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Tort Law as Risk Allocation Contract

Some Critical Remarks on the Regulatory Deterrence Model

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Abstract

The standard economic analysis of law has modelled tort liabilities as the state's instruments to reduce accident costs, comprising prevention costs and damages. This regulatory deterrence model (RD model), however, does not fit with the private autonomous nature of tort law (PA model). This is why the RD model has to resort to numerous *ad hoc* elements to explain it. Nevertheless, given that private law is not some policy-instrument; rather, it is a complex system of norms with courts being independent adjudicators of legal disputes arising, amongst others, from contractual arrangements, legal dogmatics, rather than standard economics, seems to be a more appropriate approach to the economic analysis of private law. As such, in this paper, I am presenting an economic analysis of tort law that is closely associated with the PA model.

Keywords

tort liability, accident costs, liability rules, private autonomy, complexity system

1 Introduction

Accidents cannot be fully anticipated either because the prevention costs are too high or, more importantly, because the damages are less worthy than those acts causing the accidents (Coase 1960). Tort law, therefore, should assign the responsibility for the damage to the party whose benefits are less because this formula is *ex ante* beneficial for the injurer and the injured and then could be seen as their accident-risk-contract (the private autonomous model, henceforth: PA model) (Cheung 1992; 1998). The standard economic analysis of tort law, however, models tort law as a regulatory instrument to deter behaviors that do not align with some preexisting safety standards (the regulatory deterrence, henceforth: RD model). But there are several deficiencies in this model.

First, the remedy of tort law is compensatory, which is inconsistent with the function of deterrence. Second, there is a built-in mechanism in the risk-allocation contract model that induces the parties to take optimal safety measures because the less safe measures a party takes, the more likely it is that the party is liable for the damages, as the benefits of its act (B) exceed the expected damages (PL). Therefore, a regulatory safety prescription is not necessary. Third, the preexisting safety standards are external to the injurer when it acts, causing damage. And fourth, the court as an independent adjudicator is not institutionally fit for prescribing safety measures.

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The misuse of the RD model in analyzing tort law has resulted from the very foundation of economic analysis of law – externality theory. In this theory, coercive governmental measures have been required to correct market failures (externalities). As Coase (1960) has shown that, on the one hand, the externalities usually are not failures; on the other hand, coercive governmental measures have their own problems, the costs of which might be higher than the benefits gained. As the tort liability is imposed only after accidents occur and a more or less fault responsibility is the principle for paying compensatory damages, the RD model does not fit for analyzing the tort liability. In practice, tort law is a part of private law of which private autonomy is the principle and default rules are their contents. Therefore, tort law is the implicit contractual arrangement by the injure and the victim of allocating accident risks.

In the following section, I expose the major problems the RD model encounters in explaining tort law, such as the reasonable person standard problem, the harmful precautions problem, the strict liability problem, the causation problem, the good Samaritan problem, the unknown risks problem, and the empirical inadequacy problem. Afterwards, I am putting forward the model of tort liability as a contractual arrangement of risk allocation (the PA model), and I will demonstrate its explanatory power for resolving those problems encountered by the RD model. In section four, I am examining the claim that economic analysis of law is a scientific study of law which underlines the misuse of the RD model and the missing of the PA model.

2 The Regulatory Deterrence Model

The standard tort liability model has been constructed on the assumption that the injurer and the injured party can *ex ante* "jointly"[1] take precautions to prevent the injury and the liability imposed will induce the injurer to take optimal precaution by which the sum of precaution costs of the injurer and the injured and the expected damages will be minimized (Brown, 1973; Shavell, 1987; Landes & Posner, 1987; Cooter & Ulen, 2016; Cooter & Porat, 2014; Schäfer & Ott, 2022). There are, however, some fundamental problems with the premises of this understanding of tort liability, which ought to be laid open and deconstructed before any constructive argument on my part could be introduced. As such, this section is dedicated to roadmap the most widespread faulty assumptions of the RD model and to highlight their essential inconsistencies.

2.1 The Reasonable Person Standard Problem

The most obvious problem of the RD model is its inconsistency with "the reasonable person standard". According to this model, the more the injurer's precaution costs are, the lower its liability standards.[2] In other words, the less capable of preventing the injury the injurer is, the less likely the injurer is liable for the injury, whereas "the reasonable person standard" doctrine states that the injurer's lesser capacity of taking precautions is not a reason for immunity from

[1] The injurer and the injured act independently, but whether they are negligent is assessed on the standards calculated interactively. $L(x,y) = p(x,y)D + A(x) + B(y)$ is the social costs function of the parties' precautions (Landes & Posner 1987, 59).

[2] In the equation $L(x,y) = p(x,y)D + A(x) + B(y)$, the optimal precautions" x*and y* can be found by taking the first partial derivatives of L with respect to x and y and setting the resulting expressions equal to zero. This requires that x* and y* satisfy the following conditions: $Ax = -pxD$ and $By = -pyD$". (Landes & Posner, 1987, 59–60).

its otherwise negligence liability. Landes and Posner (1987, 123–131) argue that the courts' costs of investigating into the less capable injurer's capability would justify the courts seeing the less capable injurer as a standard one. But this argument misses the point. The courts cannot accept such reasoning, it can only accept the *fact* of the injurer's lesser capability, but cannot find any merit in it. Hence, the courts' information about the injurer's capability is not an issue here.

Shavell (1987, 75) would object, however, that, in some cases, a "moderate" level of care that the less capable injurer cannot meet would discourage them from engaging in the socially harmful activity at the beginning. But this is not a good argument, either. Firstly, the courts have never produced, according to the best of my knowledge, such a reasoning. Secondly, the fact that the injury had been inflicted would inevitably mean that the deterrence had failed.[3] Thirdly, resorting to this outside model factor of benefits of activity would discredit the model *qua* model. Fourthly, the factor of benefits of activity would also apply to reasonable persons, and such cannot be allowed to engage in those activities whose benefits are less than the damages done, even if they take optimal care.

Furthermore, there is an information problem for determining the injurer's and the victim's reasonable (negligence) standard from an *ex post* point of view. The determination of the injurer's reasonable standard depends on the victim's reasonable standard, while the determination of the victim's reasonable standard depends on the injurer's reasonable standard. This would put too much information burden on the courts to determine the reasonable (negligent) standards of the injurer and the injured, respectively. Meanwhile, the injurer and the injured would deviate from the standard even if the opposing party makes a small error (Bayern 2023, 47–57).

