NOTES

AN ECONOMIC ANALYSIS OF TORT DAMAGES FOR WRONGFUL DEATH

In the last two decades, proponents of an economic approach to law have had a significant impact on the thinking of legal scholars. This economic approach has been particularly influential in the area of tort law,\(^1\) where its proponents have sparked debates over both the positive claim that tort law is efficient\(^2\) and the normative claim that tort law should be efficient.\(^3\) Although there is a large volume of literature discussing the theoretical validity of both the positive and normative efficiency claims, few authors have examined specific areas of tort law to determine whether these claims are being, or can be, met.\(^4\) Instead, most law and economics scholars have focused on whether, and if so which, liability rules\(^5\) are efficient.\(^6\) This emphasis on liability rules, however, has re-


\(^3\) See Coleman, Efficiency, Utility, and Wealth Maximization, 8 Hofstra L. Rev. 509 (1980) (criticizing the claim that the law should be efficient); Dworkin, Is Wealth a Value?, 9 J. Legal Stud. 191 (1980) (criticizing the claim that legal rules should maximize wealth); Kronman, Wealth Maximization as a Normative Principle, 9 J. Legal Stud. 227 (1980) (same); Posner, The Value of Wealth: A Comment on Dworkin and Kronman, 9 J. Legal Stud. 243 (1980) (supporting the claim that the law should maximize wealth); see generally Efficiency as a Legal Concern, 8 Hofstra L. Rev. 485 (1980).

\(^4\) But cf. Cooter & Kornhauser, supra note 2, at 145-50 (deriving a set of necessary conditions which must inform the common law process if that process is to be efficient); Rizzo, The Mirage of Efficiency, 8 Hofstra L. Rev. 641 (1980) (discussing the enormous informational requirements needed to make the law efficient).

\(^5\) This Note uses the term “liability rules” to describe rules that govern whether the defendant must compensate the plaintiff for the damage the defendant caused. Examples of liability rules are: negligence, contributory negligence, comparative negligence and strict liability. These rules should be distinguished from “damage rules,” which determine what amount the defendant must pay the plaintiff if the defendant is found liable.

\(^6\) See, e.g., R. Epstein, supra note 1, at 5-68, 133-35; Calabresi & Hirschoff, Toward a Test
sulted in neglect of the fundamental question whether the underlying damage rules are, or can be made, efficient—a neglect that should be remedied since efficient tort damage rules are a prerequisite for the efficiency of tort liability rules.7

This Note begins to fill this gap in the law and economics literature by examining the damage rules governing recovery for wrongful death.8 The Note demonstrates that the positive claim that liability rules for wrongful death are efficient is incorrect because current wrongful death damage rules, which base recovery for wrongful death on the future income of the victim,9 are not efficient. In addition, this Note shows that tort law in this area cannot be made efficient because it is not possible to design efficient damage rules to govern recovery for loss of life. Thus, the normative claim that personal injury law10 should be efficient is significantly undermined since it is not sensible to argue that wrongful death liability rules should be efficient when wrongful death damage rules and, therefore, liability rules cannot be efficient.

Section I summarizes the current law on recovery for wrongful death and presents the basic requirements which these damage rules for Strict Liability in Torts, 81 Yale L.J. 1055 (1972); Shavell, Strict Liability Versus Negligence, 9 J. Legal Stud. 1 (1980); see also Rizzo, Law Amid Flux: The Economics of Negligence and Strict Liability in Tort, 9 J. Legal Stud. 291 (1980).

7 See notes 14-20 and accompanying text infra.

Posner has suggested that certain current tort damage laws are not efficient—for example, the current law governing recovery for wrongful death—but he has not addressed how this conclusion affects his positive and normative economic theories of the law. See R. Posner, supra note 1, § 6.14. Similarly, although other authors have suggested that the current law governing recovery for personal injury and death is not efficient, see, e.g., Komesar, Toward a General Theory of Personal Injury Loss, 3 J. Legal Stud. 457 (1974), they also have not considered how this conclusion affects the positive and the normative claims of law and economics scholars.


8 In this Note, the term “wrongful death” is used to refer to all actions to recover damages for tortiously inflicted death, whether the action is under a wrongful death act or a survival act. See text accompanying notes 22-29 infra for a discussion of the distinction between wrongful death acts and survival acts.


10 Throughout this Note the term “personal injury law” refers only to liability rules and excludes worker compensation rules.
must satisfy if they are to be efficient. Section II analyzes the current rule under the Pareto efficiency criterion. It finds that the current rule is not efficient under this criterion and, furthermore, that a Pareto efficient damage rule for wrongful death cannot be devised. Section III considers whether the current rule is efficient under the principal alternative efficiency criterion, the Kaldor-Hicks criterion. This section demonstrates that the current rule is not Kaldor-Hicks efficient. In addition, it shows that, although it is theoretically possible to devise a Kaldor-Hicks efficient damage rule, such a rule would be impracticable because the information requirements are too great. The Note concludes that personal injury law is not, and cannot be made, efficient and suggests an alternative approach to designing optimal tort damage rules that would serve the same basic goals as efficiency.

I

THE ECONOMIC THEORY OF EFFICIENT TORT DAMAGES

Tort law imposes liability and damages on defendants in accident cases for two main reasons: to provide incentives for individuals to limit their risk-producing activities to efficient levels and to compensate those who are harmed.\textsuperscript{11} Under the economic approach to law the pursuit of these goals is inextricably linked: in order to achieve efficiency the tort system must "fully compensate"\textsuperscript{12} those who are harmed for their losses.\textsuperscript{13}

---

\textsuperscript{11} See R. Epstein, C. Gregory & H. Kalven, supra note 1, at 941-43; R. Posner, supra note 1, § 6.12; Prosser & Keeton, supra note 9, §§ 1, 4; Kuperberg & Beitz, Introduction to Part Two, in Law, Economics & Philosophy, supra note 1, at 143-44; see also Coleman, Corrective Justice and Wrongful Gain, 11 J. Legal Stud. 421, 422-28 (1982) (discussing the role of corrective justice under negligence and strict liability).

Compensation and efficiency are not the only goals of tort damage law. See, e.g., Prosser & Keeton, supra note 9, §§ 2-3 (tort law also serves the goals of retributive and distributive justice). This Note, however, is only concerned with the economic efficiency of tort liability and damage rules; therefore, those other goals are not considered.

\textsuperscript{12} For an explanation of the economic concept of full compensation, see text accompanying notes 33-39 infra.


The fact that tort damage rules for wrongful death are inefficient not only renders liability rules for wrongful death inefficient but, unless activities that impose a risk of death are distinct from those that impose a risk of injury, renders inefficient liability rules for all personal injuries. This is because potential tortfeasors will include the expected liability for killing someone in their calculations of their expected losses from imposing a particular risk of injury on others. Consequently, inefficient damage rules for wrongful death will induce potential tortfeasors to impose inefficient levels of risk of injury, as well as inefficient levels of risk of death. This result holds even if damage rules for nonfatal injuries are efficient.
A. Requisites of Efficient Tort Damage Rules

Under economic theory, tort liability and damage rules are efficient when they provide incentives for individuals to take the level of care that leads to an efficient level of accidents. The latter is not zero. Rather, the efficient level is the level at which the marginal cost of additional accident reduction activities equals the marginal benefit of those activities—where the marginal benefit is the reduction in accident costs resulting from the last unit of care taken.

