the issue of timing from a broader perspective.