Cooter and Porat (2000), on the other hand, argued that the courts should take into account the risk to the injurer in determining the negligence standard; otherwise, the standard would be lower than the social optimal. While this is correct under the *ex ante* regulatory model, determining tort liability is an *ex post* investigation of the cause of a specific realized event, not an unrealized abstract standard. And the negligence rule is derived from the private autonomy principle, therefore, in determining whether the injurer should be liable or not, the courts should assume that the injurer has already taken the risk to itself into account and would only consider the injurer's activity's external impacts on others.

2.2 The Harmful Precautions Problem

According to some RD model understandings, those benefits that do not flow to the injurer would be excluded, and thus sometimes would make the injurer take self-optimal but socially inefficient care. Perry (2023) called this negative externality "harmful precautions". Consider the example of driving. To drive fast for taking a patient to the hospital for emergency treatment should allow the driver to drive faster than normally, but not according to this RD model.

Intentional torts present the opposite problem. In most intentional torts, the precaution costs are negative, i.e., resources spent on intentionally causing damages, and thus the injurer should not be liable according to this model. To tackle the problem, Landes and Posner (1987, 149–189) introduced an additional factor, namely that the damage to the injured party should be larger than the gain of the injurer. But this has a "utility monster" problem. Ultimately, they resort to the reason that the injurer can but does not transact under low transaction costs, and therefore, the injurer is liable; some rather awkward explanation.

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[3] Note this doctrine has only been invoked in actual cases in which accidents did occur and therefore it means that the deterrence has failed in these specific cases.

Furthermore, on the injured party's side, under this *ex ante* RD model, the potential damage which might have occurred due to the injurer's dangerous activities has not been included in the calculation of the liability standard, and thus the standard would be too low from the perspective of social efficiency (Bayern 2023, 30–31).

2.3 The Strict Liability Problem

Under the RD model, a tort regime of negligence rule or strict liability would make no difference in inducing the injurer to take optimal care. But if it is so, the distinction between the negligence rule and strict liability would be misleading. This problem is exposed through Cooter (1984), who puts forward a prices/sanctions model in which negligence rule is the sanction and strict liability is the price. He argues that when imperfection in setting the liability standard is more significant, strict liability should be adopted, while the imperfection in assessing damages is more significant, negligence rule should be adopted. But as Grady (2009) pointed out, the discontinuity of liability facing the injurer in the negligence rule cannot exist due to the rule of factual causation, and therefore this prices/sanctions model must be regarded as unsound. Furthermore, firstly, the term "prices" is misleading. "Taxes" would be more accurate because the "prices" herein are set by the courts rather than the spontaneous order of market transactions. Secondly, a strict liability as *ex post* liability is not an appropriate instrument for enforcing these "prices/taxes" regimes. Take car driving as an example. Speeding tickets are "prices/taxes", a strict liability which is initiated only after damages have been done,and is still a sanction *tout court*. Thirdly, as the above subsection 2.2 shows, the negligence rule would take the benefits inflowed to third party by the concerning injurer's activity into account in determining the negligence standard, while strict liability would induce the injurer to disengage in this kind of socially beneficial activities.

Shavell (1980) argues that strict liability is a better tort regime for those cases in which the "activity level effect" exists. But as Garoupa and Ulen (2013) point out, the effect is not necessarily a monotonically increasing relationship between the probability of an accident's occurring and the quantity of the underlying risky activity. Even in the cases where this activity level effect exists, they correctly argued that *ex ante* regulations are much more effective than an *ex post* liability regime to address this problem.

The fundamental problem of this comparison of negligence rule and strict liability, however, lies in its methodological flaw: in this comparison, the negligence rule is, indeed, a legal rule (whatever its contents) while "strict liability" is a legal result, similar to the predicate "not liable". And if the courts assessed tort liability totally based on effectiveness, legal rules such as the negligence rule would be superficial because the courts would just rule the injurer not liable upon not having induced it to take optimal precautions or the injurer liable upon having induced it to take optimal precautions. The meaningful comparison between negligence rule and strict liability, therefore, has to be based on strict liability as a legal rule which has a defined scope of application. This is why strict liability as a legal doctrine has been confined to specific torts such as products liability and abnormally dangerous activities.[4]

[4] In civil law system, fault is the rule while strict liability is exception.

2.4 The Causation Problem

Next, there is Cooter's (1987) thesis, built on the ideas of Bertrand Russell, according to which cause is disappearing in economic models of tort law. Instead, the mathematical relationships among such variables as the probability of accidents, the harm inflicted, and optimal precautions tend to dominate and supplement these kinds of discussions. However, factual causation and proximate cause are important doctrines in tort law. What is more, from a practical point of view, as Grady (1989) pointed out, the injured party usually would not allege that the injurer does not meet the due care standard and therefore is negligent; rather, the victim would allege those precautions the injurer does not take which would have prevented the damage from occurring. Being positive theorists of law, legal economic analysts have to explain this phenomenon.

Landes and Posner (1987, 228–255), as usual, introduced an extra factor of "care of complying the safety standard" to save this "positive" model of tort law. In their model, the usual safety standard, below which the injurer is judged to be liable for damages, is closely associated with the "care of complying the safety standard", and, as such, causation is largely left out, being kept for those accidents which would have happened regardless of the "care of complying the safety standard".

Shavell (1987, 105–110) has demonstrated that those accidents not caused by the injurer would have no effect on determining the optimal care. He also pointed out that, similar to the incentive induced by strict liability, the liability regime without this causation requirement would have no effect on the injurer's taking optimal care. However, he put forward some affirmative reasons for the causation doctrine. First, he claims that the injurer would not engage in the activities, regardless of taking due care, because it would bear "crushing" liability. The problem with this argument is that it is an *ad hoc* argument, again, similar to his explanation of the reasonable person standard above, in subsection 2.1. Second, the causation requirement would reduce the number of cases brought into courts, and thus, administrative costs would be reduced.