To achieve this goal of efficiency, the tort system must make individuals responsible for the accident costs they unilaterally impose on others; thus, damage rules must require that liable defendants pay the full costs of their accidents. If the prevailing damage rule does not require tortfeasors to pay for all of the costs they impose on others, potential tortfeasors will not take sufficient care; from society's perspective there will be too many accidents since at the resulting level of accidents the benefit to society from additional expenditures on accident reduction

14 Throughout this Note, the term "individuals" includes firms as well as natural persons.
16 More precisely, the marginal cost of the activities should equal, or just exceed, the marginal benefit of those activities. Kornhauser, supra note 13, at 1035.
17 Id. at 1034-35.
18 This result is simply one application of the standard economic solution to the problem of external costs that individuals impose on others but do not bear themselves, e.g., pollution. For a general discussion of the economic approach to externalities, see, e.g., R. Musgrave & P. Musgrave, Public Finance in Theory and Practise 71-73 (4th ed. 1984); R. Tresch, Public Finance: A Normative Theory 90-153 (1981). This approach presumes, however, that individuals have some control over the frequency and severity of accidents. See Kornhauser, supra note 13, at 1034.
19 See R. Epstein, C. Gregory & H. Kalven, supra note 1, at 743; R. Posner, supra note 1, § 6.12.

Efficiency theory assumes that individuals will respond to a given legal rule so as to maximize their own utility, and in particular, that they will act in their own immutable self-interest. The theory excludes the possibility that legal rules have an educational or moral influence on individuals. Kornhauser, L'Analyse Economique du Droit, 118-19 La Revue de Syntheses 313, 314 (1985). For a discussion of the behavioral assumption that individuals seek to maximize their utility, see Kelman, Choice and Utility, 1979 Wis. L. Rev. 769; Kelman, Misunderstanding Social Life: A Critique of the Core Premises of "Law and Economics," 33 J. Legal Ed. 274, 275, 277-78 (1983); Kornhauser, The Great Image of Authority, 36 Stan. L. Rev. 349 (1984). In addition, it can be argued that traditional utility maximization models do not reflect gender differences. Cf. C. Gilligan, In a Different Voice: Psychological Theory and Women's Development 62-63 (1982) (suggesting that women do not share men's individualistic orientation).
will exceed the additional cost. If, on the other hand, damages are higher than the amount necessary to compensate victims fully, potential tortfeasors will engage in too much accident prevention and some "economic" accidents will be deterred.\(^\text{20}\)

Damage rules, therefore, are not efficient unless, at a minimum, they require tortfeasors to fully compensate each victim for the costs imposed on her. In addition, efficient damage rules also should require tortfeasors to compensate third parties for any losses they incurred as a result of the victim's death. This Note will not consider whether current damage rules adequately compensate third parties, however. Instead, for the sake of analytical simplicity, this Note will only consider whether the current damage rules fully compensate victims for their losses, and whether damage rules that fully compensate victims for their losses can be devised.\(^\text{21}\)

**B. Current Laws Governing Recovery for Wrongful Death**

Damages for wrongful death are governed by two types of statutes: wrongful death acts and survival acts. Every state has some form of wrongful death act.\(^\text{22}\) These acts generally base recovery on the loss in-

---


These results are based on the standard law and economics model of tort law which presumes that it is theoretically possible to devise efficient liability rules, so long as damage rules also are efficient. This result, however, is not uncontroversial. When this model is expanded to admit the possibility of various real world complications, there are circumstances under which no liability rule is truly efficient.

For example, efficient liability and damage rules will not result in efficient accident deterrence if the tort law excludes low probability accidents from the scope of liability through mechanisms such as proximate cause. In order to achieve efficiency, potential tortfeasors must expect to pay for all the harm they cause. See Shavell, An Analysis of Causation and the Scope of Liability in the Law of Torts, 9 J. Legal Stud. 463, 476-77, 482, 486 (1980) (arguing that injurers should be liable for accidents that they caused by not taking care). Furthermore, once litigation costs are introduced, efficient liability and damage rules will not produce an efficient level of accidents because not all potential plaintiffs will be able to sue. As a result, potential tortfeasors' expected damage payments will be less than total expected costs. See Ordover, Costly Litigation in a Model of Single Activity Accidents, 7 J. Legal Stud. 243, 244-46 (1978). Finally, if the due care standard is based on tortfeasors' and victims' levels of care, not on how often they engage in a particular activity, and the frequency with which individuals engage in the activity affects expected accident costs, then a liability system that will lead to efficient deterrence by both potential victims and potential tortfeasors generally cannot be devised. Shavell, supra note 6, at 2-3, 6-8.

\(^{21}\) This simplification does not alter the conclusions of this Note that current damage rules undervalue human life and that an efficient damage rule cannot be designed. In fact, these conclusions would be strengthened by the inclusion of third parties' losses since the total compensation would then rise above the enormous sum necessary to compensate a victim for the loss of her life. See text accompanying notes 64-66 infra. Moreover, courts would be required to perform the virtually impossible task of determining the value that numerous third parties placed on a victim's life. See text accompanying notes 91-95 infra (discussing the insurmountable difficulties which a court would face in trying to calculate the optimal recovery amount under the Kaldor-Hicks criterion).

\(^{22}\) Prosser & Keeton, supra note 9, § 127, at 945.
curred by the victim’s relatives (or “survivors”). Survivors usually are compensated under these statutes for the loss of the economic benefit they would have received from the victim had she not been killed; this amount is the present value of the victim’s expected earnings net of her expected living expenses. Survivors also may be able to recover for loss of consortium and for other intangible injuries, such as their grief and mental suffering.

A number of states that have wrongful death acts also have survival acts. These acts transfer to the victim’s estate the causes of action that the victim possessed at the time of her death. Damages generally include recovery for pain and suffering, medical costs, and lost wages up until the time of death. Where both types of acts are available, survivors still recover for the present value of the victim’s net expected income; the victim’s estate generally recovers for the victim’s pain and suffering, medical costs, and lost wages up to the moment of death.

Not all the components of recovery available under these acts are relevant to the issue of whether the current damage rules fully compensate the victim for the actual harm imposed on her. Most elements relate instead to the type of harm imposed or to the cost to individuals other than the victim of that harm. In fact, the only component of recovery which properly can be viewed as the victim’s recovery for the cost to her of her death is the component based on the present value of her expected future net income. The recovery for the victim’s medical costs and for pain and suffering should not be included because these damages compensate the victim for the manner of her death, not for the event itself. Similarly, components of recovery that are based on third parties’ losses, such as loss of consortium, should not be included because the size of this recovery is not relevant to the issue of whether the victim herself is adequately compensated for her losses. Therefore, the question addressed in this Note—whether the current rules satisfy the necessary condition for efficiency by fully compensating the victim for her life—turns on

---

23 Id. at 949-50.
24 Id. § 127, at 949; see R. Posner, supra note 1, § 6.14.
25 Prosser & Keeton, supra note 9, § 127, at 949-52.
26 Id. §127, at 950.
27 Id. §126, at 943.
28 Id. §127, at 950.
29 Id.
30 In other words, these components compensate an individual for the costs the tortfeasor imposed on her over and above the costs associated with instantaneously shortening her life span—for example, the additional costs associated with dying slowly in a hospital or dying in a particularly painful manner.
31 See note 21 and accompanying text supra.
whether the present value of the victim's expected future net income\textsuperscript{32} equals the full compensation value of her life.

C. Methods for Determining the Full Compensation Value of Life

In economic theory there are two ways of valuing the costs that tortfeasors impose on victims for purposes of determining the proper full compensation value of any harm. The first is the ex post valuation method. Under this method, the cost of a tortfeasor's risk-producing activity is determined after the harm has occurred. In the case of wrongful death, this means that the cost is based on the value to the victim of her life. The second method is the ex ante valuation method. Under this method, the cost of a tortfeasor's activity is measured by the cost of the additional risk of harm she imposes on others; the cost of the harms that may actually occur ex post is not included.\textsuperscript{33}

The issue of whether to use an ex post or an ex ante valuation method is affected by which efficiency criterion is employed. The traditional economic efficiency criterion is the Pareto criterion. Under the Pareto criterion, a damage rule is efficient if it requires a tortfeasor to make her victim as well off after the accident as she was before the accident.\textsuperscript{34} Under this criterion, the amount of recovery must equal the value that the individual who suffered the loss would place on the injured item.\textsuperscript{35} Given that the tort system recognizes causes of action for actual physical harm done, but not for the risk thereof,\textsuperscript{36} the recovery amount under Pareto efficient damage rules must be based on the ex post value of the loss because it is the receipt of this amount which, by definition, returns the victim to her preaccident level of utility. Thus, in the case of

\textsuperscript{32} Throughout this Note the term "expected future net income" refers to the victim's expected future earnings net of her expected living expenses.


\textsuperscript{34} For a general discussion of the Pareto criterion, see R. Musgrave & P. Musgrave, supra note 18, at 55-56; R. Tresch, supra note 18, at 20-21, 29-37; H. Varian, Microeconomic Analysis 145-55 (1978); see also Dworkin, supra note 3, at 193-94 (contrasting the Pareto criterion to the theory of wealth maximization).


\textsuperscript{35} Calabresi & Melamed, Property Rules, Liability Rules, and Inalienability: One View of the Cathedral, 85 Harv. L. Rev. 1089, 1094 n.10 (1972).

\textsuperscript{36} Prosser & Keeton, supra note 9, § 30, at 165.
accidents involving loss of life, damages must be based on the value that the victim would place on her own life—not simply on the value the victim would place on the risk the tortfeasor imposed on her. The principle alternative to the Pareto criterion is the Kaldor-Hicks criterion. Under the Kaldor-Hicks criterion, a rule is efficient if a tortfeasor could potentially compensate others for the costs she imposes on them. A damage rule is Kaldor-Hicks efficient when a potential tortfeasor’s expected damage payments for all the accidents she expects to cause by engaging in a particular activity equal the total costs she imposes on others. Since under the Kaldor-Hicks criterion it is not necessary to compensate the victims for their actual costs, the value of these costs can be determined ex ante, based on the cost of the risk of harm, as well as ex post. Efficient damages, therefore, could be based on the pre-accident valuation of the increase in risk caused by the tortfeasor’s activity, instead of on the physical loss suffered by the actual victim.

Thus, in order to determine the validity of the positive claim that accident law is efficient, it is necessary to determine whether the tort damage value of life under the current rules—the present value of the victim’s future net income—equals the tort damage value of life under either the ex post rules of the Pareto criterion or the ex ante rules of the Kaldor-Hicks criterion. To determine the merits of the normative claim that accident law should be efficient, it is necessary to determine whether it is possible to design efficient damage rules under either efficiency criterion. These issues are addressed in the next two sections.

37 Ex ante damage rules could be employed under the Pareto criterion if the tort system recognized a cause of action for unreasonable risk imposition. The problems associated with recognizing such a cause of action make it an unworkable option. See Friedman, supra note 33, at 83. It would be difficult to determine, for example, whether the defendant had imposed an unreasonable risk where no physical harm has occurred. Even if a court were to find that the risk was unreasonable, it would be difficult to determine the magnitude of this additional risk. Id.

38 See Knetsch, Legal Rules and the Basis for Evaluating Economic Losses, 4 Int’l Rev. L. Econ. 5, 5, 12 n.1 (1984). For a general discussion of the Kaldor-Hicks criterion (also called the potential Pareto and the compensation criterion), see M. Jones-Lee, The Value of Life: An Economic Analysis, 3-4 (1976); Mishan, supra note 33, at 691-93; H. Varian, supra note 34, at 215-23. For criticisms of the Kaldor-Hicks criterion, see note 70 and cited authorities infra.

39 Under Kaldor-Hicks, damages could be based on ex post values. This possibility is not analyzed in this Note, however, because Kaldor-Hicks ex post rules would be identical to the Pareto efficient ex post rules discussed in notes 48-68 and accompanying text infra. Ex post rules are discussed under the Pareto criterion because it does not share all the problems of the Kaldor-Hicks criterion. See note 70 infra.
Under the Pareto criterion, a rule is efficient if it induces people to behave in such a way that no one is made worse off and at least one person is made better off. In the tort context, a damage rule is Pareto efficient if it sets recovery at the amount that would return the victim to her pre-accident level of utility, thereby fully compensating her for her loss. This amount is the value of the good that the tortfeasor destroyed; it is the ex post value of the harm.

In the case of goods for which a well-defined market exists, for example cars, a tort damage rule governing recovery for the loss of that good is Pareto efficient if recovery is set at the market price of the good. This recovery amount enables the victim to repurchase the good, thereby returning herself to her pre-accident utility level. In wrongful death actions, however, there is no actual market price on which to base recovery. In circumstances where no market for the good in question exists economists employ the hypothetical market price method to determine the full compensation value of the good.

Under the hypothetical market price method, the value of a good is the price the individual herself would place on the good if she could trade
The use of the individual's subjective valuation of the good is not merely a matter of expediency. For assuming that individuals know what is in their best interests, it is possible to return a victim to her pre-accident level of utility only if the amount of compensation equals the value that the victim herself would place on her loss. Consequently, when the good destroyed is life, the Pareto efficient full compensation tort damage amount is the minimum pecuniary amount that an individual victim would consider sufficient to place her at her pre-accident level of utility. Damage rules that are set at this value are efficient because they induce potential tortfeasors to avoid activities from which the expected gains are less than the expected costs—in this case, the loss of victims' lives.

A. The Ex Post Tort Damage Price of Life

In order to determine whether the current damage rule is Pareto efficient and, if not, whether a Pareto efficient rule can be devised, it is necessary to decide what is the proper ex post full compensation value to the victim of her life. Under economic theory there are two methods for determining the ex post full compensation value of a good. The first

44 The use of this method presupposes that it is proper to think in terms of hypothetical markets in lives. Sagoff argues that it is improper to think in these terms because he claims that, before one can ask if individuals would consent to a particular trade, one must determine whether individuals would consent to there being a market in the good in the first place. Sagoff argues that American society explicitly prohibits markets in human life and thus societal decisions should not be based on an implicit market in life. Sagoff, On Markets for Risk, 41 Md. L. Rev. 755, 765-66 (1982). Sagoff's argument is not fatal to the use of the hypothetical market method, however, because to consent to the use of hypothetical markets is not to consent to there being an actual market in lives.

A more serious criticism of the hypothetical market is that it ignores the impact that interactions between markets will have on the value of the good in any given market (it is a partial, not a general, equilibrium approach). Thus the derived price is not unequivocally the efficient price. See Arthur, The Economics of Risks to Life, 71 Am. Econ. Rev. 54, 54, 62 (1981); see also Rizzo, supra note 4 (discussing the problems for the law and economics school of employing partial equilibrium models). The general equilibrium solutions to real world valuation problems are intractable, however, and are not attempted in this Note.

45 Under the Pareto criterion (and the Kaldor-Hicks criterion) it is assumed that individuals know what is in their best interest. Calabresi & Malamed, supra note 35, at 1094 n.10, 1113; see R. Tresp, supra note 18, at 5-6; see also Broome, Trying to Value a Life, 9 J. Pub. Econ. 91, 94-95 (1978) (arguing that when probabilities of death are involved people can never know accurately what is in their best interests); Mishan, supra note 33, at 695 (arguing that it is proper to use individuals' subjective valuations of changes in risk); Mishan, The Value of Trying to Value a Life, 15 J. Pub. Econ. 133, 134-35 (1981) (responding to Broome).