The real problem, however, is that this *ex ante* regulatory model does not fit with *ex post* compensatory tort law. The causation requirement only makes sense retrospectively for finding those parties having engaged in an unreasonable risky activity causing some damages in concrete cases. In short, causation in tort law is what Hayek (1945) said "the knowledge of the particular circumstances of time and place" contrasting with "scientific knowledge". That is, the *ex post* nature of tort liability allows the injurer to dynamically adjust his act to changing risks.

2.5 The Good Samaritan Problem

Others argue that the less costly the precaution is, the higher the liability standard, leading to the conclusion that everyone should be a good Samaritan. This is, however, inconsistent with the legal requirement of duty of care in tort liability. Landes and Posner (1987, 142–148) have argued that the duty of a good Samaritan would induce "the injurer" to take substitutive activities which are absent of "coerced rescue risks" and incidentally would reduce the socially not optimal activities. Again, an extra factor, substitutive activities, has sneaked in to justify the model. In my opinion, they should have incorporated these substitute activities into the model from the very beginning. The omission of this factor makes the investigation of strict liability partial and misleading: strict liability compared with negligence would not induce the injurer to take too much precautions. The more serious analytical problem, however, is that it is impossible for the potential injurers *ex ante* to know which activities are prone to encountering coerced rescue risk, and therefore, when taking substitutive activities to avoid those risks is a

viable option. Hence, in this situation, liability rules do not induce people's conduct and thus are meaningless, even harmful, to transfer risks with no benefits.

2.6 The Insurance Problem

From a deterrence standpoint, the insurance the injurer procures would dilute its incentive to take optimal care, and therefore, the injurer should not be allowed to procure insurance for its liability. In fact, third-party insurances are prevalent and sometimes compulsory as well. Some countries, such as New Zealand, even take certain accidents out of the tort law regime and set up a comprehensive fund for compensation without considering whether the injurer is liable or not.

Whether the insurer will, indeed, insure the liability depends on the insurer's ability to prevent the insured's (i.e., the injurer) from committing moral hazards. This has become an issue; however, only insurance for liability had been allowed by the (efficient) law based on the assumption that the insurance would not dilute the injurer's incentive to take optimal care. Otherwise, a calculation of trade-off between the degree of dilution and the benefits of insurance has to be done at least from the viewpoint of social optimization. The injurer's judgment-proof argument has the same problem. If so, this would put too much burden on the courts as adjudicators of individual cases and thus would not be a part of private law.

2.7 The Unknown Risks Phenomenon

Nevertheless, some damages, in terms of type or amount, are too uncertain to be *ex ante* calculated for optimal precautions, such as environmental pollutions, nuclear disasters, or other mass torts. Therefore, the *ex ante* regulatory model cannot apply to these damages. A strict liability based on deterrence, giving incentives to take optimal precautions, is superficial. In cases of environmental pollution, many causes of pollutions are unknown until recently. Therefore, there are no "optimal" precautions as such. Similarly, in cases of nuclear disasters, either the precautions are optimal until the disasters occur, or maximum damages have been granted by special laws. Hence, these phenomena also lay some fundamental inconsistencies open with the RD model understandings.

2.8 The Empirical Inadequacy Problem

Finally, there is the so-called empirical inadequacy problem, which consists in tort liability being a remedy, not a sanction. Therefore, the empirical studies of the effectiveness of tort liability are meaningless in the application of law (cf. Arlen, 2021). Empirically speaking, however, in terms of verifying this deterrence model, no case of negligence is apparent, and injurers have taken optimal care in all strict liability cases. These have never been empirically determined, though.

But this is vehemently opposed by some, such as Eric Posner (2021), who put forth an opposite "futile argument", saying that empirical studies would prove that the imposition of tort liability would have no effect on reducing the number of accidents or would induce otherwise detrimental defensive acts due to the contractual nature of tort liability. Shao and Weng (2023) also experimentally demonstrated that while there is some deterrence effect of punitive damages for intentional torts, there is no such effect of compensatory damages for the negligence rule. This should not be surprising because the negligence rule, in contrast to intentional torts, applies to those scenarios wherein the injurer should have recognized the unsocial risk but failed to do so when engaging in the activity, hence causing accidents. While the risk never came to the

mind of the injurer, the liability derived therefrom would have no effect regardless of whether the injurer engages in the activity.

Gary Schwartz (1994), in a comprehensive survey of economic analysis of tort law literature, found that those fine-tuned economic theories predict very poorly the consequences of various tort rules in practice, while there did exist a weak deterrence effect of the general tort liability. But even this latter finding rather "perform[s] a function similar to that of advertising and other promotional activities in the normal product market" (Coase, 1994, 25–28) because the so-called deterrence effects of the general tort liability have been measured without a causal theory.

3 The Private Autonomous Model

The fundamental problem with the RD model, besides its inconsistencies laid open above, is its intrinsic association with the so-called "externality" theory, i.e., the law should *prima facie* intervene to eliminate those "external effects" which someone's action has on others. But as Coase (1987, 20–30) has pointed out, the value of damage might be less than the benefits of the action. Moreover, the administrative costs of law's intervention might be larger than the gap between the greater value of damage and the benefits of the action. In both cases, the law's intervention would make things worse than before. In short, the externality theory is *prima facie* unsound even in terms of "efficiency" (Chien, 2013; 2016). Yet, even more important it is that this legal effectiveness approach distracts legal economists from inquiring into more relevant scientific issue, such as the fundamental question of why the law is needed? (Pearl & Mackenzie, 2018) The legal effectiveness is only an incidental consequence of the law. The law's effectiveness has rarely been determined by the black letter law alone (Basu, 2018).

Tort law, indeed, is concerned with those damages occurring among people who do not contract for allocating the risks. This "market failure", however, should not immediately lead to the conclusion that a coercive law is needed. There are two reasons for this. First, the *ex post* attribute of tort liability indicates that the deterrence has failed. Second, its attribute of compensating damages rather than penalty (non-monetary or criminal fines) indicates it is not a sanction which is the necessary instrument backing up the law's deterrence effect. That is why Coase (1987, 148) could say that "the lack of a contract" and "the gap in a contract" are the same problem because of high transaction costs.