46 See Kornhauser, supra note 13, at 1032-33.

47 See text accompanying notes 14-21 supra.

48 See text accompanying notes 34-37 supra.

49 See Knetsch, supra note 38, at 5-6.

Additional methods for determining the value of life are employed in cost-benefit analyses of government policies. For example, there is the "human capital," or "earnings-based," ap-
method, the ex post willingness-to-pay method,\textsuperscript{50} sets the value of a life at the amount an individual would be willing to pay to purchase her life, thereby avoiding immediate death.\textsuperscript{51} It is reasonable to assume that an individual would be willing to pay all that she is able to pay to purchase her life.\textsuperscript{52} This amount is the present value of her expected income stream, plus any assets she currently owns. Notice that the current damage rules are consistent with the willingness-to-pay measure in that under both rules recovery varies with the victim's income. Recovery under current damage rules, however, is less than recovery would be under willingness-to-pay because it is net of the victim's expected living expenses and it does not include the value of nonincome components of the victim's expected wealth.

The second method for determining the Pareto efficient value of life is the ex post compensation demand method.\textsuperscript{53} Under this method, the approach which places the value of life at the present value of the individual's expected contribution to the national product, i.e., the present value of her expected future income. See M. Bailey, Reducing Risks to Life: Measurement of the Benefits 28-29 (1980); M. Jones-Lee, supra note 38, at 1-2; Linnerooth, The Value of Human Life: A Review of the Models, 17 Econ. Inquiry 52, 52-53 (1979); Mishan, supra note 33, at 687-88. A second approach, a variant of the first, limits the value of a person's life to her economic contribution to others, or her "net output." M. Bailey, supra, at 29; Mishan, supra note 33, at 688-89. The value of life is measured by subtracting the individual's expected lifetime consumption from her expected future earnings. Both these measures approximate, or are equivalent to, the current tort damage value of life. They are not examined in this Note, however, because they do not determine the value of the harm based upon the victim's subjective valuation of the harm, as is required by the Pareto (and Kaldor-Hicks) criteria. See notes 44-47 and accompanying text supra. Also, these measures have been criticized because they set the value of the life of an unemployed person who is not expected to become employed at zero, thus denying that individuals' lives have any intrinsic worth. See, e.g., M. Bailey, supra, at 29.

\textsuperscript{50} There is a second willingness-to-pay measure which could be used to value life—the ex ante willingness-to-pay measure. This method, however, is not based on the harm for which the victim is seeking to recover in a tort action (i.e., physical harm), and therefore it cannot be used as the basis of a Pareto efficient tort damage rule. See text accompanying notes 34-37 supra. But cf. note 56 infra (discussing a Pareto efficient quasi-ex ante damage rule).

\textsuperscript{51} See M. Bailey, supra note 49, at 30-35; see generally Knetsch, supra note 38, at 5. For a general discussion of this measure, which is also called equivalent variation, see A. Deaton & J. Muellbauer, Economics and Consumer Behavior, 184-88 (1980); J. Henderson & R. Quandt, Microeconomic Theory: A Mathematical Approach 49-52 (3d ed. 1980).

\textsuperscript{52} There may be people who would not be willing to pay this much. See note 54 infra (discussing why some people's lives might have lower values than others). For purposes of this Note, however, these complications are ignored, and it is assumed that individuals would expend their full resources to avoid immediate death. Incorporating these additional concerns would complicate the analysis but would not affect the conclusions of the Note. See id.

\textsuperscript{53} As in the case of the willingness-to-pay measure, there is a second compensation demand value of life, the ex ante compensation demand value. For the same reason discussed in note 50 supra, this measure also is inconsistent with the Pareto criterion in the tort damage context. But cf. note 56 infra (discussing a Pareto efficient quasi-ex ante damage rule). For a general discussion of compensation demand, which is also called compensating variation, see A. Deaton & J. Muellbauer, supra note 51, at 184-88; J. Henderson & R. Quandt, supra note 51, at 49-52; M. Jones-Lee, supra note 38, at 6-13; H. Varian, supra note 34, at 207-15.
value of a human life is set at the amount an individual would require to sell her life, assuming that the compensation would be paid immediately after the sale. In general, it is assumed that the ex post compensation demand value of life is infinite.\textsuperscript{54} This is not because the intrinsic value of human life is infinite. Rather, it is because, under the current tort system, a cause of action in wrongful death arises only after an individual is killed. Therefore, the full compensation cost of the accident must be determined by hypothetically asking the victim, at the moment her cause of action arises, how much she would need to return her to her pre-accident level of utility. Since the money will not be paid until after she has “sold” her life and has entered a state of being where money has no value to her,\textsuperscript{55} the amount of money needed to make her as well off dead as she was alive is infinite.\textsuperscript{56}

\textsuperscript{54} See R. Posner, supra note 1, § 6.14; Buchanan & Faith, Trying Again to Value a Life, 12 J. Pub. Econ. 245, 245-46 (1979); Mishan, supra note 33, at 693.

The ex post compensation demand value of life is not infinite for everyone. For example, the ex post compensation demand value of life may not be infinite for an individual who is poor and who needs money in order to purchase health care that will save the life of a loved one. Mishan, supra note 33, at 693 n.12. Another complication arises once it is recognized that people who generally would place an infinite selling price on their lives might value their lives differently if their circumstances change—for instance, if a loved one dies. Cf. W. Shakespeare, The Tragedy of Romeo and Juliet, act V, scene iii, lines 119-20 (Romeo, mistaking the sedated Juliet for dead, fatally poisons himself; Juliet, upon awakening and finding her lover's lifeless body, also commits suicide). However, even for these “desperate” individuals, the compensation demand value of their lives will exceed the willingness-to-pay value and, generally will exceed the present value of their expected net income stream. Therefore, the existence of such people does not affect the conclusions of this Note.

\textsuperscript{55} This is an example of a state-dependent utility function because the event in question alters the structure of the individual's entire utility function. The presence of state-dependent utility functions has interesting implications for calculating the full compensation value of the losses in nonfatal accidents, e.g., blindness. These accidents not only decrease victims' earning capacities, but also alter the structure of the victims' utility functions, since certain goods a victim owns now will be worthless (e.g., books) and other goods she never desired may become very valuable (e.g., a seeing eye dog). For a discussion of this point, see Friedman, supra note 33, 82-83 (1982); see also note 67 infra.

\textsuperscript{56} R. Posner, supra note 1, § 6.14; Broome, supra note 45, at 92; Buchanan & Faith, supra note 54, at 245-46; Friedman, supra note 33, at 81-82; Mishan, supra note 33, at 693.

It is important to note that if one allows for the presence of bequests it might be possible to design a quasi-ex ante compensation demand or willingness-to-pay measure that is consistent with Pareto efficiency. For example, under a quasi-ex ante compensation demand measure, recovery would be set at the amount necessary to make the potential victim as well off after the additional risk of death is imposed on her as she was before the risk was imposed. Recovery under this rule would be set at the amount of money which it would be necessary to pay the potential victim's survivors, after her death, in order to compensate the potential victim ex ante for an increased risk of dying. Fraser, What is 'Fair Compensation' for Death or Injury? 4 Int'l Rev. L. & Econ. 83, 85 (1984). Where the individual derives positive utility from the money that would be paid to her survivors if she is killed, this rule will not result in infinite damage payments. Recovery, however, would be enormous, and certainly would exceed the present value of the individual's future income, since the potential victim will need to weigh the utility that the compensation will give her survivors against the disutility that her
Economists use both the willingness-to-pay and the compensation demand methods to value life in the context of cost-benefit analysis;\(^{57}\) however, the issue of which rule should be applied to determine the tort damage value of a life has not been explicitly analyzed. Under both the compensation demand and the willingness-to-pay measures the value of life is set at the price which maximizes the individual's utility given her budget constraint, i.e., given her wealth. Under the willingness-to-pay rule, however, the value of an individual's life is set at the price she would be willing to pay to purchase her life, given her budget constraint. In determining this "purchase price" the individual's life is not included in her budget constraint. Thus, the value she places on her life is limited by her financial resources. Under the compensation demand rule, on the other hand, the price determined is the "sale price." This is set at the amount the individual would demand as compensation for her death. Here the individual's life is included in her budget constraint and thus she is not limited in her valuation of her life by the finiteness of her financial resources.\(^{58}\)

The only difference between these two measures lies, therefore, in death will cause both her and all her loved ones (not just those who would receive compensation under the law). Furthermore, the ex ante measure would not solve the problems which arise when the tortfeasor's expected damage payments for tortiously killing someone are infinite because damages still will be infinite under this rule for those who derive no positive utility while alive from knowing that others will receive money. This method, therefore, is not analyzed in this Note because it would not solve the problem of infinite damage payments associated with the use of the ex post compensation award measure. See text accompanying notes 66-68 infra. Furthermore, it would be subject to even more severe calculation problems than the standard ex ante compensation demand measure discussed in Section III infra. See text accompanying notes 91-95 infra.

\(^{57}\) See authorities cited in note 49 supra.

\(^{58}\) See generally R. Tresch, supra note 18, at 64-69 (discussing these two measures).

Economists generally assume that the compensation demand value and the willingness-to-pay value of a good are the same. Knetsch, supra note 38, at 62; cf. Coase, The Problem of Social Cost, 3 J. Law & Econ. 1 (1960) (utilizing this assumption in deriving the Coase Theorem). This conclusion is based on the assumption that whether or not the individual owns the good in question does not significantly affect her wealth. Therefore, her budget constraint is essentially the same under either measure and the only practical consequence of choosing between the only two measures vanishes. Knetsch, supra note 38, at 6.

Although there may be goods for which this assumption holds, e.g., a toothbrush, in the case of an individual's life her budget constraint will be affected dramatically by whether or not she owns the good, and the measures will diverge substantially. For a discussion of the differences between these two measures, see generally E. Mishan, Cost Benefit Analysis 169-76 (3rd ed. 1982); Knetsch, supra note 38; cf. Dworkin, supra note 3, at 192 (arguing that there is a difference between the amount people will pay to acquire an item and the amount they would demand in return for relinquishing it).

Not all economists agree that wealth effects are the only reason why the two measures diverge. On the basis of several empirical studies, Knetsch argues that compensation demand measures are generally higher than willingness-to-pay measures because people require a higher amount to compensate them for a decrease in entitlements or goods than they would be willing to pay to preserve the status quo. Knetsch illustrates this point by noting that the
where they place the entitlement to the victim's life. Under compensation demand it is assumed that the individual holds the entitlement to her life since the price is set according to what an injurer must pay to destroy it. Under willingness-to-pay, on the other hand, it is assumed that the entitlement to the individual's life is vested elsewhere since the price is set according to what the victim would pay to preserve it. Thus, the question of which method should be used reduces to whether or not tort damage rules should be based on the assumption that the individual holds the entitlement to her life. To answer this question, it is first necessary to analyze the nature of liability rules.

Liability and damage rules protect entitlements by allowing a party to remove an entitlement from its holder only if she is willing to pay an objectively determined price for it—the price determined under the applicable tort damage rules. Under these rules it is axiomatic that the victim must own the entitlement before the defendant can be liable for having injured it. Since damage rules are not triggered unless the court found the defendant liable, damage rules must be based on the same assignment of entitlements that led to a finding of liability—a consistency

aggravation one experiences after losing a sum of money appears to be greater than the pleasures associated with gaining the same amount. Knetsch, supra note 38, at 6-8.

Calabresi & Melamed, supra note 35, at 1092. The state also protects entitlements through inalienability rules and property rules. Id. Inalienability rules, such as laws against selling oneself into slavery, prevent a willing buyer and a willing seller from transferring the entitlement. Id. Property rules require someone who wishes to remove an entitlement from its holder to buy it in a voluntary transaction in which the holder agrees to the sale price. Here, the individual, not the state, determines the value of the entitlement. Id.

Liability rules differ from property rules, in part, because they do not require the holder to consent to the taking. According to Calabresi and Melamed, the primary reason society employs liability rules instead of property rules is to promote transfers of entitlements for which the transaction costs associated with trading or valuing the entitlements are too high; eminent domain and negligence (accidents) are examples of transaction cost motivated liability rules. In these circumstances, liability rules facilitate socially beneficial transfers of the entitlements by providing a collective determination of value. Id. at 1106-10. Note that in order for liability rules to be Pareto efficient this objectively determined price (i.e., the recovery amount) must equal the Pareto efficient "full compensation" value of the entitlement. See text accompanying notes 14-21, supra.

60 See Calabresi & Melamed, supra note 35, at 1089-93; see also Prosser & Keeton, supra note 9, § 30, at 165 (one of the four elements of a negligence cause of action is actual damage to the interests of another).

Calabresi and Melamed distinguish between two types of liability rule protected entitlements, focusing on the special case where one individual is a polluter and her neighbor is not. Under the first, which is the standard liability rule, neighbor A may pollute but must compensate neighbor B for damages caused. Under the second, the right to pollute is protected by a liability rule such that neighbor A may pollute unless neighbor B pays her not to pollute. Calabresi & Melamed, supra note 35, at 1115-16. The former type of liability rule protected entitlement describes the law on wrongful death and thus is the only type addressed in this Note. However, in both situations it is the individual who does not possess the liability rule protected entitlement who must pay the compensation.

that is necessary if liability rules are to protect efficiently the entitlements they were designed to protect.\(^6^2\) Thus, in order for wrongful death damage rules to be Pareto efficient, they must be based on the ex post compensation demand, as opposed to the willingness-to-pay (either ex post or ex ante) value of life because only the former is consistent with the assumption that the victim possessed the entitlement to her life.\(^6^3\)

**B. The Positive and Normative Claims Considered**

Although damage rules must be based on the ex post compensation demand measure if they are to be Pareto efficient, the efficient damages per victim under this rule are infinite.\(^6^4\) This result has two implications for the claims made by proponents of the economic approach to law. First, it shows that the positive claim that tort rules governing fatal accidents are Pareto efficient is incorrect because the current damage rules base recovery on the victim’s expected future net income—an amount well below infinity. The current rules, therefore, should be changed; they are not Pareto efficient, and they are less desirable than many alternative inefficient rules since they provide incentives for potential tortfeasors to impose more risk of death on low-income people than on high-income people.\(^6^5\)

Second, this result undermines the normative claim that accident

---

\(^6^2\) To base the value of an entitlement on the willingness-to-pay measure when it should be based on the compensation demand measure is to undervalue an entitlement and thus insufficiently to deter risky activities. See text accompanying notes 14-21 supra; accord R. Posner, supra note 1, § 6.12.

\(^6^3\) Cf. Knetsch, supra note 38, at 11 (agreeing that damages for engaging in a prohibited activity should be based on compensation demand, but arguing that the harm should be valued based on the change in the individual’s expectations, as opposed to changes in the value of the actual good); Mishan, supra note 33, at 691-93, 703-04 (the compensation demand measure should be used in the context of cost-benefit analysis of government projects). This discussion can also be used to show that the compensation demand measure should be used to determine the tort damage value not only of life, but of any good for which no actual market exists.