Private law is autonomy-based and thus its function is to facilitate transactions rather than deter behaviors (Chien, 2025; Hayek, 1945; Zywicki & Sanders, 2008). Tort law, as part of private law is, therefore, simulating a risk-allocating contractual provision which the injurer and the injured would have agreed. This mutually beneficial risk-allocating contractual provision is as follows: the benefits of engaging in the activity (B) should not be less than the expected loss (PL) caused by the activity. In legal terms, the injurer will be liable for compensating the loss if the unrealized benefits of not engaging in the activity are less than the resultant reduced expected loss, i.e., B<PL. This formula implies that the less capable the injurer is, or the more dangerous the activity is, or the less beneficial the activity is, the higher the liability standards are (Chien, 2016). Take driving as example. The less capable driver, such as short sighted, would reduce more expected damage than normal driver would once they reduce their driving speed.

As such, the Hand formula B<PL has been misunderstood by most legal economists. Judge Hand, in the decision *U.S. v. Caroll Towing* (159 F.2d 169 (2d Cir 1947)), did not rule for the injurer based on the victim's negligence of leaving no body on board *per se* which would otherwise have prevented the sinking of the barge. Rather, Judge Hand ruled that the victim

cannot justify his leaving no body on board and thus B is zero meanwhile this happened at war time and in winter which increases the accident-occurring rate P of boat collision and therefore B<PL. It follows that the victim is contributorily negligent.

In contrast to the RD model, this formula would coherently and concisely explain tort law. The reasonable person standard would pose no problem because the injurer with less capability under the formula should bear a higher liability standard, and thus the defense claim of less capability cannot be sustained. The benefits of activity are the factors determining the liability standard; therefore, the harmful precautions problem would not arise. When the activity is abnormally dangerous, i.e., P close to 1, the injurer is almost certainly liable, and thus a strict liability regime emerges. When P is close to 0, in which the harm has not been caused by the activity, the formula would dictate that the injurer is not liable. The contributory negligence which the victim or others contribute would reduce the effectiveness of the injurer's precautions, i.e., P, and thus the injurer might no longer be liable. Furthermore, the damages could be adjusted to P, and therefore comparative negligence regime arises due to the *ex post* compensation as a risk allocation contractual arrangement. The good Samaritan problem is also dismissed, as the harm would still occur even if the injurer is not engaged in the (rescue) activity.

There is another efficiency advantage in *ex post* tort liability compared with *ex ante* regulatory measures. The *ex post* nature of tort liability means the injurer can use what Hayek termed "the knowledge of particular circumstances of time and place" such as speeding up on a clear road without increasing accident risks.

It is puzzling, then, that there would be no tort liability cases if the liability standard had been correctly determined, even on the comparison of activity benefits rather than on precaution costs. There are two explanations for this. According to the first viable option, most humane decisions are not deliberate and thus not always precise (Kahneman, 2011). The other solution would be that people make errors in the process of living (as learning) (Rizzo & Whitman, 2018). In both cases, a tort liability of compensating loss would not over-deter people from engaging in socially beneficial risky activities.

4 Economic Analysis of Law as Legal Science

As Zerbe (2014) pointed out, legal economists should abandon the unreal Walrasian world and the quasi-real world of market failures and externalities, namely, the world of the RD model, and instead focus on institutions reducing transaction costs. In other words, institutions are contractual arrangements reached by people to reduce dissipation of rent (Cheung, 1998). In the world of law, this means that people would trust the courts to delimit rights to resolving disputes, which makes mutual benefits unrealized. Thus, firstly, the courts have to impartial and. secondly, they have to efficiently apply law, resulting in like cases decided alike, different cases decided differently. Therefore, legal dogmatics is required for the courts' credibility and thus the law's effectiveness (Summers, 2005; Basu, 2018). Furthermore, against the criteria of consilience, simplicity, and analogy for scientific theory choice (Thagard, 1978), the PA model, rather than the RD model, is the better explanatory theory of tort law.

4.1 Tort Liability as Prices?

Robert Cooter and Thomas Ulen (2016, 3), in their widely used textbook, *Law and Economics*, claimed that "[e]conomics provided a scientific theory to predict the effects of legal sanctions

on behavior. To economists, sanctions look like prices, and presumably, people respond to these sanctions much as they respond to prices […] Economics has mathematically precise theories (price theory and game theory) and empirically sound methods (statistics and econometrics) for analyzing the effects of the implicit prices that laws attach to behavior." On the theoretical side, this puts the cart before the horse. In terms of science, legal theory should be concerned with "why the law" not "how effective the law". On the empirical side, correlation is not causation (Pearl & Mackenzie, 2018; Shang & Williamson, 2023), and the quantification cannot be value-neutral.

To justify using economics for legal studies, Cooter and Ulen have doubly misused the term "price", the *raison d'état* of economists. In ordinary language, sanctions could be said as prices that the rule violators have to pay. But in economics, price has a specific meaning of consequence or mechanism of voluntary transactions. This is exactly the opposite of sanctions. As Hayek (1945) pointed out, the (rule of) law has emerged in human actions, which is similar to the price system (Zywicki & Sanders, 2008). The law, as a price guiding people's behavior, is derived from the law's stabilizing of people's expectations. To make sure the law is being obeyed, sanctions on lawbreakers, indeed, are needed. But they are derived from the primary law and therefore cannot be the core of legal studies. In economic analysis of tort liability, this sanctions-centered approach has one further defect, namely, liabilities of compensation cannot be sanctions.

Viewing laws as sanctions also makes many empirical legal studies irrelevant for legal studies because the interdependence exists between theory and empirical analysis. Although legal empirical analysts have expanded their testing scope to evidence about the informational environment and evidence prompting expansion of the potential set of options, and thus are closer to real decision-making (Arlen, 2021), they still miss the target of legal studies, that is, law as a price (i.e., norm or rule).

Cost-benefit analysis is an economist's tool to assess "legal policies". Economists claim that this analysis is objective, scientific, and thus value-neutral. However, as Bernard Harcourt (2018) pointed out, this is impossible. One reason why the precautions/deterrence model has failed is its avoidance of comparing the benefits of conflicting activities, which are mostly determined by social norms. For example, Judge Learned Hand said no benefits lost (B=0) because there is no good reason for leaving nobody onboard, which would have reduced the damage and therefore B<PL.