\(^6^4\) See text accompanying notes 53-56 supra. But cf. note 54 supra.

\(^6^5\) Under the current rule it is cheaper for the tortfeasor to kill low-income people because damages will be lower. See Abel, supra note 15, at 716-17.
law should be Pareto efficient. Since damages cannot be set at the Pareto efficient amount of infinity, liability rules cannot be made Pareto efficient. Furthermore, it is doubtful that society should even attempt to make wrongful death damage rules Pareto efficient. Infinite damages awards imply that the efficient rate of accidental deaths is zero. This would, in essence, transform the liability rule protecting the entitlement into an inalienability rule. Such a rule, however, would cause individuals to refrain from engaging in many beneficial activities since the slightest risk of causing the tortious death of another would raise the spectre of bankruptcy. Thus, the Pareto efficient near-zero rate of accidental deaths would be bought at the price of a near-zero level of many beneficial activities. This is not a desirable result; the normative claim that personal injury law should be Pareto efficient is invalid.

III

ECONOMIC ANALYSIS OF THE TORT DAMAGE VALUE OF LIFE UNDER THE KALDOR-HICKS CRITERION

The previous Section has shown that when the Pareto criterion is used as the standard of efficiency the current tort damage rule will not be efficient, and cannot be revised so that it will be efficient. The Pareto criterion is not the only efficiency criterion, however. In fact, most proponents of the economic approach to law employ the Kaldor-Hicks crite-

66 It might seem possible to obtain a finite ex post compensation demand value of life by taking the amount a particular individual would require to compensate her for a one percent probability of dying and multiplying this amount by 100 to obtain the value she would place on a 100 percent probability of dying. See Friedman, supra note 33, at 85 (suggesting this amount as an acceptable measure of full compensation damages for death). This procedure is invalid, however, if—as economists generally assume—the relationship between the compensation required and the probability of death is nonlinear. See Linnerooth, supra note 49, at 55, 57-58. In other words, if it is reasonable to assume that an individual would require more to compensate her for raising the probability of her death by one percent, from 99 percent to 100 percent, than she would require to raise it from zero to one percent, then the compensation demand value of one percent probability of dying, measured at the low end of the spectrum, multiplied by 100, is not the compensation demand value of a 100 percent probability of death. See id. at 55, 57-58.

67 R. Posner, supra note 1, § 6.14; cf. Friedman, supra note 33, at 82-83. Friedman argues against full ex post compensation for serious injuries on the ground that the recovery amount must be very large to compensate an injured person for both the resulting loss of income and for the pleasures she can no longer enjoy. In order to compensate for the latter she will need to consume other pleasures to a point of near satiation—a point at which the marginal utility of each dollar is zero. Friedman concludes that although this may seem intuitively fair, it is also wasteful since full compensation involves transferring income from uninjured persons, who can receive large benefits from each additional dollar, to injured persons, who receive small benefits from each dollar. Id.

68 See Calabresi & Melamed, supra note 35, at 1092-93; see also note 59 supra (discussing inalienability rules).
rion, although many argue that use of the criterion is inappropriate in this context. The Kaldor-Hicks criterion will be examined in this Note, however, because it is the principal alternative efficiency criterion and since it permits use of ex ante methods for evaluating lives. Since ex ante values of life are finite, application of the Kaldor-Hicks criterion makes it at least theoretically possible to design efficient damage rules.

A. Efficient Ex Ante Damage Rules Defined

Under the Kaldor-Hicks criterion, as under the Pareto criterion, recovery must be set at the amount that makes tortfeasors responsible for all of the costs that they impose upon others. However, the Kaldor-Hicks criterion requires only that total damages be such that tortfeasors

---

69 See G. Calabresi & P. Bobbitt, Tragic Choices 85-86 (1978); Posner, supra note 34, 488-91; see also authorities cited in notes 2-3 supra; cf. R. Posner, supra note 1, § 1.2 (discussing the wealth maximization efficiency criterion).

It is interesting to note that although Posner claims that his wealth maximization criterion is based on the Kaldor-Hicks criterion, Posner, supra note 34, at 490-91, wealth maximization is a proxy for utility maximization only if the marginal utility of income is constant—only if an additional dollar is worth the same to a rich person as it is to a poor person. See Calabresi, About Law and Economics: A Letter to Ronald Dworkin, 8 Hofstra L. Rev. 553, 556-57 (1980). Consequently, to accept the normative claim that the law should be Kaldor-Hicks efficient is not to accept Posner's claim that legal rules should be designed to maximize wealth. For a critique of Posner's claim that the law should maximize wealth, see generally Coleman, supra note 3; Dworkin, supra note 3; Dworkin, supra note 40; Kornhauser, supra note 2.

70 For example, many argue that the use of the Kaldor-Hicks criterion to design legal rules will not necessarily improve total social utility. In fact, society may be worse off, in terms of total social utility, under Kaldor-Hicks efficient rules than under alternative "inefficient" rules. See, e.g., Coleman, supra note 3, at 519-20 & n.14, 544-45; Keenan, Value Maximization and Welfare Theory, 10 J. Legal Stud. 409, 412 (1981); cf. Kornhauser, supra note 2, at 592-97 (discussing Posner's Wealth Maximization criterion).

For a discussion of other criticisms of the Kaldor-Hicks criterion, see, e.g., H. Varian, supra note 34, at 217 (showing that use of the Kaldor-Hicks criterion can lead to contradictory results); Coleman, supra note 3, at 518-20, 534-40 (criticizing the Kaldor-Hicks criterion as a normative standard in the law); cf. Kornhauser, supra note 2, at 592-97 (presenting criticisms of the Pareto and Wealth Maximization criteria that also apply to the Kaldor-Hicks criterion).

71 The ex ante measure is the measure most economists use when doing cost-benefit analysis involving risk of death or injury. For a discussion of the merits of the use of this ex ante criterion for evaluating life in the context of cost-benefit analysis of government projects, see M. Bailey, supra note 49, at 18-19; Buchanan & Faith, supra note 54; Jones-Lee, Trying to Value a Life: Why Broome Does Not Sweep Clean, 12 J. Pub. Econ. 249 (1979); Mishan, supra note 33, at 693-94; Schelling, The Life You Save May Be Your Own, in Problems in Public Expenditure Analysis (S. Chase ed. 1968). For an introduction to the theoretical problems associated with using the ex ante methods for valuing life, see, e.g., Broome, supra note 45; Hammond, Utilitarianism, Uncertainty and Information, in Utilitarianism and Beyond 85, 97 (A. Sen & B. Williams ed. 1982) (individuals' ex ante utilities do not necessarily have utilitarian ethical significance).