Coase (1994), in his essay, *How Should Economist Choose?*, pointed out the common problems of economic theorizing. On the theoretical side, he said: "[b]ut a theory is not like an airline or bus timetable. We are not interested simply in the accuracy of its predictions. A theory also serves as a base for thinking. It helps us to understand what is going on by enabling us to organize our thoughts." (Coase, 1994, 16–17) On the empirical side, he said most empirical studies do not test the competing theories while only measure the effects of the selected theory, which can be done with the advancement of computational power and statistics. What is more, "if you torture the data enough, nature will always confess." (Coase, 1994, 37)

4.2 Tort Law as Liability Rules?

Calabresi and Melamed (1972, 1128), in their now classic article, concluded that "[l]egal scholars, precisely because they have tended to eschew model building, have often proceeded in an ad hoc way, looking at cases and seeing what categories emerged. But this approach also affords only one view of the Cathedral. It may neglect some relationships among the problems involved

in the cases which model building can perceive, precisely because it does generate boxes, or categories".

From the perspective of whether transactions have been based on voluntariness, Calabresi and Melamed (1972) created three categories of legal rules, i.e., property rules, liability rules, and rules of inalienability. This is a great insight, particularly for legal economists who usually only pay attention to the laws governing market transactions. But as Epstein (1997) pointed out, Calabresi and Melamed have overemphasized the role of liability rules, considering them either in contrast to property rules or devoid of institutional contexts.

Even so, it is incorrect to assume that Calabresi and Melamed (1972) regarded tort liability as belonging to the category of liability rules. In their opinion, the liability rules referred to those rules allowing entitlements to be taken by paying a price determined not by their holders. Tort liability, on the other hand, is usually not an absolute one. Rather, it is a standard of liability for damage that has to be found, such as intentional, negligent, or engaging in dangerous activities. Putting tort liability into the category of liability rules would distract the investigation of the most important issue, namely, what is the liability standard and why is it so? Consequently, the market failure paradigm or externality theory, whose deficiencies have been exposed by Coase (1960), has been sneaked in for the reason of tort liability.

As such, Calabresi and Melamed (1972) have attributed the cause of liability rules to high transaction costs, which block market transactions based on property rules. Therefore, they have eradicated the public law/private law divide and have put tort liability and eminent domain into the same category of liability rules. But, firstly, as Krier and Schwab (1995) pointed out, the concept of high transaction costs is too vague to be operationalized. Secondly, eminent domain is part of public law, which imposes constraints on the government's exercise of the taking power (Epstein 1997, 2111–2120). This dimension would be lost in putting eminent domain in the category of liability rules.

Elaborating on their critics, Calabresi (2016, 117–130) characterizes in his more recent work the liability "rule" as a hybrid of market (the property rule) and command rule (inalienability) to implement what he called "social democratic values". But this argument should be rejected because of its tautology. As such, this argument can justify any amount of damages: when the payments are equal to market price, it is a substitute for market; when the payments are above market price, it is a penalty for inalienability; when the payments are lower than market price, it is an assessment for collective values. More importantly, this argument is institution-free and thus legal classification, such as contract/tort, civil/criminal, or public law/private law, would become meaningless (Rose, 1997); that is, no legal constraints being imposed on rule-choosers. Although Calabresi (1991) invoked the cost-effectiveness used by Coase (1960) to further elaborate on this research question, a proper legal classification is still a prerequisite (Kaitan & Steel, 2023).

4.3 The Institution of Courts

The standard law and economics approach regards law as policy and thus implicitly assumes that the courts are institutionally fit for making a correct cost-benefit analysis. But this cannot be further from the truth (Komesar, 1994; 2001). Not only does the "efficiency" of common law not derive from judges consciously making society-wide cost-benefit analysis (P. Rubin, 2005), but the society-wide cost-benefit analysis would also undermine that very law and thus its "efficiency" (Buchanan, 1974). The economic reasoning by Judge Richard Posner in the *Indiana Harbor* (916 F. 2d 1174 (7th Cir. 1990)) is a good example to illustrate this problem.

In *Indiana Harbor*, the RD model, which Professor Posner has pioneered has led him as a judge to mischaracterize relevant legal issues (Rosenberg, 2007; Sykes, 2007) and misinterpret the reasons for the abnormally dangerous activity doctrine (Bogus, 2023). In that model, strict liability is needed when the activity the injurer engaged in is socially harmful, but it would not be prevented by the negligence rule, which requires the injurer to take optimal care only. In that decision, Judge Posner had done his own investigation and found that the transportation of the dangerous chemical by rail, even through populous areas, is the inevitable choice for the defendant under the then technological conditions and thus the defendant would not have been deterred from engaging in its concerned activity even under strict liability.

In individual cases, judges' investigation into whether the concerned activity is the inevitable choice under constraints, however, would make strict liability meaningless, overstretch the courts' capacity, and complicate the adjudication procedure. Brilliant Judge Posner's investigation might be, but it still could be wrong. For ordinary judges, it would be even harder to get it right. More seriously, the result of this kind of economy-wide investigation, even under professional economists, would still be uncertain and thus would *de facto* deprive the application of strict liability due to the victim bearing the burden of proof. As Rosenberg (2007) pointed out, strict liability is a price that would automatically induce the injurer to take the optimal level of activity, and thus, the courts' inquiry into the issue is superfluous.

One might add that Posner (2003) once criticized Hayek's law and economics precisely for its formalism. As Zywicki and Sanders (2008) pointed out, Posner holds an unrealistic assumption of judicial knowledge and ignores the "efficiency" of rules emerging spontaneously, which facilitates the use of knowledge of society. In the like manner, Bogus (2023) argued, by the vivid example of Jurassic Park, that the reason for strict liability for abnormally dangerous activity is the society acceptance of the abnormally dangerous activities but with the condition that the damage should be compensated once the damage occurred without inquiring into whether negligent or not because the deal between the injurer and the victim has been made under the condition the injurer takes optimal care.