72 See text accompanying notes 88-90 infra.
could potentially compensate those on whom they imposed costs.\textsuperscript{73} 

Damages need not be based on the physical harm inflicted on the actual victims. In fact, total damages can be based on the ex ante valuation of the costs of the tortfeasor's activity. This amount is the value of the total risk of death that the tortfeasor imposed upon the affected population. Under the ex ante approach, the cost of any physical harm that may result to particular victims is irrelevant.\textsuperscript{74}

Assuming potential tortfeasors will engage only in those risk-producing activities for which the expected profits exceed the expected damage payments,\textsuperscript{75} Kaldor-Hicks ex ante damage rules are efficient in that they induce potential tortfeasors to impose risk of death on others only when the gain from imposing the risk\textsuperscript{76} outweighs the cost to those on whom the risk was imposed.\textsuperscript{77} Ex ante damage measures do not ensure, however, that the gain from the activity outweighs the cost of the actual accidents that may occur as a result of the activity.\textsuperscript{78}

In order to implement Kaldor-Hicks efficient ex ante damage rules it is necessary to determine the affected population's subjective valuation of the additional risk of death that the tortfeasor imposed upon them.\textsuperscript{79} There are two methods for determining this value: the ex ante willingness-to-pay method and the ex ante compensation demand method.\textsuperscript{80} Of these two, only the ex ante compensation demand method can be used to compute Kaldor-Hicks efficient tort damages. It is the one that is consis-
tent with the premise underlying liability rules that the victim owned the entitlement that the defendant destroyed—\textsuperscript{81} in this case the entitlement to be free from a particular “unreasonable” risk of death.\textsuperscript{82}

B. The Positive and Normative Claims Considered

Under the ex ante compensation demand method, the total amount of damages a potential tortfeasor should expect to pay for engaging in a particular activity is the total amount that all affected individuals would demand as compensation for accepting a given additional risk of death.\textsuperscript{83} The amount of damages the tortfeasor should have to pay any particular victim, in the event of a suit, is the total ex ante compensation demand value of the risk divided by the expected number of tortious accident victims of the activity.\textsuperscript{84} This amount is not related to the victim's actual loss. In fact, since damages are based on the expected number of deaths, when actual deaths exceed expected deaths there will be some victims who do not recover at all under this rule.\textsuperscript{85}

\textsuperscript{81} The proof of this claim is identical to the one presented at text accompanying notes 57-63 supra (showing that compensation demand is the efficient valuation method in the tort damage context). It is interesting to note that the preferred ex ante method for cost-benefit analysis also is the ex ante compensation demand method. Mishan, supra note 33, at 693-94.

\textsuperscript{82} The entitlement at issue under the Kaldor-Hicks efficient ex ante damage rules is the entitlement to be free from particular levels or types of risks, whereas the entitlement at issue under efficient ex post damage rules is the entitlement to life. See text accompanying notes 33-39 supra.

The entitlement protected by the Kaldor-Hicks ex ante damage rules is more consistent with the entitlement actually protected under the tort law than is the entitlement protected by Pareto efficient ex post damage rules. Tort liability rules do not vest individuals with an absolute right to be free from all (uncompensated) risks of death. Rather, the tort law only gives individuals an entitlement to be free from unreasonable levels and types of risk. See Prosser & Keeton, supra note 9, §§ 31, 79.

\textsuperscript{83} See, e.g., Broome, supra note 45, at 92; Linnerooth, supra note 49, at 53; Mishan, supra note 33, at 694. The Kaldor-Hicks efficient ex post compensation demand method, like the Pareto efficient ex post compensation demand method, assumes a hypothetical market in the relevant entitlement—here, freedom from unreasonable risk of death. See note 44 supra for a criticism of this assumption.

\textsuperscript{84} To illustrate, consider a firm that operates a chemical plant in an area populated by 100,000 people. Assume that operation of this plant raises each resident's probability of dying by .003 percent. Assume further that each individual in the population would require $300 to accept this .003 percent increase in the probability that she will die. Given that there are 100,000 people in the community, the total amount the tortfeasor should expect to have to pay is $30 million (100,000 multiplied by $300). Should one of the residents be killed, the court in calculating recovery would have to apportion damages so that the firm's total expected damage payments are $30 million. The court can achieve this goal by dividing $30 million by the total number of expected tortious deaths—which in this example is three (.003 percent multiplied by 100,000). Consequently, under an ex ante compensation demand based tort damage rule, a victim (more precisely, the victim's estate or survivors) should collect $10 million if she is killed ($30 million divided by 3).

\textsuperscript{85} This result is entirely consistent with the Kaldor-Hicks criterion's conception of efficient deterrence. Once the tortfeasor has paid the total ex ante compensation demand amount, it
Since under Kaldor-Hicks ex ante damage rules, a tortfeasor's total expected damage payments must not exceed the affected population's valuation of the total additional risk of death imposed on them, it is clear that the current income-based tort damage rules governing wrongful death are not Kaldor-Hicks efficient. Given that the total amount of damages is finite,\(^8\) it would not be possible for a court to ensure that a tortfeasor pays the correct amount of total damages over time if it were required to apportion damages according to the generally unpredictable variable of the actual victims' expected net income.\(^7\) In fact, there may even be cases where a particular victim's net income will exceed the total ex ante compensation demand value of the risk—for example, if the risk is small and concentrated on a few people and the victim had a large salary. Consequently, the current damage rules for wrongful death are not Kaldor-Hicks efficient ex ante compensation demand damage rules; therefore, the positive claim that personal injury law is Kaldor-Hicks efficient is incorrect.

The issue remains whether a Kaldor-Hicks efficient tort damage rule can be devised. Since a tortfeasor's total expected damage payments under ex ante compensation demand rules generally will be finite, these rules are at least theoretically possible. The ex ante compensation demand value is finite because it is calculated based on the assumption that the compensation is hypothetically\(^8\) paid to individuals at the moment when the risk is imposed on them—when they are alive and are able to enjoy the money. Therefore, there is no reason to expect that the compensation required will be infinite.\(^9\) Moreover, where the additional

---

\(^8\) See text accompanying notes 88-90 infra.

\(^7\) The result that actual recovery should not vary with the victim's income or wealth holds even when the affected individual's ex ante compensation demand amounts vary with the wealth of the individual. This is because actual damages are based on the total ex ante compensation demand (which varies with the wealth of the population) divided by the expected number of deaths, and not simply on any particular victim's ex ante compensation demand value. The argument would not apply to those cases where the identity of all the victims of a particular activity are known at the time of the first victim's suit. However, providing special income-based damage rules to cover this special class of cases would complicate the damage laws unnecessarily.

\(^8\) Under this measure, the individuals are not in fact compensated for the risk imposed on them. The hypothetical payment is only an analytical tool for determining how much a particular tortfeasor's total damage payments should be. See note 74 and text accompanying notes 73-74 supra.

\(^9\) See Buchanan & Faith, supra note 54, at 245-46; Kornhauser, supra note 13, at 1032-33; Linnerooth, supra note 49, at 57-58; Mishan, supra note 33, at 693.

The ex post compensation demand, on the other hand, is infinite because the compensation is hypothetically paid after the victim has died, when money no longer has any value to her. See text accompanying notes 53-56 supra.
risk imposed is quite small, the total ex ante compensation demand amount that the tortfeasor should have to pay will be fairly low, even though the risk affects many people—and even though it may be almost certain that people will be killed.90

However, despite their theoretical possibility, these damage rules cannot be employed because of intractable calculation problems. In order to implement the ex ante Kaldor-Hicks compensation demand damage rule, a court would have to calculate: (1) the identity of each individual in the affected population; (2) the amount of additional risk that the tortfeasor placed on the affected population; and (3) each individual's ex ante compensation demand value of this additional risk. A court might be able to determine the first two items with an acceptable degree of accuracy. However, no court could even approximate each individual's ex ante compensation demand value. For example, a court could not obtain the total ex ante compensation demand value by assuming that individuals have identical utility functions, and then multiplying one individual's ex ante value of the risk91 by the total number of people affected. This is because individuals' preferences are nonlinear in risk;92 in other words, the higher an individual's initial probability of dying (base line risk) the more compensation she will require to accept a given increased risk of death.93 Therefore, individuals with identical utility functions will have different ex ante compensation demand values for the

90 To illustrate, consider the case of the firm whose activities will increase the probability of death of each member of a population of 100,000 by .003 percent, discussed in note 84 supra. There, it is expected (in the probabilistic sense of the word) that the firm's activities will result in the deaths of three people (100,000 multiplied by .003 percent). Although the ex post compensation demand value of each of these three lives is infinity, see text accompanying notes 53-56 supra, the ex ante compensation demand value of the total risk imposed on all 100,000 people affected is finite. This is because, assuming that none of the individuals would require an infinite amount of compensation for the additional risk (since the compensation will be paid to them during their lifetimes), the total ex ante compensation demand will be the sum of a finite number of individual's finite-valued ex ante compensation demands. See Kornhauser, supra note 13, at 1032-33; Mishan, supra note 33, at 692-95.

The use of relatively small finite ex ante values of life in cost-benefit analyses of government projects reveals one of the apparent anomalies of the valuation of life issue: society is willing to expend far greater resources to save the life of a known person in present peril than to save a statistical life. See Linnerooth, supra note 49, at 55 n.9; Fried, The Value of Life, 82 Harv. L. Rev. 1415, 1416 (1969); see also Greer, Value of One Life? From $8.37 to $10 Million, N.Y. Times, June 26, 1985, at A1, col. 2.

91 This, in and of itself, would be a difficult number to calculate with any acceptable degree of accuracy.

92 For a discussion of nonlinear preferences with respect to risk, see Linnerooth, supra note 49, at 55, 57-58.

93 Individuals' ex ante compensation demand values for a given additional risk will be identical only if their preference functions are identical, their base line risks are identical, and they are identically situated with respect to factors that affect their risk valuations, for example, wealth, and number of dependents.
same additional risk because they will have different base line risks, since, for example, their jobs are not equally risky or their driving habits are not identical.

Thus, in order to determine the total compensation demand value, the court must calculate the ex ante compensation demand of each individual in the affected population. The informational requirements associated with such an endeavor are so enormous that any attempt even to approximate the total ex ante compensation demand value of the risk is completely infeasible and meaningless. This difficulty is further compounded by the fact that individuals' utility functions differ and their valuation of the cost of a given additional risk of death will vary with the type of death at issue.\textsuperscript{94} Therefore, Kaldor-Hicks efficient ex ante damage rules are not feasible; the normative claim that accident law should be Kaldor-Hicks efficient becomes rather questionable.

It might appear that this last statement can be countered with the claim that although Kaldor-Hicks efficient damages for accidental death are impracticable, they are at least theoretically possible, and therefore society should attempt to implement them. However, this claim is incorrect. Courts would face such enormous difficulties in calculating the appropriate damage award under a purportedly Kaldor-Hicks efficient damage rule that the resulting damage award would not even approximate the Kaldor-Hicks efficient amount. In fact, it can be argued that courts' inaccurate calculations would come no closer to efficient recovery amounts than would legislation establishing a flat statutory recovery amount for wrongful death in the hope that the results would be efficient on average. This latter approach may even be preferable because potential victims and tortfeasors would face less uncertainty as to the size of damages than they would under a Kaldor-Hicks efficient damage rule. Where individuals are risk averse, this reduction in uncertainty would be, \textit{ceteris paribus}, an efficiency gain.\textsuperscript{95}

\textsuperscript{94} See Fried, supra note 90, at 1433-34.

\textsuperscript{95} See generally J. Henderson & R. Quandt, supra note 51, at 56-60 (demonstrating that risk averse individuals derive positive utility from a reduction in uncertainty and will expend resources, for example insurance premiums, towards this end).

A flat rate also would be preferable to the current wrongful death damage rules, because, unlike the current income-based rules, it would not provide incentives for potential tortfeasors to reduce their expected damage payments by imposing a higher risk of death on low-income people than on high-income people. See Abel, supra note 15, at 716-17. The claim that a flat rate would be preferable to the current rules is supported by the fact that these rules may be inefficient, as well as unjust. The current income-based rules certainly are not Pareto efficient since Pareto efficient recovery is the same for each individual—infinity. See text accompanying notes 64-65 supra. Nor are these incentives necessarily justifiable under the Kaldor-Hicks criterion, since it is unclear whether the total ex ante compensation demand value of a particular increase in the probability of death varies with the income level of the affected population. Cf. Schelling, supra note 71, at 149 (arguing that there is no reason to suppose that an individ-
CONCLUSION

The proponents of the positive and normative claims of the economic approach to law have produced a significant body of literature purporting to show that tort law is, or should be, efficient. This debate has proceeded, however, without analysis of whether tort damage rules are, or can be made, efficient. This Note has shown that in the area of accidental death, the current damage laws are not and cannot be made efficient. Thus, the positive claim that personal injury liability rules are efficient is invalid; the normative claim that they should be efficient is seriously undermined.

However, the conclusion that wrongful death rules cannot be efficient does not necessarily undermine other normative legal standards which, like efficiency, seek to ground liability and damage rules on individuals' preferences. Indeed, it may be possible to design preference-based damage rules which would serve two of the principle purposes of tort liability and damage rules: limiting the liability of those who harm others and compensating those who are harmed. Under a normative standard which seeks to ground legal rules on individuals' preferences, wrongful death damage rules should reflect individuals' preferences both as potential purchasers of others' lives and as potential sellers of their own lives.

The efficient prices discussed in this Note would not be the appropriate basis for wrongful death damage rules because they are based solely on individuals' preferences in their capacity as sellers of their lives; they ignore that individuals also have preferences over the price at which they will have to involuntarily purchase others' lives. In order to design rules that meet this normative standard, it is necessary to focus not on the question of what damage amount individuals would consider proper compensation for harm inflicted on them, but instead on what damage rule they would consent to, knowing that they may be both purchasers and sellers of lives. This approach is consistent with efficiency in that it seeks to base the outcome on individuals' preferences, but it is preferable to the efficiency approach because it captures the dual role of tort damage rules.

A thorough analysis of the contours of these optimal damage rules is...
not attempted here and is left for further study. However, it is instructive to note that under this hypothetical consent approach neither ex ante nor ex post compensation demand amounts would be chosen as a wrongful death damage rule. It is reasonable to conclude that rational individuals would not select ex ante damage rules because they would not consent to damage rules that courts could not implement and that would leave some victims’ survivors without any recovery. Ex post damage rules are not optimal because rational individuals would not consent to a rule that sets damages for each wrongful death at infinity. For although each individual would value her own life at infinity—and would set her sale price at this level were she acting as the sole seller in a hypothetical market—it is reasonable to conclude that individuals, when faced with the possibility of having to pay such an award, would not consent to infinite damage awards for each wrongful death. The practical effect of such a rule would be to threaten each individual with bankruptcy and thus eliminate most productive activity in society.

This discussion suggests that the conclusions of this Note have implications that extend beyond the analysis provided here of wrongful death damages and of the positive and normative efficiency claims as applied to personal injury law. This analysis raises the more general question of whether the efficiency goal of basing tort rules on individuals’ preferences is in fact served by efficient damage rules as these rules have been defined traditionally. Proponents of the normative efficiency claim, therefore, must not only prove that tort rules should be based on individuals’ subjective preferences but also that traditional notions of efficiency can be used fully to reflect these preferences.

Jennifer H. Arlen

98 See text accompanying notes 91-95.
99 See notes 83-85 and accompanying text supra.
100 See notes 66-68 and accompanying text supra.
101 See text accompanying notes 53-56 supra.
102 See text accompanying notes 66-68 supra. It also would be interesting to consider whether the current income-based damage rules are optimal under this standard or whether individuals would prefer a rule which, for example, sets a flat recovery amount for wrongful death. Although this question warrants further analysis, it is not addressed in this Note, because to do so would require an explicit model of individual choice.