4.4 Legal Dogmatics as the Scientific Foundation of Law

The economic analysis of law has arisen to counter the formalism of doctrinal legal studies (Rubin, 2017). Focusing on investigating the effectiveness of law and thus using quantitative analysis, however, only distracts the scientific studies of legal doctrines: the systematization of legal rules. As Holmes (1897, 62), the pioneer of the law and economics, claimed: "The number of our predictions when generalized and reduced to a system is not unmanageably large. They present themselves as a finite body of dogma which may be mastered within a reasonable time. […] We could reconstruct the corpus from them if all that went before were burned. The use of the earlier reports is mainly historical […]".

This systematization of law would reduce the legal costs of legislation, adjudication, administration, and learning to improve the survival rate of the rule of law, competing with other dispute-resolving measures such as violence, money, or power. And as a scientific study, it has the logical form of the inference to the best explanation (Amaya, 2018; Michelon, 2019; Chao, 2019).

From this perspective, particularly concerning the consilience of the competing principles, whether the RD model or the PA model is a better one for explaining tort liability is an easy case. As I have demonstrated above, unlike the PA model, the RD model cannot, in any meaningful way, explain any tort law doctrine without introducing external elements.

Tort law, as liability rules discussed above in subsection 4.2, poses a different problem. Although the tripartite framework covers a whole legal system and thus superficially has much consilience, the rules that are the *explanandum* do not "belong together", and thus the framework cannot explain these rules (Michelon, 2019, 889–894). For example, tort liability and eminent domain have different normative meanings: the former being autonomy-based private law and the latter being power-restricted public law. Therefore, liability rules cannot be the principle which can explain both tort liability and eminent domain.

The RD model was built to compare the effectiveness of the no liability, negligence rule, and strict liability, although they do not belong together. No liability is not a rule, and strict liability also is not a rule, but an opposite side of no liability, while the negligence rule is a rule properly so-called. The result of applying the negligence rule is either the predicate liable (strict liability) or not (no liability). Therefore, the RD model would be more appropriate to be viewed as seeing the effects of errors in implementing the negligence rule. No liability designates those cases wherein the liability should be imposed, but actually it is not, while strict liability designates those cases wherein the liability should not be imposed, but actually it is.

But how does this relate to legal economics being a science? Friedman (2009) argued that the predictive power rather than the reality of the assumption is the criterion by which a model should be assessed as scientific or not. The assumption of *ex ante* contracting of the private autonomous model is not real, but it has much predictive power. He further clarified that "[t]o avoid confusion, it should perhaps be noted explicitly that the 'predictions' by which the validity of a hypothesis is tested need not be about phenomena that have not yet occurred, that is, need not be forecasts of future events; they may be about phenomena that have occurred but observations on which have not yet been made or are not known to the person making the prediction." (Friedman, 2009, 9)

In the PA model, the fault principle makes not only the separate independent torts of intentional harms, negligence, and strict liability but also the various doctrines of compensation, causation, contributory negligence, duty of care, and others a unified liability rule, becoming known to the legal complexity, i.e., legal practitioners, educators and scholars (Khaitan & Steel, 2023). This is truly scientific.

As Amaya (2018) pointed out, "[i]n the philosophy of science, explanatory coherentism has been advocated as a main alternative to the dominant Bayesian approach to theory choice." For an economic analysis of law, this failure of quantitative analysis, however, has less to do with technical problems concerning constraints on data, computing capacity, or estimation techniques (Levmore, 2021). Rather, it has to do with the normative nature of law, which defies quantitative analysis. Furthermore, the standard economic models of law usually lack mechanisms linking economic efficiency to law and thus further reduce their scientific credibility (Shang & Williamson, 2023). Although the evolutionary models based on either the demand side or the supply side of litigations might mitigate this problem (P. Rubin, 2005), they could only explain common law as a process, and thus they could not shed light on individual legal doctrines, which are the core of legal studies, i.e., legal dogmatics (Summers, 2005).

Aarnio (1994) argued that legal dogmatics is a social science in the sense of studying society as existing in phenomena. He said that "legal dogmatics expressly interprets linkages (norms) through which people's personal relationships become legalized and in this way sociated […] and thus legal dogmatics is a study of these normative 'reciprocating mechanism'." (Aarnio, 1994, 16) Legal dogmatics has two tasks, namely interpreting legal texts and systematizing legal norms which cannot be empirically confirmed or falsified, but can only be judged by their coherence. It is, thus, the above-mentioned missing mechanism of scientific explanation.

The function of law is to let people accept the courts' judgments of right-delineation and thus avoid resorting to non-legal dispute resolutions. A systematization of law and a consistent and coherent interpretation of law would minimize the costs of legislating, adjudicating, and learning law and thus increase the law's chances of winning over violence, money, and power in the arena of dispute resolution.

4.5 The Criteria for Theory Choice

Finally, against the criteria for the theory choice (Thagard, 1978), the PA model is better than the RD model for explaining tort law. Regarding the criterion of consilience, the PA model is not inconsistent with the liability insurance, unknown risk, and legal dogmatics, which the RD model does not cover. In the criterion of simplicity, the PA model does not add *ad hoc* hypotheses as the RD model does for explaining concepts such as the reasonable person standard or intentional torts. Last and not least, the criterion of analogy, the PA model is better than the RD model because tort law is a part of private law, of which private autonomy is a core principle, whereas regulatory deterrence is the function of public law.

5 Conclusion

The RD model is an *ex ante* regulatory model, while the tort law is an *ex post* legal mechanism to allocate the "inevitable" risks. The RD model sees legal liability as an incentive to induce the injurer and the victim to take optimal precautions to minimize the total costs of precautions and risks. If this is the function of tort liability, there would be no accidents that occur for which anyone is responsible because the tort law has already given perfect incentives to people; therefore, no person, being rational, would take under-optimal precautions and then bear tort liability for damages. Empirically speaking, the volumes of tort cases are significant, if not dominant.

By contrast, the PA model of tort liability has been constructed on an implicit contract and ordinary human nature. Accidents, by definition, imply the transaction costs being too high to contract an allocation of risk. The law, therefore, simulates the implicit contract that the injurer and the victim would have agreed on. This provision of allocating risk would be that the injurer's interests unrealized equal the reduced expected damage due to the injurer's disengaging the conflicting activity. This is the equation of $B=PL$. When $B<PL$, the injurer will be liable for the damage. Judging from the human nature of fast thinking, $B<PL$ sometimes would happen; therefore, tort cases arise.

In this study, I intended to emphasize that the subject matter of economic analysis of law studies should be law, not economics. Otherwise, Buchanan's (1959; 1974) comment of "good economics but bad law" or Mestmäcker's (2007) "a legal theory without law" would happen. Law is a complexity system in which private law and public law have different kinds of rent-dissipation to be reduced. Therefore, the RD model of public law cannot be used to analyze tort liability of private law, something befitting the PA model instead.

References

Aarnio, A. (1994). Is Legal Science a Social Science? In W. Krawictz, N. MacCormick, & G. H. von Wright (Eds.), *Prescriptive Formality and Normative Rationality in Modern Legal Systems: Festschrift for Robert S. Summers* (pp. 3–17). Duncker & Humbolt. https://doi.org/10.3790/978-3-428-07895-0

Amaya, A. (2018). Coherence and Systematization in Law. In G. Bongiovanni, G. Postema, A. Rotolo, G. Sartor, C. Valentini, & D. Walton (Eds.), *Handbook of Legal Reasoning and Argumentation* (pp. 637–672). Springer. https://doi.org/10.1007/978-90-481-9452-0_22

Arlen, J. (2021). The Essential Role of Empirical Analysis in Developing Law and Economics Theory. *Yale Journal on Regulation*, 38(2), 480–502. Online: https://tinyurl.com/4uwew2ca

Basu, K. (2018). *The Republic of Beliefs: A New Approach to Law and Economics*. Princeton University Press. https://doi.org/10.2307/j.ctv10qqzs3

Bayern, S. (2023). *The Analytical Failures of Law and Economics.* The Cambridge University Press. https://doi.org/10.1017/9781009159203

Bogus, C. T. (2023). Why *Indiana Harbor* Is the Worst Torts Decision in American History. *Connecticut Law Review*, 55(3), 649–680. Online: https://tinyurl.com/2hwv97za

Buchanan, J. M. (1959). Positive Economics, Welfare Economics, and Political Economy. *Journal of Law and Economics*, 2, 124–138. https://doi.org/10.1086/466556

Buchanan, J. M. (1974). Good Economics. Bad Law. *Virginia Law Review*, 60(3), 483–492. https://doi.org/10.2307/1072438

Brown, J. P. (1973). Toward an Economic Theory of Liability. *Journal of Legal Studies*, 2(2), 323–349. https://doi.org/10.1086/467501

Calabresi, G. (1991). The Pointlessness of Pareto: Carrying Coase Further. *The Yale Law Journal*, 100(5), 1211–1237. https://doi.org/10.2307/796691

Calabresi, G. (2016). *The Future of Law and Economics: Essays in Reform and Recollection.* Yale University Press. https://doi.org/10.12987/yale/9780300195897.001.0001

Calabresi, G., & Melamed, A. D. (1972). Property Rules, Liability Rules, and Inalienability: One View of the Cathedral. *Harvard Law Review*, 85(6), 1089–1128. https://doi.org/10.2307/1340059

Chao, H.-K. (2019). Inference to the Best Model of the Consumption Function. *History of Political Economy*, 51(3), 493–513. https://doi.org/10.1215/00182702-7551888

Cheung, S. N. S. (1992). On The New Institutional Economics. In L. Werin, & H. Wijkander (Eds.), *Contract Economics* (pp. 48–65). Blackwell.

Cheung, S. N. S. (1998). The Transaction Costs Paradigm. 1998 Presidential Address Western Economic Association. *Economic Inquiry*, 36(4), 514–521. https://doi.org/10.1111/j.1465-7295.1998.tb01733.x

Chien, T.-S. (2013). The Legal Meaning of Coasean Economics. *Peking University Law Journal*, 1(1), 197–214. https://doi.org/10.5235/205174813807351636

Chien, T.-S. (2016). The Evolution of Tort Law in Taiwan. A Doctrinal-Economic Interpretation. In Y. Chang, W. Shen, & W. Wang (Eds.), *Private Law in China and Taiwan: Legal and Economic Analyses* (pp. 156–181). Cambridge University Press. https://doi.org/10.1017/9781316658925.007

Chien, T.-S. (2025). Economic Analysis of Private Law in Taiwan: A Return to the Private Autonomy Principle. *Asian Journal of Law and Economics*, 16(1), 87–101. https://doi.org/10.1515/ajle-2024-2004

Coase, R. H. (1960). The Problem of Social Cost. *Journal of Law and Economics*, 3, 1–44. https://doi.org/10.1086/466560

Coase, R. H. (1987). *The Firm, the Market, and the Law*. University of Chicago Press.
Coase, R. H. (1994). *Essays on Economics and Economists*. University of Chicago Press. https://doi.org/10.7208/chicago/9780226051345.001.0001
Cooter, R. (1984). Prices and Sanctions. *Columbia Law Review*, 84(6), 1523–1560. https://doi.org/10.2307/1122472
Cooter, R. (1987). Torts as the Union of Liberty and Efficiency: An Essay on Causation. *Chicago-Kent Law Review*, 63(3), 523–551. Online: https://tinyurl.com/55uvdbze
Cooter, R. D., & Porat, A. (2000). Does Risk to Oneself Increase the Care Owed to Others? Law and Economics in Conflict. *The Journal of Legal Studies*, 29(1), 19–34. https://doi.org/10.1086/468062
Cooter, R. D., & Porat, A. (2014). *Getting Incentives Right: Improving Torts, Contracts, and Restitution*. Princeton University Press. https://doi.org/10.23943/princeton/9780691151595.001.0001
Cooter, R. D., & Ulen, T. (2016). *Law and Economics*. (6th ed.). Addison-Wesley. Online: https://tinyurl.com/mvwf2f4c
Epstein, R. A. (1997). The Clear View of the Cathedral: The Dominance of Property Rules. *Yale Law Journal*, 106(7), 2091–2120. https://doi.org/10.2307/797162
Friedman, M. (2009). The methodology of positive economics (1953). In U. Mäki (Ed.), *The Methodology of Positive Economics: Reflections on the Milton Friedman Legacy* (pp. 3–44). Cambridge University Press. https://doi.org/10.1017/CBO9780511581427.002
Garoupa, N., & Ulen, T. S. (2013). The Economics of Activity Levels in Tort Liability and Regulation. In T. J. Miceli, & M. J. Baker (Eds.), *Research Handbook on Economic Models of Law* (pp. 33–53). Edward Elgar. https://doi.org/10.4337/9781781000151.00007
Grady, M. F. (1989). Untaken Precautions. *Journal of Legal Studies*, 18(1), 139–156. https://doi.org/10.1086/468143
Grady, M. F. (2009). Unavoidable Accident. *Review of Law and Economics*, 5(1), 177–231. https://doi.org/10.2202/1555-5879.1302
Hayek, F. A. (1945). The Use of Knowledge in Society. *American Economic Review*, 35(4), 519–530. Online: https://www.jstor.org/stable/1809376
Holmes, O. W., Jr. (1897). The Path of the Law. *Harvard Law Review*, 10(8), 457–478.
Kahneman, D. (2011). *Thinking, Fast and Slow*. Allen Lane.
Khaitan, T., & Steel, S. (2023). Areas of Law: Three Questions in Special Jurisprudence. *Oxford Journal of Legal Studies*, 43(1), 76–96. https://doi.org/10.1093/ojls/gqac025
Komesar, N. K. (1994). *Imperfect Alternatives. Choosing Institutions in Law, Economics, and Public Policy*. University of Chicago Press.
Komesar, N. K. (2001). *Law's Limits. The Rule of Law and the Supply and Demand of Rights*. Cambridge University Press.
Krier, J. E., & Schwab, S. J. (1995). Property Rules and Liability Rules: The Cathedral in Another Light. *New York University Law Review*, 70, 440–483. Online: https://tinyurl.com/3w9pknu5
Landes, W. M., & Posner, R. A. (1987). *The Economic Structure of Tort Law*. Harvard University Press. https://doi.org/10.4159/harvard.9780674864030
Levmore, S. (2021). The Eventual Decline of Empirical Law and Economics. *Yale Journal on Regulation*, 38(2), 612–632. Online: https://tinyurl.com/mwbpb3zn
Mestmäcker, E.-J. (2007). *A Legal Theory Without Law. Posner v. Hayek on Economic Analysis of Law*. Mohr Siebeck. https://doi.org/10.1628/978-3-16-151072-4
Michelon, C. (2019). The Inference to the Best Legal Explanation. *Oxford Journal of Legal Studies*, 39(4), 878–900. https://doi.org/10.1093/ojls/gqz021

Pearl, J., & Mackenzie, D. (2018). *The Book of Why: The New Science of Cause and Effect*. Basic Books.

Perry, R. (2023). Harmful Precautions. *Notre Dame Law Review*, 99(1), 153–202. Online: https://scholarship.law.nd.edu/ndlr/vol99/iss1/4/

Posner, E. A. (2021). The Boundaries of Normative Law and Economics. *Yale Journal on Regulation*, 38(2), 657–677. Online: https://tinyurl.com/49zf657u

Posner, R. A. (2003). *Law, Pragmatism, and Democracy*. Harvard University Press. https://doi.org/10.4159/9780674042292

Rizzo, M. J., & Whitman, G. (2018). Rationality as a Process. *Review of Behavior Economics*, 5(3–4), 201–219. https://doi.org/10.1561/105.00000098

Rose, C. M. (1997). The Shadow of The Cathedral. *The Yale Law Journal*, 106(7), 2175–2200. https://doi.org/10.2307/797165

Rosenberg, D. (2007). The Judicial Posner on Negligence versus Strict Liability: *Indiana Harbor Belt Railroad Co. American Cyanamid Co*. *Harvard Law Review*, 120(5), 1210–1222. Online: https://tinyurl.com/3zazax9u

Rubin, P. H. (2005). Micro and Macro Legal Efficiency: Supply and Demand. *Supreme Court Economic Review*, 13, 19–34. https://doi.org/10.1086/scer.13.3655299

Rubin, E. L. (2017). From Coherence to Effectiveness: A Legal Methodology for the Modern World. In R. van Gestel, H.-W. Micklitz, & E. L. Rubin (Eds.), *Rethinking Legal Scholarship: A Transatlantic Dialogue* (pp. 310–350). Cambridge University Press. https://doi.org/10.1017/9781316442906.009

Schäfer, H.-B., & Ott, C. (2022). *Economic Analysis of Civil Law*. (2nd ed., translated by M. Braham). Edward Elgar. https://doi.org/10.4337/9780857935076

Schwartz, G. T. (1994). Reality in the Economic Analysis of Tort Law: Does Tort Law Really Deter. *UCLA Law Review*, 42(2), 377–444.

Shang, Y., & Williamson, J. (2023). *Evidential Pluralism in Social Sciences*. Routledge. https://doi.org/10.4324/9781003143000

Shao, J.-H., & Weng, M.-H. (2023). The Deterrence Effect of Tort Damages: An Empirical Study via Public Bad Experiment.［邵靖惠，翁明宏，侵權行為損害賠償之預防目的—以法律實證分析為中心] *National Chengchi Law Review* [政大法學評論], 173, 157–226. https://doi.org/10.53106/102398202023060173003

Shavell, S. (1980). Strict Liability versus Negligence. *The Journal of Legal Studies*, 9(1), 1–25. https://doi.org/10.1086/467626

Shavell, S. (1987). *Economic Analysis of Accident Law*. Harvard University Press. https://doi.org/10.4159/9780674043510

Summers, R. S. (2005). *Form and Function in a Legal System: A General Study.* Cambridge University Press. https://doi.org/10.1017/cbo9780511511066

Sykes, A. O. (2007). Strict Liability versus Negligence in *Indiana Harbor. The University of Chicago Law Review*, 74, 1911–1931. Online: https://tinyurl.com/664w68t9

Thagard, P. R. (1978). The Best Explanation: Criteria for Theory Choice. *The Journal of Philosophy*, 75(2), 76–92. https://doi.org/10.2307/2025686

Zerbe, R. O. (2014). *Economic Efficiency in Law and Economics*. Edward Elgar. https://doi.org/10.4337/9781843761488

Zywicki, T. J., & Sanders, A. B. (2008). Poser, Hayek, and the Economic Analysis of Law. *Iowa Law Review*, 93(2), 559–603. Online: https://tinyurl.com/52yuya4h